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Original Research

Barriers for Using Electronic Health Records (EHRs) by Nurses in Qatar: A Cross Sectional Study

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Abstract

Introduction: Electronic Health Records (EHR) have been implemented by multiple hospitals all around the world. EHR initiatives tend to be driven by the promise of availability of patient data and enhanced system integration by the need to improve efficiency and cost-effectiveness and by a changing doctor-patient relationship towards where care is divided among a multidisciplinary members of health care professionals and/or by the need to deal with a more complex and rapidly changing environment. The aim of this research is to determine the barriers faced by nurses in Qatar in using EHRs in terms of knowledge, skills, and attitude (KSA).

Methods: A survey was sent to approximately 12,000 nurses from different hospitals under Hamad Medical Corporation in Qatar through the corporation's official e-mail from January 1, 2021 to May 31, 2021. The questionnaire was developed and validated by the researcher of the study (α=0.877). The Statistical Package for the Social Sciences (SPSS) version 25.0 was used to analyze the data.

Results: A total of 262 nurses participated in the study. Majority of the nurses who participated are females (69%) and ages 31-35 years old (50.4%). Among the respondents 98.5% are staff nurses with various educational levels: bachelor's degree in Nursing (43.5 %), diploma in Nursing (27%), and Master of Arts in nursing (3.8%). Only 23.3% of the respondents have a length of service of less than 4 years; 76.7% have been with their institution more than 4 years. The majority of respondents came from the inpatient areas (37%), followed by the outpatient nurses (15.3%), and operating room nurses (14.1%). Around 91% of the respondents claimed to have a 0-3 number of trainings in the past 3 years. A significant correlation was found between age (r=-0.124, p=0.045), length of service (r=0.193, p=0.002), and area assignment (r=0.129, p=0.037) with the skill on EHR.

Conclusion: Results of the study showed that the dimension of knowledge, skills, and attitude towards the use of EHR is a barrier, but only to a moderate extent. The nurses in Qatar are highly educated, well experienced and are mostly millennials. This opens a great opportunity of

acceptance and amplification of EHR in Qatar with the proper training and support to nurses.

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Impact statement

Nursing education and nursing informatic programs should include not only clinical but also technical trainings to provide future nurses with the knowledge, skills, and attitude necessary to use the EHR system effectively. Increase the number of continuous training programs in the usage of EHR which aims not only to maximize the capacity and proficient use of all EHR in the clinical systems of the nurses, improves the efficiency of work and documentation process as the ultimate result, but also to keep pace with the ever-changing technology. Encourage compliance in all areas of assignment among nurses in the use of EHR to recognize more the importance and the benefits of EHR as a tool for documentation. Continuous supportive learning environment from healthcare facility administrators to understand nurses' attitude toward the use of health information technology, help drive acceptance and maximize awareness to improve high-quality patient care. Further studies be conducted to explore barriers in using EHRs in different localities and groups of nurse-participants.

INTRODUCTION

The advent of computers and technological advancements has brought about many changes in all facets of the nursing practice. Incorporating technology is a breakthrough to meet the ever-increasing demands for better and efficient services, even in healthcare. The Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH) supported the use of electronic health records (EHR) in improving the care delivery system [1]. The ability to improve patient care outcomes, health care providers' performance, and reimbursement activities have been the central values for using EHR systems. Incorporating evidence-based practice tools into the informatics system may encourage decision-making at the level of care and improve the quality of care [2]. EHR systems have been implemented in health care settings for several years and have been increasing in usage worldwide. In the US, the adoption of EHRs among non-federal acute care hospitals reached to 83.8% in 2015; Japan's usage of EHRs reached to 34.2% in 2014 in comparison to South Korea which has a 58.1% adoption in 2015; Norway, Sweden, UK, Netherlands, and New Zealand reported that physician's adoption of EHRs reached to 99% since 2015 [3]. In the middle east region, despite the years of delay in the use of EHRs, the adoption of the information system in healthcare had been significant [4].

