

Health Care Provider's Satisfaction Toward Implementing Electronic Medical Record "Salama" at Rashid Hospital, Dubai Health Authority

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Abstract

Background: Electronic Medical Records (EMR) are computerized medical information systems that collect, store and display patient information. EMR allows medical practices to replace traditional patient charts with computerized system. The EMR system stores physicians' notes, x-rays, prescriptions, and other medical information in electronic format rather than paper files thus make searching for, retrieving, and sharing patient data easier and more efficient. **Objective:** To measure satisfaction level among electronic medical records system users. **Methodology:** This study was carried out in the Rashid hospital, Dubai Health Authority (DHA), United Arab Emirates in October 2017. It is a cross-sectional, descriptive study. A Convenience sample was selected to participate in this study. **Results:** The sample consisted of 772 participants. The vast majority were from nurses 660 (85.5%), physicians 30 (7.8%), clinical support 21 (2.7%), and administrative staff 31 (4%). The satisfaction was measured on numerical scale from 0 – 10. The majority revealed 35% satisfaction, 27.10% and 12.50% scored 10 out of 10. The minority reflect satisfaction less the 5%. For overall satisfaction of the Salama software, nurses (8.8) were significantly more satisfied than other hospital staff (8.0) ($p < .000$). Overall satisfaction levels of Salama were significantly higher in those below the age of 30 (8.9) versus those above the age of 30 (8.6) ($p = .004$). **Conclusion:** The overall satisfaction trend shows that hospital is favorable with the implementations of Salama systems within hospital. As noticed from the result that the nurses are more satisfied compared to the other discipline. In addition the staff whom under 30 more satisfied than whom more than 30 years. The significant difference in satisfaction among age ranges and roles in the Rashid hospital is both of concern moving forward with the implementation of the future integrated EMR, continuous training and support are going to really need to supplement success of Salama.

Keywords

Satisfaction, Electronic Health Record, EMR, Salama, Patient Safety

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1. Background

Patient data and details are retained, accumulated and displayed in a computerized medical information system known as Electronic Medical Records or (EMR). It is a method to acquire clinical data about an individual patient

and establish a legible and organized recording. Health Care Providers are accustomed to the current paper based medical records which will be replaced by EMR [1]. For a time period, Patient records have been kept in paper form. They have utilized increasing space and significantly delayed access to efficient medical care [2]. On the contrary, EMR

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gathers individual patient clinical information electronically. This makes the data readily available to all providers in the healthcare system making the delivery of care consistent and coherent [3].

Healthcare is greatly influence by the expanded use of electronic medical records (EMR). Many attest that EMR transition is needed for efficiency and effectiveness of healthcare processes whereas others state that electronic records are the indication of the end of personal privacy. The transition to EMRs despite these views will linger and the health care industry must learn to adapt accordingly [4].

Implementation of an accomplished EMR is solely possible with a security culture that entails viability, engaged and dynamic. To sustain the process, it needs constant attention, care and feeding. Finally, for the security culture to be successful, it must be of high priority at all levels of the organization. They must be able to offer the essential resources and training [5]. Nurses take part in the continuity of patients care. They help plan for EMR implementation because they play a central role at the front line of care and are often accountable for quality improvement work, and they frequently interact with other sectors [6]. A deficiency noted during the implementation of the EMR was lack of readiness of the organization to undergo transformation [7]. It is important to assess the satisfaction level among EMR users especially among the health care providers. Engagement and support from the users is essential during the implementation of the new EMR system. EMR is defined as the legal patient record that is created in digital format in hospitals and ambulatory environments. EMRs may contain a variety of personal and clinical data [8]. EMR accommodates medical activities to substitute the outdated patient charts with a computerized system. The EMR system retains physicians' records, x-rays, treatments, and other medical information in electronic format rather than paper form. Thus, makes inquiring, recovering, and sharing patient's information effortless, easier and more efficient [9]. United Arab Emirate (UAE) has started the EMR system in 2008. It was pioneered in Abu Dhabi and Al Ain. DHA and Dubai SMART aim to make health care safer, higher quality, more accessible, equitable, and affordable. Salama was launched under the patronage of His Highness Shaikh Hamdan Bin Mohammad Bin Rashid Al Maktoum Crown Prince of Dubai on February 2016. EMR "Salama" is a DHA-wide project that aims to deliver patients and doctors access to medical records through a patient portal. This will ensure that the electronic patient medical record would be available across the DHA health facilities [10]. DHA is composed of four hospitals. These includes: Dubai Hospital, Latifa Hospital; Hatta Hospital and Rashid Hospital which is considered as one of the largest hospital in DHA.

