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An Exploration of Nurses' Perceptions of the Usefulness and Easiness of Using EMRs

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ABSTRACT

EMRs play an essential role in documenting clinical information. Nurses are integral to the success of an EMR implementation, as they are the largest group of employees in a hospital and provide patient care. A major factor in the success of EMR implementation is nurses' acceptance of the system. This study is designed to measure nurses' willingness to use EMRs in clinical practice, determine factors influencing nurses' acceptance of EMR documentation in clinical practice, and gain an understanding of the nurses' perspective on EMRs to encourage the adoption and implementation of EMRs in other health facilities in Saudi Arabia. This study included nurses from Hail General Hospital, Maternity and Children Hospital, King Khalid Hospital, and Hail General Hospital. Study results indicate that perceived usefulness and ease of use are strongly correlated, resulting in nurses' greater acceptance of EMRs. According to the study results, nurses are willing to use EMRs. Our result shows that overall, nurses find the EMR useful in their jobs, with 40.9% agreeing and 24.4% strongly agreeing. Whereas the overall easiness was 9.4% agreed and 24 strongly agreed. Nurses need to be prepared for a demanding workplace through their nursing curriculum. Nursing students and professionals should understand the importance of EMRs in ensuring high-quality, effective, and efficient patient care. It is imperative that nurses continuously improve their computer skills to keep up with technological advancements.

Keywords
Acceptance
Clinical Documentation
EMR
HIT

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Introduction

Advocates of healthcare reform and governments have long advocated extensive use of health information technology (HIT) to improve patient safety, improve healthcare quality, and reduce costs, including electronic medical records (EMRs) and computerized physician order entry (CPOE) [1]. As well as solving access and quality of medical information, simplifying, securing medical routines, and overcoming distance and budget constraints, adopting information technology (IT) and domain-specific information systems (IS) has proven practical tools. In general, information technology (IT) is viewed as an effective tool for improving the efficiency and effectiveness of organizations. Although medical facilities have been slower to adopt IT than other industries, they are beginning to realize their benefits [2]. EMRs benefit healthcare managers in several ways, including reducing costs and enhancing quality [3]. EMR is a computer application used to convey orders for medical care, pertinent document information about a patient's medical history, and communicate diagnostic test results [4].

The adoption and use of IT in healthcare and technological advancements have been the subject of increasing research in past years [5]. Researchers have explored how the cognitive beliefs and effects of healthcare professionals (especially physicians) influence their acceptance of newly implemented information systems, including electronic medical records (EMRs) and electronic health records (EHRs)[6], [7]. Despite widespread encouragement and interest from governments and corporations, many hospitals and physicians still need to adopt electronic documentation [8], [9]. Among the healthcare workforce, nurses dominate most of the positions. In order to determine the effectiveness of technology, it is essential to understand how they perceive it. This study explores nurses' perceptions of EMR systems in Hail City. As part of this study, recommendations will be offered to improve EMR practice utilization. The main research questions are:

1. What are the nurses' perceptions of the usefulness of EMR systems?
2. What are the nurses' perceptions of the ease of use of EMR systems?

The perceptions will be determined using the technology acceptance model (TAM) based on the survey responses.

Literature Review

The risk of medical errors increases if medical records are lost and healthcare professionals fail to link present health problems with past medical histories in light of diagnoses, medications, and side effects, as well as surgical risks [10]. Electronic medical records (EMRs), medical informatics, and electronic health records (EHRs) are among the healthcare information technologies contributing to healthcare improvement by facilitating user interaction. In addition to simplifying the retrieval of patient information, these record systems minimize medical errors and support medical diction [11]. Despite their prevalence in hospitals across the globe, electronic medical records have yet to be adopted by health professionals due to several challenges [12]. Staff acceptance of EHRs has been questioned despite the considerable effort that went into their implementation [13].

