

Nurse's Knowledge, Skills, and Attitude toward Electronic Health Records

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Abstract

Electronic health records (EHR) one from important trends in the health care sectors that leads to efficient healthcare information which stored electronically to support patients care, education and ongoing research. **Aims** 1. Determine nurses' knowledge, skills and attitude toward electronic health records 2. Compare between nurses' knowledge, skills and attitude toward electronic health records. **Setting:** Assiut University Hospitals mainly (Al-Rajhi Liver Hospital and Pediatric Hospital) **Subject:** nurses No. = 205 nurse. **Study Tools:** the pretest for attitudes toward computers in healthcare (P.A.T.C.H) assessment scale developed by¹ and modified by². **Results:** Al-Rajhi Liver Hospital nurses have higher mean score than nurse's works in Pediatric Hospital regarding knowledge, skills and attitude towards the use of electronic health records and the highest percentage, of nurses works at Al-Rajhi Liver Hospital had satisfactory knowledge level, adequate skills and positive attitudes (97.1%, 98.1%, 95.2%) respectively. **Conclusion:** nurses' have positive attitude towards use of electronic health records there are highly statistical significant difference between nurse's knowledge, skills, and attitude between Al-Rajhi Liver Hospital nurses and Pediatric Hospital nurses $P \leq 0.05$. **Recommendations:** further research studies should be done to explore the barriers of implementing EHR, and exploring the prevalence of EHR in nursing curriculum to provide more insight into this topic.

Key words: Nurses, Knowledge, Skill, Attitude, Electronic Health Records

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I. Introduction

In many hospitals around the world, the electronic health records are considered a significant improvement in health care sectors. Successful implementation of electronic health record promotes the work of nurses, saves their time and improves the quality of care given to patients. Furthermore, little is known about the implementation of electronic health record in developing countries³.

Nurses now that nursing profession whether licensed practical nurse or registered nurse must possess basic computer knowledge, skills and attitude regarding electronic health records because nurses are the basic stone in any health care agency they responsible for providing direct care for patients from admission to discharge they also participate in patients rehabilitation after discharge, responsible to formulate nursing care plan and nursing all the previous duties must be documented in ways that match or suitable with advances in technology and utilize of computer and another technological device so nursing knowledge must be assessed and enhanced through health authorities. The term knowledge refers to (what the information nurse have regarding electronic health record meanwhile skills refer to the ability of the nurses to use computer in documenting patient information. Whereas the term attitude refers to the professional feeling of the nurses towards the use of EHR².

Electronic health records (EHR) is an individual's digital records that can be accessed with other health care workers. It was mostly used for billing purposes⁴.³ added that (EHR) enable health care organizations to improve the availability, transmission, and storage of patient's information, increase collaboration, and integration between physicians and other health team also utilization of patient's data quickly and easily.

Electronic health records have many uses includes the following; improve quality, eliminate duplication, improve communication, security, increase productivity, reduce health disparities, involving patients and their families, minimize medical errors, enhancing treatment & coordination, and protecting the privacy and security of data about patients health^(5&6).⁷ added that data collected in the EHR can be used to promote healthy practices and communities, expose disease incidence, and provide evidence for policy change also EHR have many advantages for both patients and health personnel.

⁸ mentioned many advantages of EHR for patients describe them as follows; improved diagnosis and treatment, fewer errors, and faster care and decision making process. Meanwhile advantages of EHR for health

care personnel as follows; quickly transfer of patients' data between departments, enhanced patients workflow and increased productivity, reduction in errors within medical and nursing practice, decrease health care cost, and develop electronic documentation capabilities among health care team.

Despite the benefits of the EHR, nurses have been unwilling to accept the system. Because nurses not attend training on the information technology process and the lack of training has an effect on their behavior to accept or reject the system⁹. It has been proposed that simulation learning on an EHR system could help nurses feel less stressed and more comfortable with technology to prevent resistance and failure to adopt¹⁰.