Objectives

1. To measure satisfaction level among electronic medical records system users.
2. To find if there is difference in level of user satisfaction with the electronic medical records application in between nurses and other discipline.
3. To find if the age effect user satisfaction with the electronic medical records

2. Methodology

This study was carried out in the Rashid Hospital, Dubai Health Authority (DHA), United Arab Emirates in October 2017. It is a cross-sectional, descriptive study. A Convenience sample was selected to participate in this study. 772 participants met the inclusion criteria. The nurses and other health care providers (Doctors, administrative and clinical support.) who were selected to participate in this study have more than one year of experience in the Rashid Hospital, completely understand and speak English, and dealing with EMR as daily basis.

Sample size was determined based on a valid website "OpenEpi.com". Total population are 2400 staff, according to the formula 332 participants are required, but the sample extended to 772 because of availability of the staff. The sample was determined by confidence interval 95%.

Data collection was carried out using structured instrument. Survey monkey was used to collect the data. The tool developed to measure the user response on the EMR System from different aspects such as use, quality and users' satisfaction with various aspects of their EMR system (Salama). This questionnaire was adapted from supplemental tool: EMR satisfaction Survey, medical group management association, MGMA 2014, the copyright was assured and questionnaire owner approved adaptation process.

The questionnaire consist of 28 questions out of them 10 questions are open-ended questions which are related to personal information, computer literacy and EMR experience and 18 questions are to measure agreement or disagreement related EMR. The participants were asked to indicate their level of with each of the 18 statements, using the Likert scale strongly agree, agree, disagree and strongly disagree. The questionnaire ended with open ended questions, which invited suggestions to improve the effectiveness of EMR implementation.

For the purposes of this study, the variables were operationally defined. Satisfaction Level: is measurement of satisfaction after using EMR. Rating scale was used "On a scale of 1 to 10, what's your overall satisfaction with the

EMR Overview, Usefulness, and Support. Satisfaction of EMR Users: is the state of being satisfied; contentment of EMR from different aspects such as EMR as new platform, Usability and usefulness and Support. Likert Scale is used to indicate their level of agreement or disagreement, Strongly Agree, Agree, Disagree, and Strongly Disagree.

The study was reviewed by the DHA research committee at Rashid Library. Institutional Review Board (IRB) approval has been obtained in order to start data collection. The questionnaire and consent form was given to the participants who met the inclusion criteria. An information sheet was attached to the questionnaire explaining to them the purpose of the study. The nurses assured that the confidentiality and privacy of the answers are maintained. No names, phone numbers, and identification are required. Data coding, data entry and data analysis has been conducted by using SPSS 20 software. The data has been tested at 95% level of significance, and the difference that has P-value < 0.05 was considered significant.