In Qatar, a progressive country in the middle east, massive development in medical infrastructures have undergone and several healthcare systems from other countries were imported [5]. In 2010, the World Health Organization (WHO) ranked Qatar at the top of the per capita health expenditure list among the Gulf Cooperative Council. The national development strategy of the Ministry of Public Health in Qatar 2018-2022 encompasses an integrated system of healthcare and skilled workforce [6]. This means a continuous adoption and improvement of information systems, like EHRs, and training and recruitment of healthcare professionals. In a paper presented to the World Innovation Summit for Health (2020), nurses and midwives recruited from third world countries represents the largest professional workforce in the Qatar healthcare system, thereby making them the largest users of EHRs [7]. This proposes a huge challenge for these nurses to adjust to Qatar's advance healthcare information system especially in the use of EHRs.

There are different barriers towards the use of EHRs and overcoming these barriers is not easy [8]. Encouraging the entire healthcare team on board and finding the time and resources to make the change is a significant undertaking [9]. The nurses' current practice status needs to be analyzed in terms of knowledge, skills, and attitude. If the current workflow is well mapped out, the trend should continue. It is essential to understand the barriers faced by nurses in using EHR and creating action plans to enhance nurses' activities and routines towards EHR usage. Globally, different studies have examined barriers faced by nurses in using electronic health records. As of the researcher's knowledge there have been few studies linking nurses and the use of EHRs in Qatar. However, none tried to discover the

relationships with the nurse's characteristics and their knowledge, skills, and attitude towards EHR.

For this reason, the researcher is motivated to explore this topic and believes that it is very timely and necessary to look into and investigate the barriers faced by nurses in the use of EHR. The results of this study are very beneficial in giving substantial evidence that will support the formulation of an action plan which nursing leaders and health care providers can use to ensure a more efficient, productive, and sustained development to this area of nursing practice throughout the health care organization.

Specifically, the researcher sought to answer the following questions:

1. To what extent do nurses perceive the barriers in the utilization of electronic health records when it comes to their knowledge, skills, and attitude**?**
2. Is there any relationship between the profile variables and the barriers faced by the nurses in using EHR in terms of knowledge, skills, and attitude among the participants?
3. Is there any significant difference on the responses of the participants related to the barriers faced by the nurses when grouped according to areas of assignments?
4. Based on the findings of the study, what action plans can be proposed?

Hypothesis

To answer the questions set forth in this study, the following null hypotheses were tested at 0.05 level of significance:

1. There is no significant relationship between profile variables and the barriers in using EHR in terms of knowledge, skills, and attitude among the participants.
2. There is no significant difference on the responses of the participants related to the barriers when grouped according to areas of assignments.

METHODS

Design

The study utilized a quantitative descriptive and correlational method of investigation to achieve the results that the researcher required. The quantitative descriptive correlational describes the variables and the relationship that occurs naturally and between and among them.

Survey

The study utilized online survey questionnaires from January 1, 2021 to May 31, 2021 which was developed by the researchers of the study. The questionnaire was composed of two parts. Part 1 consisted of questions regarding the demographic profile of the participants (e.g. age, gender, nationality, current position, educational attainment, area of assignment, length of service, training, and seminars attended for the past 3 years). Frequency distribution and percentages were used in the presentation of the participant's demographic profile.

Part 2 focused on the barriers faced by nurses in using EHR pertaining to the knowledge, skills, and attitude of nurses. To analyze the barriers faced by the nurses in using EHR in terms of knowledge, skills and

attitude, weighted mean was used in a 4-point Likert's scale.

The survey tool has 23 questions in total: Part 1 has 8 questions; part 2 has 15 questions (5 each for knowledge, skills, and attitude). The questionnaire was derived from a series of literature reviews, experiences, observations and other references made by the researcher. The instrument underwent validation by the panel of experts from the nursing education department, nursing and midwifery research department, medical research committee, and psychometrician. Suggestions, comments, and recommendations were taken into consideration to ensure that the questions were clear and relevant to the clinical situations of the participants. When the subjects decided to participate, they answered the survey questionnaire and submitted it on the same day upon their approval. The modified questionnaire was then pilot tested to 10 staff, which were not included in the study's final analysis. The questionnaire used Cronbach's alpha measure of internal reliability (α=0.877).