Since documentation plays a major role in providing health care workers with evidences about what they given to their patients, its implementation will not be successful unless it is a combined with embracing the technology in nurses attitude³.

The main reason for failure to implement an EHR is that nurses simply refuse to use it. So they should be trained firstly and they should be informed before introducing an EHR system, also hospital and network managers must ensure that nurses are at the table from the start when addressing technology related to nursing. Therefore, nurses must be key decision-makers from the beginning, so participation in the process will increase the likelihood of full and timely technology adoption¹¹.

Significance of the study:

Today's many of infectious disease appear which may or may not transmit through paper work so National Institutes of Health¹², mentioned that coronavirus was stay on different surfaces and papers up to 24 hours. So all health care agencies in need to diminish the use of paper after corona virus and tend to use EHR. No studies were done about the three variables together nationally and internationally. So it gives the researcher the motives to study it.

Aims of the study:

- 1) Determine nurses' knowledge, skills and attitude toward electronic health records.
- 2) Compare between nurses' knowledge, skills and attitude toward electronic health records

Study Questions:

1. Does a nurse have knowledge, and skills regarding EHR?
2. What are nurses attitude toward implementation of EHR?

II. Subject and Method

Technical design:

a- Research design: Descriptive correlational study design was used in the present research.

b- Setting: The present study was conducted at Assiut University Hospitals mainly at (Al-Rajhi Liver Hospital and Pediatric Hospital)

c- Subject: Convenient sample of nurses were studied total number = 205 nurses classified as follows: 104 nurse works at Al-Rajhi Liver Hospital and 101 nurse works at Pediatric Hospital.

Tool of data collection: structured questionnaire sheet which consists of two parts. Part (1): personal data sheet that gather data about, age, gender, years of experience, education qualification, marital status and hospital name. Part (2): The pretest for attitudes toward computers in healthcare (P.A.T.C.H) assessment scale **which developed by**¹ and modified by². It consists of two sections. **Section I)** Nurses knowledge towards the use of electronic health record it consists of 18 statements the responses were measured on three point likert scale ranged from agree = 3, neutral = 2, disagree = 1 scoring interpretation will be vary according to 18 statements, total score equal 54 and divided into the following if nurse obtain from 18-27 it means the nurse had unsatisfactory knowledge level if nurse obtain from 28-54 it means the nurse had satisfactory knowledge level **II)** Nurses skills towards the use of electronic health record it consists of 11 statements the responses were measured on three point likert scale ranged from agree = 3, neutral = 2, disagree = 1 scoring interpretation will be vary according to 11 statements total score equal 33 and divided into the following if nurse obtain from 11-22 it means the nurse had inadequate skill level if nurse obtain from 22-33 it means the nurse had adequate skill level **III)** Nurses attitude towards the use of electronic health record it consisted of 21 statement the responses were measured on three point likert scale ranged from agree = 3, neutral = 2, disagree = 1 scoring interpretation will be vary according to 21 statements total score equal 63 and divided into the following if nurse obtain from 21-36 it means the nurse had negative attitude if nurse obtain from 37-60 it means the nurse had positive attitude.

Administrative Design: An official permission was obtained from the medical and nursing directors at (Al-Rajhi Liver Hospital and Pediatric Hospital), and all departmental heads in selected hospitals.

Operational Design: This design explains the steps of actual implementation of the study, including preparatory phase, the pilot study, and the field work.

Preparatory phase: This phase took about three months from July to September 2019 which included reviewing the available literature concerning the study topic, prepares, and translates the study tool.