The willingness of healthcare providers to use electronic systems is one of the significant factors contributing to the success of these systems [14]. It has long been the focus of research to understand and explain why users accept technology in this manner, and the findings of this study will be of assistance to both those who design and those who implement such systems [10], [15]–[17]. Since nurses are one of the major healthcare professionals interacting directly with electronic health records, it is imperative to determine whether nurses accept these systems. Nurses were observed and interviewed in multiple sites to examine how they use electronic health records (EHRs) daily [18].

It has been found that EHRs improve communication, improve medication safety, and facilitate the sharing of information. Many nursing institutions, including those in our research settings, require nurses to use EHRs as part of their daily routines [19]. Nurses would only accept EHRs if they considered them useful and easy to use, so they might have a negative view of the technology, preventing them from learning new functions or using it effectively [20]. Accordingly, it is crucial to investigate the acceptance of EHR in this environment of mandatory use. There have been several theories proposed regarding the acceptance of technology. This study is based on the technology acceptance model (TAM) (See Fig. 1).

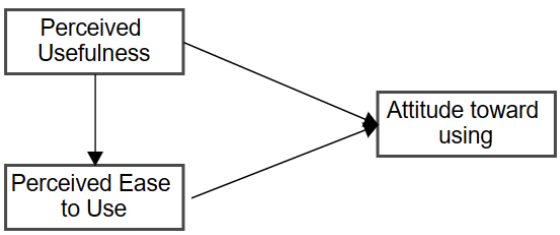


Fig. 1. TAM Model [10]

As part of our research, we used it to measure the acceptance of information systems and technology. Nurses' acceptance of EHRs has been examined using this model. Initially, it looked at why individuals may need to utilize IT more effectively [21]. In the present day, it is widely used in the healthcare industry and can be applied to many types of computer systems and populations [22]. An individual's willingness to accept technology is determined primarily by perceived usefulness (PU) and perceived ease of use (PEOU) based on the TAM theories [10]. Acceptance refers to a person's willingness to fulfill the requirements of a given task. PU is the belief that applying specific technology will improve job performance. PEOUs are individuals who believe that they will be able to use certain technology seamlessly and effortlessly. According to Davis, PU and PEOU influence the actual use of technology. According to a literature review, a limited number of papers have examined nurses' perceptions of EHR usefulness and ease of use [16]. Furthermore, some studies, like the current one, used TAMs as theoretical frameworks, whereas others conducted comprehensive validations and tests beyond the present investigation. According to the literature, there is a great deal of variation. Nurses' acceptance of computer-generated nursing care plans using an application that was not an electronic health record [23]. A different assessment tool has been found in the literature for nurses working in intensive care units [15]. Another study used an extended TAM version to evaluate physicians and nurses [24]. Many studies were found in the literature assessing and predicting different entities, and the investigations focused on the physician's acceptance in healthcare. Hence, the researcher believed that as nursing is the core of healthcare organizations, there is significance in investigating nurses' acceptance of the EMR. The current study can serve as a baseline reference for Saudi stakeholders in the health informatics field. TAM was used in this study to examine nurses' perceptions of the usefulness and ease of using EHRs.

Material And Methods

A. Study Area and Subjects

This study was conducted in four hospitals in Hail City, Saudi Arabia, in 2022. This study examined the use of HIS by nursing staff in four major hospitals in Saudi Arabia's Hail city. This study collected data from nurses at the following hospitals: Hail General Hospital, Maternity and Children Hospital, King Khalid Hospital, and Hail General Hospital. In this regard, the target population includes all nurses in the four hospitals listed above in Hail. Staff nurses are among the 1400-1200 users of HIS. The population is estimated to be between 1400- 1200 users. A sample size of 350 was used for the study [25].

B. Study Design

The data collection method for this study relies on distributed questionnaires, and it is a cross-sectional descriptive-analytic study. This questionnaire is based on a previous survey of Tubaishat [26]. The study was explicitly designed to examine the factors influencing nurses' acceptance of the EMR system, including perceived ease of use and usefulness.