The study was conducted in Hamad Medical Corporation (HMC), the largest healthcare provider in Qatar. The invitation to participate was sent to all nurses via HMC official corporate e-mail, along with a cover letter explaining the study's purpose and expectations. A letter from the principal investigator in collaboration with the Medical Research Center was attached to the e-mail inviting the participants to be involved in the study. The participants can thereby choose to participate or not after the notification and can decide to be involved during the given span of the study and after the notifications were given to them. Answering the questions serves as their consent to participate in the study. The identities of the participants were kept confidential and anonymous. After data collection, the data was coded and double-checked by the principal investigator; The data was stored in a protected computer following HMC's policies and guidelines.

The sample size was calculated based on the number of nurses working in HMC (around 12,000) and with a CI of 95% (5% margin of error and 50% the response distribution) the estimated sample size is 373 and increased it to 500 to overcome any incomplete surveys. The subjects were the willing staff nurses throughout the corporation who finished a one-year term based on the inclusion and exclusion criteria. The inclusion criteria of the study were: (1) staff nurses across HMC who have at least one year of experience in the corporation; (2) staff nurses using HMC's EHR system; and (3) staff nurses who are willing to participate in the study.

Data was collected by the Principal Investigator (PI) and Co-investigator and was coded and double-checked by the NMRD. Data was stored in Microsoft OneDrive, a hard drive and a USB drive protected by a password that only the PI has knowledge of. After completing the study, the link between code and identifier will be destroyed and data will be kept for a minimum of 5 years. The PI and the Co-investigators have access to the study data. All data can only be accessed with the permission of the PI, in his office at Hazm Mebaireek General Hospital, Department of Perioperative.

Statistical Analysis

The null hypothesis was then tested at a 0.05 level of significance; frequency distribution and percentages were used to present the participant's demographic profile.

To analyse the barriers (knowledge, skills, and attitude), the weighted mean was used in a 3-point Likert scale. Furthermore, to determine the relationship between profile variables and the barriers faced by the nurses in using EHR, the Pearson r coding for nominal variables was used.

Finally, to determine the significant difference on the responses of the participants related to the barriers faced by the nurses when grouped according to areas of assignments, ANOVA was used. Based on the data analysis, interpretation or inferences were carried out to draw intangible conclusions and recommendations. The Statistical Package for the Social Sciences (SPSS) version 25.0 was used to analyze the data.

Ethical Considerations

This research project has been reviewed and approved by the IRB at the Medical Research Center (MRC) in Hamad Medical Corporation (MRC-01-20-1172), and the study has been conducted in full conformance with principles of the "Declaration of Helsinki" for Good Clinical Practice (GCP).

RESULTS

Table 1 shows the distribution of survey participants by profile: age, gender, position, nationality, educational attainment, length of service, area of assignment, and number of training and seminars attended.

As shown in table 1, most of the participants are aged between 31 and 35 years, composing about half of the total participants (50.4%), followed by 36-40 years group, contributing to also a fifth (19.1%) of the total participants. Those above 50 years comprises the lowest in the group (6.5%). Majority (68%) of the nurses employed in the subject hospital are females while (32%) belong to the male category. Almost half of the participants are Filipinos (48%), and a little bit more than a third (36%) are Indians and the rest of the nurses are from Arab countries. In terms of length of service, about a third (34.7%) of the total participants have been in the organization and are practicing nurses for 10 years or more, while the rest of the groups, are almost equally distributed, 1-3 years' experience (23.3%), 4-6 years (21.0%) and 7-9 years (21.0%). The data also showed that 43.5% (n=177) of the study participants hold a bachelor's degree, 26.7% (n=70) have diploma in nursing, and 3.8% (n=10) obtained a master's degree. On the other hand,1.9% (n=5) earned units in a master's degree. Staff nurses comprises 98.5% of the group, against charge nurses =1.50% of the healthcare workforce. Majority of the participants are assigned in the Inpatient units comprising 37% followed by 15.3 % on the Outpatient Department, 14.1% in the Operating Room, 11.5% in the Critical area and the rest are assigned in different units of the hospital. Majority of the participants (90.5%) claimed to have 0-3 number of trainings, about 8.5% have 4-5 trainings attended while 1.1% or

only 3 participants had 6-10 EHR trainings attended in the past 3 years.