Validity of the tool: The draft of the questionnaire was reviewed by face validity by taking experts opinion to assure accurate comprehension of the study tools through a jury which comprised from 5 experts (4 professors and assistant professor working at Nursing Administration Department and 2 professor from Community Health Department) Faculty of Nursing Assiut university. Also content validity was measured used confirmatory factor analysis test to assure (clearness, accountability, and importance) of all tool statements and its result more than one for all statements so all items were confirmed

Pilot study: was conducted to detect the obstacles and problems that may be encountered during data collection phase. Also it helps to estimate time needed to fill the questionnaire form. It was carried out on 10% of nurses (No. =21), the questionnaire took from 20 minutes to half an hour to be filled. The total period for collection of data in the pilot study takes about 5 days. The participants chosen for the pilot study were excluded from the total study sample

Reliability: was ensured by measuring internal consistency using Cronbach's Alpha Coefficients methods and its result revealed that all statements of study questionnaire α were ≥ 0.8 .

Fieldwork: After ensuring the clarity and understandability of the study tool the actual data collection was started in October and ended in December 2019. The researcher's met with all participated nurses to explain the purposes of the study, and then the researcher's distributed the questionnaire form. The tool of the study were completed and collected during morning shift.

Ethical considerations: The research proposal was approved by the ethical committee faculty of nursing at South Valley University, oral agreement was obtained from all participants after informing them about their rights to participate, refuse, or withdraw at any time. Total confidentiality of any obtained data was ensured.

Statistical design:

Data entry and statistical analysis were done using (SPSS V. 22) statistical software package for social science. Data were presented using descriptive statistics in the form of, frequency and percentages, arithmetic averages, mean and standard deviations. Test (t) for the two independent samples: (Independent Samples T-Test). This option is used to measure Significant Difference between the Mean of two independent samples. $P > 0.05$ (Not significance), $P \leq 0.05$ (Significance).

III. Results

Table (1): Distribution of Nurses Personal Data at Al – Rajhi & Pediatric Hospitals (No= 205 nurse).

Personal data	Assiut University Hospital (n= 205)	
	No.	%
Age :		
20 < 30 years	32	15.6
30 - < 40 years	137	66.8
40 -55	36	17.6
Range(20-52)	(Mean± SD 30.64±5.10)	
Gender:		
Male	18	8.8
Female	187	91.2
Years of experience:		
< 15 years	69	46.8
≥15 years	109	53.2
Range(5-22)	(Mean± SD 20.15±6.40)	
Qualification:		
Secondary technical nursing school diploma	162	97
Bachelor degree in nursing science	35	17.1
Master degree	8	3.9
Marital status:		
Single	10	4.9
Married	186	90.7
Divorced	5	2.4
widow	4	2
Hospital name :		
Pediatric Hospital	101	49.3
Al Rajhi Hospital	104	50.7

Table (2): Nurses Knowledge Regarding Electronic Health Record at Al – Rajhi & Pediatric Hospitals (No= 205).

Nurses Knowledge	Al - Rajhi Hospital no=104	Pediatric Hospital no=101
	Mean± SD	Mean± SD
1- Computers are a powerful enabling tool.	3.57±0.71	3.41±0.68
2- In healthcare, computers could save a lot of paperwork.	3.42±0.68	3.22±0.64
3- Computers can help me be creative thinker.	4.11±0.82	3.33±0.66
4- Computers are difficult to use.	3.58±0.71	3.11±0.62
5- Computer will someday put health professionals out of a job.	4.58±0.91	3.54±0.70
6- Computers can be tools to solve big problems.	4.71±0.94	4.1±0.8
7- Computers are too complicated for me to learn well.	4.12±0.82	3.89±0.77
8- I feel that the electronic health record course in nursing is absolutely unnecessary.	3.59±0.71	3.22±0.64
9- People who love computers are introverted and non-social	3.45±0.69	3.41±0.68
10- Learn more about computers than most faculty or administrators do.	3.66±0.7	3.21±0.64
11- Computer every where, it is normal to use in health care sectors.	3.63±0.72	3.54±0.70
12- Drawing an electronic health record graphic takes longer than paper.	3.45±0.69	3.11±0.62
13- Computers help me keep up with nursing, knowledge and research issues.	3.91±0.78	3.41±0.68
14- Technological device makes unable to care for my patients.	3.48±0.69	3.24±0.6
15- Patients should not look for data about health and disease online	3.56±0.71	3.42±0.68
16- Technological tools enrich professional between health team.	3.47±0.69	3.44±0.68
17- Electronic health records simplify access to information	3.89±0.77	3.11±0.62
18- Computers are great tools for patient education.	3.78±0.75	3.47±0.69
Total	4.77±0.75	3.39±0.68