3. Results

The sample consisted of 772 participants. The vast majority were from nurses 660 (85.5%), physicians 30 (7.8%), clinical support 21 (2.7%), and administrative staff 31 (4%). Regarding the year of experience, the majority 326 (42.2%) have experience from 0- 5 years of experience, while 161 (20.8%) participants have between 6-10 years' experience and 157 (20.3%) have 11-15 years of experience and 129 (16.7%) participant have experience more than 15 years. While the vast majority were female 575 (74.4%) and 198 (25.6%) male. On the other hand, most of staff were 31-40 year old 321 (41.5%). According using SALAMA system 291 staff used less than 3 months, 174 staff used from 3-6 months and 46 staff used more than 6 months. While 261 staff did not answer this question. (Table 1). Regarding the case scenario, 31.20% were strongly agreed, and most of staff 57.3% agreed, 3.9% disagree and the minority were strongly disagree (Figure 1).

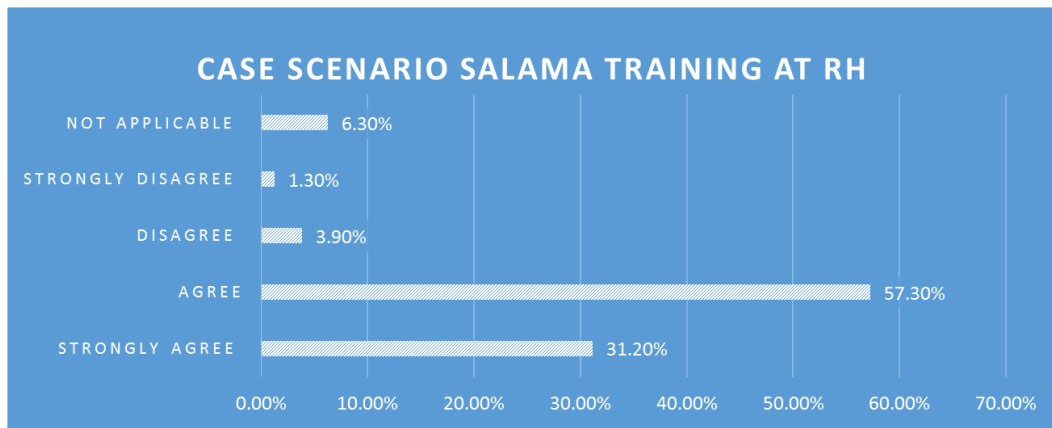


Figure 1. Case Scenario Salama training result.

Table 1. Participant's Demographical Data.

Variables	Group	Frequency (N)	Percentage%
Participant Role	Physician	60	7.8%
	Nurse	660	85.5%
	Administrative	31	4.0%
	Clinical support	21	2.7%
Years of Experience:	0-5 years of experience	326	42.2%
	6-10 years of experience	161	20.8%
	11-15 years of experience	157	20.3%
	More than 15	129	16.7%
Gender	Male	198	25.6%
	Female	575	74.4%
Age	21-30 Years Old	226	29.2%
	31-40 Years Old	321	41.5%
	41-50 Years Old	177	22.9%
	>=50 Years Old	49	6.3%
	Not answered	261	
How long have you been using SALAMA?	Less than 3 months	291	
	3-6 months	174	
	More than 6 months	46	

In terms of staff satisfaction toward documentation on Salama compared to paper work, the majority were agree 59% and 33.9% were strongly agree, 4% were disagree and 0.5% strongly disagree. (Figure 2).