Table 2 presents the summary of the mean score on the barriers faced by nurses measured along knowledge on EHR. Based on the table, the overall mean that was obtained from the responses of the participants was 2.41 which suggest that knowledge is a barrier to a MODERATE extent.

Among the items under the barriers faced by nurses measured along knowledge on EHR items number 2, 3 and 5 which states" Lack of confidence in the use of EHR to reduce the incidence of medical errors by improving accuracy (2.52)" Unable to access evidence-based tools that can be used by providers to make decisions about patient care (2.56) " and failure to update one's professional knowledge to keep pace with the current EHR based standard to increase the confidence level (2.56) obtained the highest mean scores. The results suggest that majority of the participants still lacks the competency and confidence in the use of EHR. This can be attributed to the limited no of training programs attended. Majority of the participants (90.5%) have 0-3 number of trainings, about 8.5% have 4-5 trainings attended while 1.1% or only 3 participants had 6-10 EHR trainings attended in the past 3 years.

Table 3 shows the distribution of responses pf participants on how they perceive their skills on using EHR.

Among the variables under the barriers faced by nurses measured along skills on EHR, item number 2, which states" Facilitating structured communication between nurses and members of the health team" obtained the highest rating with a mean score of 2.63. The data suggest that skills in that aspect is a barrier to a HIGH extent.

Among the variables under the barriers faced by nurses measured along skills on EHR, item number 2, which states" Facilitating structured communication between nurses and members of the health team" obtained the highest rating with a mean score of 2.63. The data suggest that skills in that aspect is a barrier to a HIGH extent.

On the other hand, retrieving diagnostic records (mean-2.29); documenting abnormalities and updating patient's clinical data in the system (mean -2.29) Updating patient's clinical data in the EHR system (2.29), obtained the lowest rating with a mean score of 2.29 are also perceived barriers, but only to a MODERATE extent.

Table 4 presents the summary of the mean score on the barriers faced by nurses measured along attitudes on EHR. Based on the table, the overall mean that was obtained from the responses of the participants was 2.06 which suggest that the participants agreed that attitude is a barrier to a MODERATE extent. Among the variables under the barriers faced by nurses measured along attitude on EHR, item number 2 "Computer consumes more time than paper-based system" and item no. 5 which states" Computers take me away from my patient" obtained the highest rating with both mean scores of 2.54 which suggest that majority of the participants perceived attitude as a barrier to a higher extent.

On the other note, "in the healthcare, use of computer delay my work" (mean=1.34); and handwritten documentation is much

more complete than electronic documentation (mean=1.39) are the behaviors NOT perceived by the participants as barriers.

Pearson product-moment correlation was run to determine the relationship between knowledge on the use of EHR and the characteristics of the participants (Table 5). The absolute magnitudes of the observed correlations between profile and knowledge of participants are either weak or negligible. The results show that there are no significant correlations between the knowledge and nurses' age (r=-0.087, p-value=0.160), gender (r=-.109., p-value=m.079) nationality (r=0.003, p-value=0.966), educational attainment (r=,061, p-value=.327), length of service (r=-0.110, p-value=0.075), and number of trainings (r=0.095, p-value=0.124).

The results imply that the knowledge of nurses in using EHR is not in any way associated with age, gender, current position, nationality, length of service and the number of trainings. The low level of association with the participants' profiles also indicates that there is no pattern observed in the knowledge of participants in using regardless of demographic background and experience.