Table (3): Nurses Skills regarding Electronic Health Record at Al – Rajhi & Pediatric Hospitals at Assiut University Hospitals (No= 205).

Nurses skills	Al - Rajhi Hospital	Pediatric Hospital
	Mean± SD	Mean± SD
1- I feel like a skilled writer.	4.44±0.88	3.55±0.71
2- I have excellent finger skill.	3.54±0.70	3.44±0.68
3- I use the computer regularly at home.	3.22±0.64	3.14±0.62
4- I am used to technology and machinery.	4.12±0.82	3.58±0.71
5- I am perfect in nursing computer.	3.98±0.79	3.54±0.70
6- I have creative in writing using a computer.	3.56±0.71	3.66±0.73
7- I easily master fill the form.	3.58±0.71	3.58±0.71
8- I usually search for information using internet.	4.25±0.85	3.69±0.73
9- Internet very interesting to communicate with colleagues (email, etc).	3.66±0.73	3.58±0.71
10- I am using my smartphone to reach to healthcare apps	3.99±0.79	3.62±0.72
11- The electronic diagrams determine how nurses provide patient care.	3.55±0.71	3.22±0.64
Total	4.88±0.76	3.50±0.70

Table (4):- Attitude of Nurses regarding Electronic Health Record at Al – Rajhi&PediatricHospitals at Assiut University Hospitals (No= 205).

Attitudes	Al - Rajhi Hospital	PediatricHospital
	Mean± SD	Mean± SD
1. I am skilled in using electronic health record user.	4.22±0.84	3.55±0.71
2. I am enjoying when learning how to use electronic health record program.	3.44±0.68	3.44±0.68
3. I manage effectively my work when with computer	3.98±0.79	3.11±0.62
4. Computers increase nurse work load	4.44±0.88	3.44±0.68
5. computers is the future and today best choice	4.22±0.84	3.41±0.68
6. Nurses have role in planning of EHR	4.55±0.91	3.55±0.71
7. I am interesting in work with machine.	1.49±0.29	2.44±0.48
8. I am confident when using a computer.	2.45±0.49	3.12±0.62
9. I feel comfortable using my computer	2.11±0.42	3.2±0.64
10. Computers may facilitate patients care.	2.12±0.62	2.74±0.74
11. Listening to people using electronic health record language enjoyable for me	2.44±0.48	2.47±0.49
12. I am happy when using a computer.	2.11±0.42	2.4±0.48
13. Computers are for personal use.	4.2±0.84	3.42±0.68
14. Online work safe my time.	3.22±0.64	3.11±0.62
15. I intend to own a home computer.	1.2±0.24	1.6±0.32
16. Computers make work interesting.	1.5±0.3	1.9±0.38
17. I feel satisfied when dealing with computers and technology.	2.1±0.42	3.22±0.64
18. Computers make me close to my patients.	1.11±0.22	1.56±0.31
19. Computer makes us enjoying nursing practice.	1.44±0.28	1.75±0.35
20. Using computers is time saving with value for patients.	2.58±0.51	2.54±0.50
21. Paper documentation more complete than computer form.	2.11±0.42	2.69±0.53
Total	2.41±0.48	1.89±0.38

Table (5): Distribution of Nurses Knowledge, Skills and attitude regarding Electronic Health Record at Al – Rajhi& Pediatric hospitals at Assiut University Hospitals (No= 205).