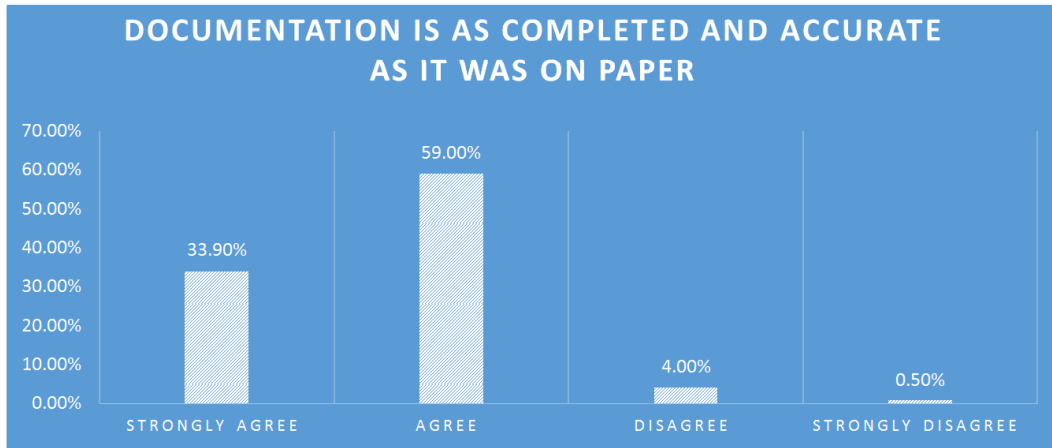


Figure 2. Staff satisfaction toward documentation on Salama compared to paper work.

According to the overall level satisfaction using Salama system. The satisfaction was measured on numerical scale from 0 – 10. The majority revealed 35% satisfaction, 27.10% and 12.50% scored 10 out of 10. The minority reflect satisfaction less the 5%. (Figure 3).

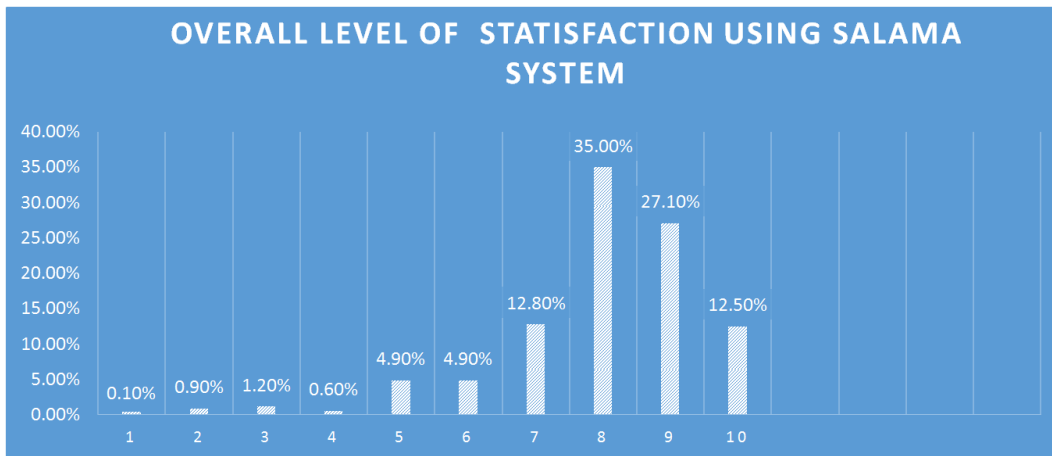


Figure 3. Overall level satisfaction using Salama system.

From other perception, the staff was asked about their opinion if Salama has helped in improving the quality of care. 63% of staff agreed that Salama has positive impact on the patients, 29.5% were strongly agree, 4.9% disagree and 0.5% were strongly disagree. (Figure 4).