The Table 6 shows the result of Pearson's product-moment correlation test to confirm whether there is a significant relationship between the skills of nurses and the independent variables. The absolute magnitudes of the observed correlations between profile and skills of participants are notably weak or negligible. The result highlights the significant correlation between age and skills (r=-0.124, p-value=0.045), length of service and skills (r-.193, p value=.002) and between area of assignment and skills (r =.129, p-value =.037)

Results of the current study indicate that age and level of clinical experience may influence the ability of a new/novice nurse to become comfortable using the EHR. Non-traditional nursing students are common, and student comfort with e-mail, Internet, word processing, keyboarding, and search engines should not be assumed.

Area of assignment is found also to have significant relationship to the skills of nurses with a p value of 0.37. It was observed that with implementation of Cerner workflows in the critical areas, it helps provide nursing staff with quick access to the skills and procedures they need to perform confidently. Clinical skills combine competency management features to create powerful resource for nurses and other clinicians.

Table 7 reflects the Pearson product-moment correlation between nurses' characteristics and their attitude towards the use of EHR. The absolute magnitudes of the observed correlations between profile and attitude of participants are all negligible. The results show that there is no significant correlations between the attitude and participants profile in terms of age (r=-0.047), gender (r=0.044), nationality (r=0.069), educational attainment (r=-0.081), length of service (r=-0.034), area of assignment (r=0.02) and number of trainings (r=-0.063).

Table 8 presents the differences in the responses of the participants related to the knowledge of nurses when grouped according to areas of assignment. Analysis of Variance was used to determine whether there is any significant difference on the responses of the

participants related to the knowledge the nurses when grouped according to areas of assignments. The results reflect that there is no significant difference in responses of participants when grouped according to their area of assignment. The respondents' knowledge on EHR do not differ across groups (F= 0.819, p-value = 0.096).

Analysis of Variance was used to determine whether there is any significant difference on the responses of the participants related to the knowledge the nurses when grouped according to areas of assignments (Table 9). The results reflect that there is no significant difference in responses of participants when grouped according to their area of assignment. Similar observation is reflected on participants skills when grouped according to their area of assignment (F=2.035, p-value=0.062).

Table 10 shows that participants' attitude towards EHR are similar to each and reflects that there is no significant difference between groups regardless of their area of assignment (F=2.019, p-value = 0.064). The table above reflects the Pearson product-moment correlation between nurse's demographic profile and characteristics, and their attitude towards the use of EHR

Table 1
Participant's Profile

Profile	Frequency	%
Age Group		
25-30 years old	42	16.0%
31-35 years old	132	50.4%
36-40 years old	50	19.1%
41-50 years old	21	8.0%
above 50 years	17	6.5%
Gender		
Male	81	31%
Female	181	69%
Current Position		
Staff Nurses	258	98.5%
Charge Nurses	4	1.50%
Nationality		
Egyptian	8	3.1%
Filipino	127	48.5%
Indian	95	36.3%
Jordanian	16	6.1%
Nigerian	1	0.4%
Pakistani	2	0.8%
Palestinian	1	0.4%
Romanian	1	0.4%
Spanish	1	0.4%
Sudan	1	0.4%
Tunisian	7	2.7%
UK	1	0.4%
Unidentified	1	0.4%
Educational Attainment		
Diploma in Nursing	70	26.7%
BS in Nursing	177	43.5%
MA in Nursing	10	3.8%
MA in Nursing (Undergrad)	5	1.9%
Length of service		
1-3 years	61	23.3%
4-6 years	55	21.0%
7-9 years	55	21.0%
10 years and above	91	34.7%
Area of Assignment		
Inpatient	97	37.0%
Outpatient	40	15.3%
Critical Care	30	11.5%
Emergency	25	9.5%
Operating Room	37	14.1%
Others	13	5.0%
More than one area of assignment	20	7.6%
Number of trainings attended in the past 3 years.		
0-3	237	90.5%
4-5	22	8.4%
6-10	3	1.1%
Total	**262**	**100%**