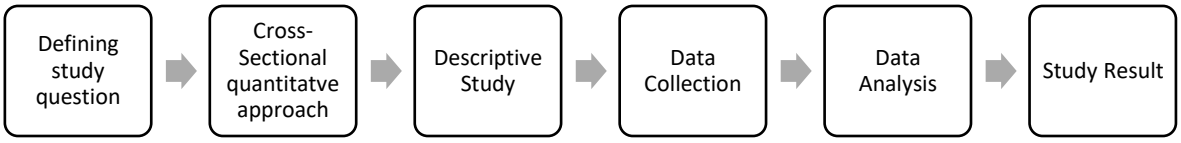


Fig. 2. Research Study Approach

C. Sample Size

Based on the total staff in these four hospitals, nurses are among the 1400-1200 users of HIS. The population is estimated to be between 1400- 1200 users. The adequate sample size consisted of 350 based on the Krejcie & Morgan study [25].

D. Data Collection, Instruments, and Measurements

According to the study's objectives and criteria, the questionnaire was selected. Using a study by Tubaishat as a guide, a questionnaire was developed to determine what factors influence nurses' acceptance of electronic medical records[26]. The questionnaire was based on two variables and composed of two sections. The researcher ensured the accuracy of the statements.

As shown in Table 1, our first section focused on nurses and their hospitals. For the second section of the study, 28 items are used to measure both PU and PEOU (14 items for each construct). Responses to the statements were recorded based on a 5-point Likert. The scale ranges from (1) strongly disagree to (5) strongly agree. The total score was calculated by adding up all items on each subscale. Accordingly, a mean score was calculated. As the mean score increased, positive outcomes for PU and PEOU increased. The reliability of the PU subscale was reported to be 0.97, and the PEOU was 0.91[21]. The Cronbach's alpha in the present study was 0.95 for PU and 0.89 for PEOU. Furthermore, we have chosen the 5-point Likert scale as the measurement scale for the model’s variables.

E. Statistical Analysis

SPSS version 17 was used to analyze the data. All negative items were reverse-coded on the questionnaire. Descriptive statistics were used to calculate all sample attributes and questionnaire items. Using Pearson's correlation coefficient, we examined whether the tool's usefulness and ease of use were related.

Results

A. The Descriptive Analysis of Participants' Demographic and Work Characteristics

Females constituted 52.57% of the sample, primarily aged 20 to 39 (168, 48%), and most held diplomas (188, 53.7%). Among the study participants, the majority had less than five years of nursing experience (n=172, 49%), and the majority (n=208, 59.5%) had worked in the hospital between one and five years. Based on our results, most respondents (n=224, 64%) possess average computer skills. Also, there is 10% claimed that they have low computer skills. However, Researchers found that computer knowledge and experience were not associated with perceived satisfaction with EMRs, implementation difficulties, training adequacy, or future use [27]. Moreover, an investigation revealed that nurses with formal education in medical informatics obtained significantly higher attitudes toward computer skills [28]. More Information can be found in Table 1.

Table 1. Participants' Demographic and Work Characteristics

Characteristics	Items	Freq. (N=350)	%
Gender (N=194)	Female	165	47.1
	Male	184	52.6
Age (years) (N = 350)	20-29	168	48.0
	30-39	104	29.7
	40-49	43	12.3
	50-59	34	9.7
Education level (N=350)	Diploma	188	53.7
	Bachelor	40	11.4
	Master/PhD	121	34.6
Years of experience in nursing practice (N=350)	Less than 5	172	49.1
	6-10	90	25.7
	11-15	34	9.7
	16-20	53	15.1
Years of experience at the studied hospital (N=350)	Less than 1	39	11.1
	1 - 5 years	208	59.4
	5 - 10 years	87	24.9
	More than 10	15	4.3
Duration of computer usage (years) (N=350)	Less than 1	36	10.3
	1-2	43	12.3
	3-4	54	15.4
	5-9	216	61.7
	More than 10	36	10.3
Level of computer skills	Low	36	10.3
	Average	224	64.0
	Excellent	89	25.4
Have you ever had formal computer training?	Yes	55	15.7
	No	294	84.0

B. Instruments Validity

A second table illustrates the twenty-eight items for Cronbach's alpha of perceived usefulness and ease.