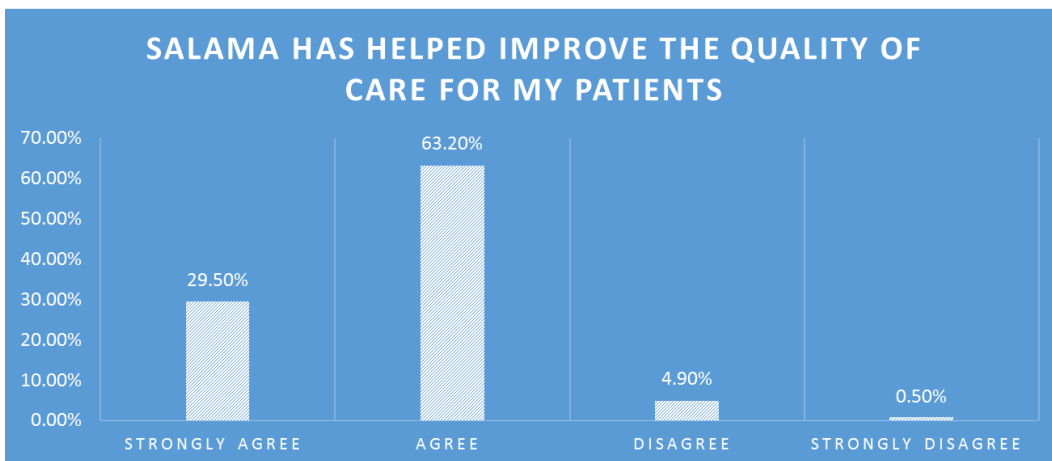


Figure 4. Salama has helped improve the quality of care for my patients.

In the same token, the satisfaction was measured regarding if the productivity. The vast majority were agree 66.8%, and 28.3% were strongly agree, 2.6% were disagree while 0.6% strongly disagree. (Figure 5).

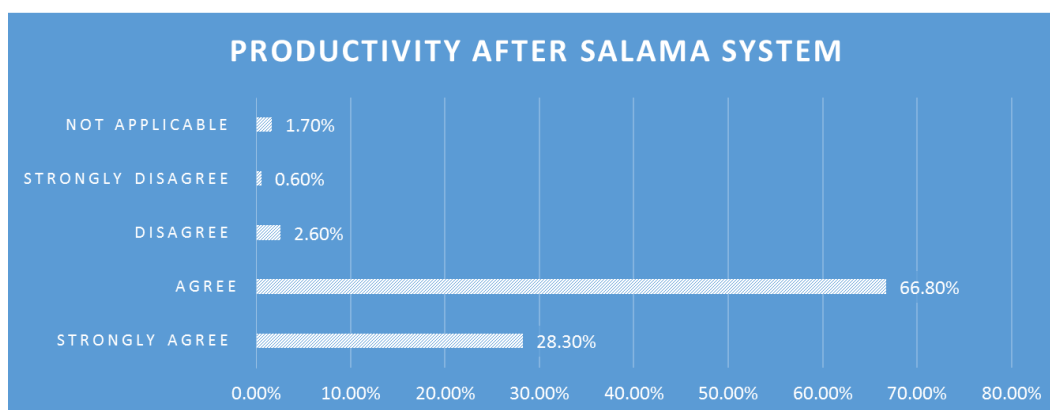


Figure 5. Productivity after lunching Salama.

Table 2. Overall mean of participants for each of the Salama categories.

Salama categories	Mean
Training	3.1
Quality of Work	3.2
Access	3.3
Tracking Patients	3.1
Documentation	3.2
Specific Feature	2.5
Efficiency	3.1
Overall Satisfactor	8.7

In order to interpret the results, we have categorized the Salama satisfaction survey into seven different categories. For training the overall sample satisfaction for that category was 3.1 (out of 4), for quality of work enhancement the mean score was 3.2, access to information on the Salama system was 3.3, tracking patient's records was 3.1, documentation of records was 3.2, specific features on the Salama was rated the

lowest satisfaction with a mean score of 2.5, efficiency of the program was rated an average of 3.1. The overall satisfaction of the Salama was rated at 8.7 out of a total scale of 10. (Table 2).

The data was analyzed to find differences between nurse's satisfactions versus other hospital discipline satisfaction of the software. Independent sample t-test was used to test for mean difference and significance. For training, nurses (3.1) were generally more satisfied than other staff (2.6) ($p < .000$), quality of work enhancement nurses (3.3) were significantly more satisfied than other staff (3.0) ($p < .000$), the same was for access to information on the Salama system nurses (3.3), tracking patients (3.2), documentations (3.3), specific features (2.6), and efficiency (3.2). For overall satisfaction of the Salama software, nurses (8.8) were significantly more satisfied than other hospital staff (8.0) ($p < .000$). (See Table 3).