Variables	Al-Rajhi liver Hospital No.=104		Pediatric Hospital No.=101		P. Value
	No	%	No	%	
Knowledge					
Satisfactory	101	97.1	70	69.3	0.000
Unsatisfactory	3	2.9	31	30.6	
Mean± SD	8.22±49.97		5.98±30.57		
Skills					
Adequate	102	98.1	55	54.5	0.000
Inadequate	2	1.9	46	45.5	
Mean± SD	7.89±42.94		6.24±38.23		
Attitude					
Positive attitude	99	95.2	74	73.3	0.000
Negative attitudes	6	5.8	27	26.7	
Mean± SD	9.45±33.38		7.9±29.32		

Table (6):- Comparison between nurses knowledge, skills and attitudes towards the use of electronic health record at Al – Rajhi& Pediatric hospitals at Assiut University Hospitals (No= 205).

Variables	Al - Rajhi Hospital	Pediatric Hospital	Independent Samples Test	
	Mean±SD	Mean±SD	T	P-Value
Nursing knowledge towards the use of computers in health care	3.99±0.75	3.41±0.68	4.98	0.000
Nursing skills towards using computers in health care	3.80±0.76	3.40±0.72	5.74	0.000
attitudes of nursing towards the use of computers in health care	4.17±0.79	3.42±0.68	4.11	0.001

*the mean significant difference at 0.01

Table (1): illustrated that the majority of nurses were female, married and have secondary technical nursing school diploma (91.2%, 90.7% & 97 %) respectively. More than half of nurses aged from 30 - < 40 years old, with years of experience equal 15 years and more, works at Al Rajihi Liver Hospital (66.8%, 53.2% & 50.7%) respectively

Table (2): Depicts that nurse's works at Al Rajihi Liver Hospital have higher mean score than nurse's works at Pediatric Hospital as regard all knowledge items. Also total mean score of nurses knowledge who works at Al Rajih Liver Hospital more than total mean score of nurses knowledge who works at Pediatric Hospital (4.77±0.75 & 3.39±0.68) respectively

Table (3): depicts that Al Rajih Liver Hospital nurses higher mean score than Pediatric Hospital nurses regarding all skill items. Also total mean of nurses skills who works at Al-Rajhi Liver Hospital more than total mean score of nurses skills who works at Pediatric Hospital (4.88±0.75 and 3.50±0.70) respectively

Table (4): -Revealed that nurses works at Al-Rajhi Liver Hospital have higher mean score than nurses works at Pediatric Hospital as regard all items of attitude toward use of electronic health record also total mean score of nurses attitude toward use of electronic health record who works at Al-Rajhi Liver Hospital more than total mean score of nurses attitude who works at Pediatric Hospital (2.41±0.48 and 1.08±0.38) respectively

Table (5): -This table illustrates that Al-Rajhi Liver Hospital nurses had higher mean score than Pediatric Hospital nurses as regarding knowledge, skills and attitude with statistical significant difference $P \leq 0.05$ also the majority of Al-Rajhi Liver Hospital nurses had satisfactory knowledge, adequate skill level, and positive attitude regarding electronic health record (97.1%, 98.1%, and 95.2%) respectively

Table (6): -Revealed that there were a highly statistical significant difference regarding nurses knowledge, skills and attitudes towards the use of electronic health record between Al – Rajhi Liver Hospital nurses and Pediatric Hospital nurses (P-Value ≤ 0.000 .)

IV. Discussion

People generally have difficulty adjusting to change particularly when technology is involved. Although people live in a world essentially run by computers and advanced technologies, there are many people who don't know how to use a computer. Until now a nurse must be trained to use a system and be confident with EHR to be successful in having this transition. The transition from paper to electronic records can enhance patient care as well as nursing satisfaction¹³.