Table 2. Cronbach's Alpha coefficient

Scale	Cronbach's alpha	Items
Perceived Usefulness	0.848	14
Perceived Easiness	0.867	14

C. Perceived Usefulness (PU) Of EMR

According to Table 2, Perceived Usefulness (PU) Items, 31%.1 indicated that their jobs would be more challenging without using an EMR, consistent with a study that demonstrated that doctors and nurses alike have difficulty reading handwritten notes. One respondent was concerned that incorrect handwriting interpretations might result in wrong medication administration [29]. Furthermore, only 10.2% strongly disagreed that EMRs enable them to coordinate and manage their work. Despite this, it was intended that medical and nursing staff could do their job more efficiently by using EMR[30]. Most of our respondents reported improved job performance due to using the EMR. Additionally, 41.1% of participants agreed that EMR addresses job-related needs, although 30.9% denied that it saves time. Previous studies noted a frequent negative perception was the time required to complete tasks when using technology [31]–[33]. EMRs have been found to improve the clinical aspects of their work in most cases. Even though EMRs allow more tasks to be accomplished, 10.0% strongly disagree that EMRs increase their ability to perform their functions. Neafunctions0% of respondents agreed, and 11.2% strongly agreed that they had noticed a reduction of time spent on unproductive activities when using an EMR. Nevertheless, it was commonly reported that excessive login times negatively affected usability [33].

As expected, research demonstrated that nurses perceived that they spent a substantial amount of time on paper records, which resulted in incomplete documentation [29]. According to participants, EMRs also increased job efficiency by 65%. On the other hand, 21% of respondents did not agree that EMRs improved the quality of their work. Nevertheless, an investigation found that nurses in an outpatient department of a tertiary hospital were satisfied with EMR based on their use, quality, and satisfaction. Positive correlations were also found among the service, quality, and satisfaction domains of EMR[34]. Also, computerization is viewed by nurses as a means of error reduction. Generally, nurses evaluated the impact of a clinical EMR system positively in terms of clinical care, the quality of services, and the quality of information[35]. Our result shows that 45% of respondents indicate that EMRs increased productivity. Moreover, 53% stated that they made their jobs easier. We found a relatively consistent result that shows that the ease of access and availability of an EMR have been identified as significant advantages or benefits by nearly 82% of physicians and 56% of nurses [36]. 64.4% of respondents agree and strongly agree with the usefulness of EMR systems in their jobs, while approximately 23% disagree or strongly disagree.

Table 3. Perceived Usefulness (PU) Items

Perceived Usefulness (PU) Items	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	M (SD)
1. My job would be challenging to perform without EMRs.	(22.2)	(29.3)	(17.4)	(22.5)	(8.6)	3.1 (1.28)
2. Using EMRs gives me greater control over my work.	(10.2)	(22.8)	(19.7)	(33.5)	(13.9)	3.2 (1.22)
3. Using EMRs improves my job performance.	(9.9)	(18.3)	(23.6)	(34.7)	(13.5)	3.2 (1.19)
4. The EMRs system addresses my job-related needs.	(6.5)	(14.3)	(16.9)	(41.1)	(21.2)	3.3 (1.14)
5. Using EMRs saves me time.	(11.4)	(19.5)	(21.3)	(32.6)	(15.2)	3.2 (1.24)
6. EMRs enable me to accomplish tasks more quickly.	(10.0)	(20.7)	(22.6)	(33.0)	(13.7)	3.2 (1.20)
7. EMRs support critical aspects of my job.	(7.8)	(17.7)	(25.1)	(38.5)	(10.9)	3.3 (1.11)
8. Using EMRs allows me to accomplish more work than possible.	(9.4)	(18.4)	(25.2)	(36.9)	(10.1)	3.2 (1.14)
9. Using EMRs reduces the time I spend on unproductive activities.	(10.2)	(15.9)	(23.0)	(39.7)	(11.2)	3.2 (1.18)
10. Using EMRs enhances my effectiveness on the job.	(6.5)	(14.5)	(18.4)	(40.2)	(20.4)	3.3 (1.16)
11. Using EMRs improves the quality of work I do.	(6.5)	(14.5)	(18.4)	(40.2)	(20.4)	3.2 (1.14)
12. Using EMRs increases my productivity	(9.0)	(18.4)	(26.8)	(35.2)	(10.5)	3.2 (1.13)
13. Using EMRs makes it easier to do my job.	(8.7)	(16.7)	(24.3)	(39.3)	(11.0)	3.3 (1.13)
14. Overall, I find the EMR useful in my job.	(9.7)	(12.6)	(12.4)	(40.9)	(24.4)	3.4 (1.17)
Perceived Ease-of-use (PEOU) Items				(0.93)		