Table 2
Barriers faced by nurses measured along knowledge on EHR

	Knowledge	Mean	Interpretation
1.	Lack of confidence in the use of EHR to reduce the incidence of medical errors by improving accuracy	2.52	HE
2.	Unable to facilitate referrals to different healthcare services.	2.14	ME
3.	Unable to access evidence -based tools that can be used by providers to make decisions about patient care.	2.56	HE
4.	Inability to provide comprehensive health information about the patients to reduce duplication of test.	2.29	ME
5.	Failure to update one's professional knowledge to keep pace with the current EHR based standard to increase the confidence level.	2.56	HE
	Overall Mean	**2.41**	**ME**

Table 3
Barriers faced by nurses measured along skills on EHR

	Skills	Mean	Interpretation
1.	Retrieving diagnostic records.	2.29	ME
2.	Facilitating structured communication between nurses and members of the health team.	2.63	HE
3.	Making information available to reduce delays in treatment.	2.44	ME
4.	Documenting abnormalities, reducing time and cost of transcription.	2.29	ME
5.	Updating patient's clinical data in the EHR system.	2.29	ME
	Overall Mean	**2.39**	**ME**

Table 4
Barriers faced by nurses in using Electronic Health Records measured along attitude on EHR

	Attitude	Mean	Interpretation
1.	Computer consumes more time than paper-based system.	2.54	HE
2.	Use of computer delays my work.	1.34	Not a barrier
3.	Computers are too complicated for me to learn well.	2.50	ME
4.	Handwritten documentation is much more complete than electronic documentation.	1.39	Not a barrier
5.	Computers take me away from my patient.	2.54	HE
	Overall Mean	**2.06**	**ME**

Table 5
Relationship between profile variables and knowledge of nurses in using EHR

Variable	r -value	p-value	Degree of correlation	Interpretation	Decision
Age	-.087	.160	Negligible	Not significant	Accept Ho
Gender	-.109	.079	Weak	Not significant	Accept Ho
Nationality	-.003	.966	Negligible	Not significant	Accept Ho
Ed. Attainment	.061	.327	Negligible	Not significant	Accept Ho
Length of service	-.110	.075	Weak	Not significant	Accept Ho
Area of Assignment	.043	.493	Negligible	Not significant	Accept Ho
Number of trainings and seminars related to EHRs attended for the past year	.095	.124	Negligible	Not significant	Accept Ho

Table 6
Relationship between the profile variables and skills of nurses

Variable	r -value	p-value	Degree of correlation	Interpretation	Decision
Age	-.124*	.045	Weak	**Significant**	Reject Ho
Gender	.110	.076	Weak	Not significant	Accept Ho
Nationality	-.060	.331	Negligible	Not significant	Accept Ho
Ed. Attainment	.062	.321	Negligible	Not significant	Accept Ho
Length of service	.193	.002	Weak	**Significant**	Reject Ho
Area of Assignment	.129*	.037	Weak	**Significant**	Reject Ho
Number of trainings and seminars related to EHRs attended for the past year	.023	.714	Negligible	Not significant	Accept Ho

Table 7
Relationship between profile variables and attitude of nurses

Variable	r -value	p-value	Degree of correlation	Interpretation	Decision
Age	-.047	.447	Negligible	Not Significant	Accept Ho
Gender	.044	.474	Negligible	Not significant	Accept Ho
Nationality	.069	.266	Negligible	Not significant	Accept Ho
Ed. Attainment	-.081	.194	Negligible	Not significant	Accept Ho
Length of service	-.034	.581	Negligible	Not significant	Accept Ho
Area of Assignment	.002	.972	Negligible	Not significant	Accept Ho
Number of trainings and seminars related to EHRs attended for the past year	-.063	.307	Negligible	Not significant	Accept Ho

Table 8
Differences in the responses of participants related to the knowledge of nurses when grouped according to area of assignment

Area of Assignment	Knowledge on EHR	F-value	p-value	Interpretation	Decision
Inpatient	2.22	1.819	0.096	No significant difference between groups	Accept Ho
Outpatient	2.26				
Critical Care	2.41				
Emergency	2.09				
Operating Room	2.29				
Others	2.08				
More than one	2.42				
Total	2.25				