Electronic health record and information technology has been rapidly included in different health care sectors especially in developed countries where the infrastructure of network system is renewed regularly, but in many developing countries approximately 45% of nurses and medical teams lack of adequate training in computer skills which consider a big hinder for nurses to adopt with EHR as many nurses in the current work force have no background with computer and information technology¹⁴.

The aim of this study was to determine nurses' knowledge, skills and attitude toward electronic health records and compare between nurses' knowledge, skills and attitude toward electronic health records at Al-Rajhi liver hospital and Pediatric Hospital. The present study results revealed that the majority of nurses were female 91.2%, more than half of them aged from 30 - < 40 years old and 50.7% works at Al Rajihi Liver Hospital

From the study result it's depicted that nurse's works at Al Rajihi Liver Hospital have higher mean score than nurse's work at Pediatric Hospital as regard all knowledge items this is because Al Rajihi Liver Hospital works with health information system and nurses and medical team. This result goes with the same line with study done by (15&2) as they found that nurses and medical team who works in hospital which already have network system and computer were available they have higher knowledge level than nurses have not the same chance. Meanwhile study done by ¹⁶ contradictory with the present study finding as they found that nurse's works in developing countries have not any knowledge regarding EHR.

The current study illustrated that nurse's works at Al Rajihi Liver Hospital achieve higher mean score than nurses work at Pediatric Hospital as regard skills items. This is because nurse's works at Al Rajihi Liver Hospital already use computer in documenting patient data from about four years ago but nurses works at Pediatric Hospital can't use computer as they have not any training about it. The present study agree with study done by ^{16&1} as they found that nurses and medical team who had computer in their home achieve higher skill level than nurses who have not. Meanwhile study done by ¹⁷ disagree with the present study finding as the result of survey done in developing countries explore that nurses have lack in basic computer skills and EHR.

The study of the present study depict that nurses works at Al Rajihi Liver Hospital have higher mean score than nurse's work at Pediatric Hospital as regard all attitude items this result due to Al Rajihi Liver Hospital nurses documenting patient care and patient data, electronically from many years after receiving basic information and training about using it but nurses works at Pediatric Hospital not activate the electronic documentation system but many of them searching for learning it. From the finding of the present study it's clear that the majority of nurse's works at Al Rajihi Liver Hospital had satisfactory knowledge level, adequate skills, and positive attitude. This is because they have a good chance for learning and developing their ability in nursing information technology and EHR through training and practice. The present study congruent with study done by¹⁸ as they found that nurses have positive attitude toward EHR.

The present study in consistent with studies done by¹⁹ as he found that nurses have negative attitude toward EHR because of computer literacy and system down time, also¹⁷ found that nurses have inadequate skills and negative attitude toward EHR also²⁰ goes with the opposite line with study finding as he found that registered nurse have dis satisfactory level of knowledge regarding EHR also the skills were low in using computers so their attitude were negative.

V. Conclusion

The result of the present study concluded that

- Nurses work at Al- Rajhi liver Hospital have higher mean score than nurses workes at Pediatric Hospital as regard all knowledge, skills and attitudes in using electronic health record.
- Highest percentage, of nurse's works at Al-Rajhi Liver Hospital had satisfactory knowledge level, adequate skills and positive attitudes (97.1%, 98.1%, and 95.2%).
- There are highly statistical significant difference between nurse's knowledge, skills, and attitude between Al-Rajhi Liver Hospital nurses and Pediatric Hospital nurses $P \leq 0.05$

VI. Recommendations

In the light of the study finding the following recommendations should be drawn.

- Exploring the prevalence of EHR education in nursing curriculum would offer more insight on this topic.
- Research report should be sent to Al-Rajhi Liver Hospital and Pediatric Hospital,
- In service education program about the use of EHR should be done
- Further research studies examine the effect of EHR on productivity, patient outcome, patient and employee satisfaction also explore barriers of implementing HER

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