Table 3. Comparison of Salama system satisfaction level of nurses and other hospital staff.

Variables	Nurse N=660	Other Disciplines N=112	<i>p</i>
Salama categories	mean±SD	mean±SD	
Training	3.1±0.86	2.6±1.4	.000
Quality of Work	3.3±0.51	3.0±0.95	.000
Access	3.3±0.48	2.9±0.93	.000
Tracking Patients	3.2±0.92	2.7±1.3	.000
Documentation	3.3±0.56	2.7±1.2	.000
Specific Features	2.6±1.1	2.1±1.4	.000
Efficiency	3.2±0.58	2.7±1.1	.000
Overall Satisfaction	8.8±1.4	8.0±2.2	.000

Finally in table 4, satisfaction levels was measured between those you are above the age of 30 (cut-off age for computer literacy) and below the age of 30. Out of the seven subcategories, six categories have a significant difference in satisfaction levels for those above and below the age of 30. Those who were below the age of 30 (3.3) were significantly more satisfied with their quality of work on Salama versus those above the age of 30 (3.2)

($p = .001$). The same was for access to information, below the age of 30 had a higher satisfaction level (3.4) versus below the age of 30 (3.2) ($p < .000$), tracking patients (3.3), documentation (3.3), specific features (2.8), and lastly efficiency (3.3). Overall satisfaction levels of Salama were significantly higher in those below the age of 30 (8.9) versus those above the age of 30 (8.6) ($p = .004$). (See Table 4).

Table 4. Comparison of Salama system satisfaction level between staff who are older than 30 Years old versus younger than 30.

Salama categories	<=30 years (n=226)	> 30 years (n=547)	P-Value
	mean±SD	mean±SD	p
Training	3.2±0.88	3.0±1.0	.106
Quality of Work	3.3±0.57	3.2±0.61	.001
Access	3.4±0.51	3.2±0.60	.000
Tracking Patients	3.3±0.92	3.1±1.0	.001
Documentation	3.3±0.63	3.1±0.71	.001
Specific Features	2.8±1.0	2.4±1.2	.000
Efficiency	3.3±0.62	3.0±0.73	.000
Overall Satisfaction	8.9±1.3	8.6±1.6	.004

4. Discussion

This study was performed after implementation and asked respondents to compare the EMR to their memory of the previous system (paper documentation). The findings and results of this study are meaningful and insightful information; in-regards to several dimensions of Salama system. As electronic medical record adoption increases, a larger percentage of the hospitals is available to help guide the future development of this technology. This survey of a fairly large group of nurses and other disciplines to measure the satisfaction toward EMR may be worth exploring. In particular, respondents valued secure messaging, remote access to the EMR, and access to new lab results, computer-based documentation, and the problem list. In the current study, staff were satisfied toward documentation on Salama compared to paper work, the majority were agree 59%, and 33.9% were strongly agree that the documentation is Salama easier and more convenient than paper work. The same result was found in a study conducted by Joos. Respondents valued computer-based documentation, and the problem list. Whereas, the participants revealed satisfaction toward using EMR compared to paper work [11]. It is widely recognized that the Electronic Medical Record (EMR) has the potential to become the core electronic information and communication system in the health care sector. Implementation of an EMR system increases efficiency and quality of health services, and Users satisfaction. As the overall satisfaction was measured on numerical scale from 0 – 10. The majority revealed 35% satisfaction 8 out of 10, and 27.10% have shown satisfaction 9 out of 10 and 12.50% have shown satisfaction 10 out of 10. The same result was found in as study conducted by Berhe in 2017 in Ethiopia, which overall satisfaction mean of 4.50 out of 5. Mean scores indicate that respondents were satisfied with the various functions of the ED EMR [12].