Table 9
Differences in the responses of participants related to the skills of nurses when grouped according to area of assignment

Area of Assignment	Skills of Nurses	F-value	p-value	Interpretation	Decision
Inpatient	2.21	2.035	0.062	No significant difference between groups	Accept Ho
Outpatient	2.30				
Critical Care	2.51				
Emergency	2.30				
Operating Room	2.43				
Others	2.25				
More than one	2.40				
Total	2.31				

Table 10
Differences in the responses of participants related to the attitude of nurses when grouped according to area of assignment

Area of Assignment	Knowledge on EHR	F-value	p-value	Interpretation	Decision
Inpatient	1.83	2.019	0.064	No significant difference between groups	Accept Ho
Outpatient	1.87				
Critical Care	1.99				
Emergency	1.94				
Operating Room	1.88				
Others	1.86				
More than one	2.10				
Total	1.89				

DISCUSSION

The statistical analysis revealed that only 262 participants successfully completed the survey which is at a 2.18% compliance rate. Most of the nurses in Qatar were recruited from Asian countries, like the Philippines and India. The migration of nurses to other countries for better quality of life, higher salary, and career opportunities have been supported by numerous studies [10-12]. The findings also revealed that nurses in Qatar were highly experienced, highly educated, and have been serving their respective institutions for a considerable number of years. This can be attributed to the idea that the systems that operate in the Qatar health system includes retention of qualified and experienced healthcare professionals that are deemed as competent in practice (e.g., oncology settings) [13-16]. Furthermore, the study reveals that majority of nurses are females which suggests that nursing is still a female dominated profession [17, 18].

The study aimed at determining the barriers faced by nurses in using electronic health records in terms of knowledge, skills, and attitude and which was the basis of proposed action plans. Overall, results of the study showed that dimension of knowledge, skills, and attitude towards the use of EHR is a barrier, but to a moderate extent.

The results suggest that majority of nurses still lacks the competence and confidence in the use of EHR. The nurses in Qatar perceived EHR as time consuming and limits their patient care (see table 4), which is in contrast with other studies were nurses described EHRs as time-efficient and provides opportunity to spend more time with their patients [19, 20]. This could be to the limited or perceived lack of training programs by the nurses in Qatar (see Table 1). Numerous research studies found that previous exposure and good basic training on computers resulted to nurses being more confident and less resistant to adopting HER [21]. To have an effective application of an EHR system, it is necessary to provide adequate time to train staff and outline the benefits of adoption [22]. Healthcare professionals can be doubtful and anxious about new technology and fear that it takes away from patient-focused care. The method of training and introduction of information technology to the healthcare worker can alleviate the frustration and overwhelming nature of EHRs [21]. Another possible explanation is that the EHR system did not meet the needs and required work arounds the nurses need to complete tasks [22, 23]. This warrants further investigation.

Moreover, the results of this study indicate that age may influence the ability in using EHR. The younger nurses tend to be more skilled than the older nurses in the use of EHR [24]. An assumption is that younger nurses are more exposed to information technology, giving them more confidence in using the system [25]. This is also true with their length of service and their area of assignment. A probable explanation is that their extensive exposure and usage of EHR yielded to more confidence in working around the system. Other literatures identified that barriers post-implementation of EHRs are specific to certain individuals and view EHRs as a system for primary clinical users like

outpatient services [22]. Although this was based on their perceived skills, and not actual assessment of aptitude in the usage of EHR it would be beneficial to provide more support to older nurses and newly hired nurses.

LIMITATIONS

There were a few limitations in this study. One of the limitations was that the sample size was small due to the limited responses from the nurses. Second, the study focused on nurses using EHR, and the findings cannot be generalized to other healthcare professionals using EHR.

CONCLUSION

Results of the study showed that the dimension of knowledge, skills, and attitude towards the use of EHR is a barrier, but only to a moderate extent. The nurses in Qatar are highly educated, well experienced and are mostly millennials. This opens a great opportunity of acceptance and amplification of EHR in Qatar with the proper training and support to nurses.

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