D. Perceived Ease-of-use (PEOU)Of EMR

According to table 3 (Perceived Ease-of-use (PEOU) Items), 29.3% disagreed, and 22.2% strongly disagreed, indicating that It is common for them to be confused by EMRs. Some nurses perceived using computers for data entry and retrieval as quick and easy [29]. Only 2% of respondents strongly agree that they frequently need to improve when using EMRs. There was disagreement among 39% of respondents, and 17.6% strongly disagreed that EMRs are frustrating to use. Nevertheless, it is reported that 14% of physicians and 22% of nurses find system downtime frustrating, including times when the system crashes, locks up, or freezes[36]. Additionally, 27,4% of respondents said they needed to read manuals frequently when using EHRs. When asked if interacting with an EMR system requires substantial mental effort, 12.0% strongly disagreed where. In contrast, when the literature , multiple participants expressed concern regarding the time needed to open the application[36]. 6.9% strongly agreed, and 29.9% disagreed, while the exact percentage was found for those who agreed. 26.9% of participants believe that EMR systems are inflexible and insensitive in terms of their interaction capabilities, which is relatively in agreement with an investigation that shows that physicians and nurses (73% and 49%, respectively) emphasized the need for more training,

the need to fix bugs in the software, the improvement of speed and reliability, as well as the need to make the application easier to use [36].

Based on the results, 39.3% of users can utilize the EMR system in a manner that meets their needs. Also, The use of computers for data entry and retrieval was perceived by some nurses as a quick and easy process [29]. There is a strong disagreement among 10.6%, whereas there is a strong agreement among 5.5% about EMR acting unexpectedly. In half of the cases (50%), the EMR system was easy to navigate and interact with. In item 12, the user was asked whether it was easy to remember to perform a task while using an EMR. We agree with an investigation indicating that, according to most nurses, EMRs simplify nurses' tasks [37]. The analysis revealed that 6.8% strongly disagreed, and 15.8% disagreed with it. 38.4% agree, 9.3% strongly agree that the EMR provides reliable and practical guidance, and 24% are unsure. Overall, 39.4% of respondents agree, and 24% strongly agree that their EMR system is user-friendly.