In term of the staff satisfaction toward if Salama has helped in improving the quality of care. 63% of staff agreed that Salama has positive impact on the patients, 29.5% were strongly agree, 4.9% disagree and 0.5% were strongly

disagree. Literatures identifies that Information Quality, Perceived Usefulness and Perceived Ease of Use are among the determinant factors of user satisfaction in using the information system [13]. The current study showed that most of the staff were satisfied regarding the productivity. *Haslina et al.*, the results highlighted three main issues pertaining to improving information and quality. The issues were Format of Output, Sufficiency, and Timeliness of information. The timeliness and sufficiency of the information required are highly depended on the data supplied by other users or departments EMR system was very much depended on the information keyed-in by the users. If other users keyed-in correct, complete, sufficient, timely, and understandable information or data then the doctors will be more satisfied when using EMR [13]. The present study analysis shows the greatest answer includes responses regarding overall satisfaction with the Salama system. The overall mean average for all responses across all categories equaled 8.7. Access to Salama scored the highest in the accessibility 3.3 out of 5, then closely result for documentation and quality of care 3.2 out of 5 for each mentioned category. Specific feature contained the lowest score 2.5 out of 5. The opposite result was found in a study conducted by Lusk (2010), which the mean of satisfaction toward the accessibility was 5.1, followed by the specific featured with mean 5.0 while lowest mean was found in the efficiency with mean 4.43 [14]. Also, in terms of overall satisfaction with Salama the higher level of user satisfaction among nurses with mean (8.8), (SD±1.4) was higher compared to other disciplines with mean 8.0 and (SD±2.2) whereas, the result was statistically significant $p<.001$. In contrast result was found in another study which the satisfaction was higher among other discipline with mean of 4.98 (SD±.87) compared to 4.24 (SD±.99) for RNs, and 4.34 (SD±1.01) for Physician with $p<0.001$ [14].

In addition, the author compared Salama system satisfaction level between staff who are older than 30 years old versus younger than 30. Those who were below the age of 30 had higher satisfaction with mean 8.9 (SD ±1.3) compared to those above the age of with mean 8.6 (SD ±1.6). The result was statistically significant $p<.004$. The same result found in

another study conducted by [14]. Age had a positive association. The level of user satisfaction was higher among the category 35 to 44 with mean 4.98 compared to the group category 55 to 64 with mean 4.0 with $p < .005$. [15]. The level of user satisfaction and the significant difference among age ranges and role in Rashid hospital is an interesting find when compared to the results of Chisolm et al. (2010) whereas he found no significant difference in age, gender, or role within their study.

5. Conclusion

The purpose of the study was to assess user satisfaction with implementing Salama and find if the role and age effect the level of satisfaction. This analysis across Rashid hospital had never been done prior to this study and lent itself to some significant findings that further emphasized the ongoing need for a successful implementing Salama. The study focused on a series of survey questions for users of the EMR. In conclusion, the overall satisfaction trend shows that health care providers are favorable with the implementations of Salama systems within hospital. As noticed from the result that the nurses are more satisfied compared to the other discipline. In addition the staff whom under 30 more satisfied than whom more than 30 years. The significant difference in satisfaction among age ranges and roles in the Rashid hospital are both of concern moving forward with the implementation of the future integrated EMR, continuous training and support are going to really need to supplement success of Salama.

6. Recommendation

1. Share Rashid hospital experience after implementing EMR with other DHA hospitals.
2. Future study is recommended across DHA level with higher sample size and more representative from other disciplines.

7. Limitation

The study conducted in one hospital only and the result can't be generalized and compared to international study. Future study in all Dubai Health Authority is highly recommended. On the other hand, the survey was distributed after 6 months of implementing Salama system; it could not be an enough period to measure the accurate level of satisfaction. The minority of the staff had experience with Salama more than 4 months.

Conflict of Interest

All authors declare that they do not have any kind of conflict of interest.

Statement of Ethics

The authors have no ethical conflicts to disclose.

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