Table 4. Perceived Ease-of-use (PEOU) Items

Perceivded Ease-of-use (PEOU) Items	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	M (SD)
1. I often need clarification when I use the EMR system.	(22.2)	(29.3)	(17.4)	(22.5)	(8.6)	3.1(1.28)
2. I make errors frequently when I use the EMR system.	(17.1)	(39.5)	(22.8)	(18.6)	(2.0)	3.3(1.12)
3. Interacting with the EMR system is often frustrating.	(17.6)	(39.0)	(18.7)	(18.1)	(6.6)	3.3(1.11)
4. I need to consult the user manual often when using EMRs.	(14.3)	(29.3)	(24.2)	(27.4)	(4.8)	3.2(1.14)
5. Interacting with the EMR system requires much mental effort.	(12.0)	(29.9)	(22.0)	(29.3)	(6.9)	3.1(1.16)
6. I find it easy to recover from errors encountered while using electronic medical records.	(10.0)	(20.7)	(22.6)	(33.0)	(13.7)	3.2(1.20)
7. The EMRs system is rigid and inflexible to interact with.	(10.3)	(27.7)	(26.8)	(27.1)	(8.1)	3.1(1.13)
8. I find it easy to get the EMR system to do what I want	(10.1)	(22.7)	(28.0)	(30.0)	(9.3)	3.01(1.14)
9. The EMRs system often behaves in unexpected ways.	(10.6)	(29.2)	(30.5)	(24.2)	(5.5)	3.2(1.10)
10. I need help using the EMR system.	(10.8)	(29.1)	(23.0)	(28.9)	(8.2)	3.1(1.16)
11. My interaction with the EMR system is easy to understand.	(7.9)	(21.4)	(21.9)	(39.2)	(9.5)	3.2(1.12)
12. I can easily remember how to perform tasks using EMRs.	(6.8)	(15.8)	(18.8)	(45.2)	(13.4)	3.3 (1.10)
13. The EMRs system provides helpful guidance in performing tasks.	(7.3)	(20.9)	(24.0)	(38.4)	(9.3)	3.2(1.10)
14. Overall, I find the EMR system easy to use.	(6.9)	(11.8)	(17.9)	(39.4)	(24.0)	3.4(1.15)
Perceived Ease-of-use (PEOU) Items			3.7(0.47)			

This section highlights the findings from a study on the perception of electronic medical records (EMRs) among healthcare professionals, including doctors and nurses. The results indicate that both doctors and nurses face difficulties in reading handwritten notes, leading to concerns about incorrect medication administration. Despite this, most respondents reported

improved job performance with the use of EMRs, with 41.1% agreeing that EMRs address job-related needs. However, 30.9% denied that EMRs save time, and 10.0% strongly disagreed that EMRs increase their ability to perform their functions. On the positive side, 65% of respondents reported improved job efficiency with the use of EMRs, and 45% reported increased productivity. The study also reveals that 29.3% of respondents disagreed that EMRs are easy to use, with 22.2% strongly disagreeing. However, some nurses found using computers for data entry and retrieval to be quick and easy. There was disagreement among 39% of respondents regarding the frustration level of using EMRs, and 14% of physicians and 22% of nurses found system downtime to be frustrating. Additionally, 27.4% of participants said they needed to read manuals frequently when using EHRs.

In terms of the user-friendliness of EMRs, 39.3% of users felt that the EMR system met their needs. Half of the respondents (50%) found the EMR system easy to navigate and interact with, and 39.4% agreed that their EMR system was user-friendly. The use of EMRs has both positive and negative perceptions among healthcare professionals. While it improves job efficiency and productivity, there are also concerns about ease of use and frustration levels with the system. Nevertheless, EMRs provide reliable and practical guidance and simplify the tasks of healthcare professionals, according to the study results.

Conclusion

Our investigation found that recent studies indicate Saudi populations are integrating technology into different aspects of their lives in ways that were not prevalent in the past. This study explored nurses' perception of EMRS in Hail City, Saudi Arabia, utilizing TAM**.** Our results confirm the validity of the TAM model in measuring nurses' acceptance and use of EMRs. Also, according to this study, perceived usefulness and ease of use are significant factors that affect nurses' acceptance of electronic health records (EMRs) use in hospitals. Researchers demonstrated that Barriers to technology implementation are usually caused by changes in nursing workflow and processes rather than the functionality of the technology itself. Also, it indicated that the most significant barrier to acceptance was a change in the workflow that hurt job efficiency. Healthcare professionals generally accept e-health applications based on a model that incorporates both the UTAUT and TAM. New methods should be designed to assess the nurses' opinions, and this matter should not be underestimated. Nursing serves as both a coordinator and a provider of patient care and health services, making them a vital component of the patient care chain. They frequently interact with EMR systems due to the nature of their work. To provide optimal patient care, nurses must feel confident about their computer skills and adequate training facilities.

Conflict of Interest

There is no conflict of interest.

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