Electronic hospital information system (e-HIS) user's satisfaction

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Abstract: Background: *A positive user attitude towards the IT and e-HIS can have valuable outcome on the system adoption which the most basic drawback of its implementation is attitudinal behavioral barriers.* **Aim** *was to assessuser'ssatisfaction of using e-HIS.***Research design**; *descriptive comparative research design will be used for this study.* **Setting**; *the study had been conducted- at Al-Rajhy Assiut University Hospital for Liver.* **Subjects**; *the study subject included all users of e-HIS (n= 250), included; (20 physicians,200 staff nurses and 30 employees).***Tool**; *One toolused fordata collection included two parts; personal and professional characteristics data sheet,and user's satisfaction questionnaire.* **Results***more than half of* **physicians***were male,married, their mean age was (30.25) years old, while the mean year of experience was (9.25), the majority of* **nurses***were female, married and graduated from technical institute, and secondary nursing school .Their mean age was (27.11) years old, while the mean year of experience was (8.76)., while thehighest percent of* **employees** *were married, male and had bachelor degree or higher.Their mean age was (36.37), the mean years of experience was (15.20).and the highest percent of studied subjects (physicians, nurses, and employees) were satisfied with use of electronic records system.* **Conclusion**; *the most of studied subjects were became have good experience and the highest percent of them are satisfied with the usage of electronic health records ($\geq$ 60%). there were highly statistical significant difference among (physicians, nurses, andemployees) and userssatisfaction* **P- value (0.000)*Recommendation**; *Organizational support for users, through providing more training , on job training for users to learn and practice on the system after implementation or upgrade and providing better user manuals for training and also as a reference for users when they have problems.Providing more channels of communication through listening to users' suggestionsand feedback or problems solutionsfor e-HIS.*
Keywords: *Hospital Information System, User acceptance, User satisfaction.*

I. Introduction

Current electronic hospital information systems (e-HIS) are comprehensive, integrated and designed to manage the administrative, financial and clinical aspects of healthcare services. They are considered a most important part of the healthcare system, these importance emerges from the significance of their role in managing all patient data and other comprehensive medical data; documenting all medical services that have been provided to the patient such as investigations, diagnoses, treatments, follow up reports and important medical decisions **(1).**

Hospital Information Systems are "computer systems that collect, store, process, retrieve, display, and communicate timely information needed in practice, education, administration and research **(2)**

Moreover, there are many benefits of using (e-HIS) as: reduce errors, increase speed of care, accuracy and also lower health costs by coordinating services and improving quality of care which traditional paper based medical records are bulky and harder to maintain, so these problems can be easily solved by implementing e-HIS. In other words, e-HIS is principally focused on the patient, as well as on medical and nursing care, and the administrative issues needed to support these kinds of care. **(3)**

So it is important to measure how customers (users) recognize and measures their satisfaction of using e-HIS rather than evaluate technical aspects of the systems and to listen to the voice of customers rather than developers' voices. **(4)**

Satisfaction was "ultimately a state experienced inside the users head" and therefore was a response that "may be both intellectual and emotional" and it considered as the basic concept of information system evaluation that could not be ignored in any experiment. **(5)**

Anyway; e-HIS users' evaluate the quality of a system, in everyday use, if they are not satisfied by the quality of a system, by the quality of the service integrated in the system and by the quality of information delivered by the system, they will not use it correctly and efficiently. User satisfaction is a mixture of the ease of use and the degree of system supports to work. (**6**)

Expectation and satisfaction requirement comes from what users see and hear about the system and interpret the ways that the system will work for them. Neglect of any of these parties involves miss related expertise, skills, knowledge, requirements and expectations. This is mainly true in hospital environments where health personnel may be distrustful and refuse new technologies. **(7)**

A positive user attitude towards information technology (IT) can have valuable outcome on the system adoption and implementation which the most basic drawback of its implementation is attitudinal behavioral barriers. Also adequate training to the end user will determine whether the implementations of a system would go smoothly or not. **(8)**

The poor e-HIS design may cause healthcare professionals, resistance and dissatisfaction .Therefore;' healthcare providers, attitude towards using e-HIS and its design has significant impacts on the successful implementation of the e-HIS. **(9)**

Many studies trying to clarify the delay or unsuccessful implementation of e-HIS and electronic health records in most health care organizations and relate this problem to the acceptance or resistance of healthcare professionals' towards these systems. Information technology knowledge, experience and skills have effect of healthcare professionals, and professionals' attitudes, in terms of their positive or negative beliefs about computerized systems and electronic health records in the healthcare setting. **(10)**

Strategies for the successful management of e-HIS development and implementation should include engaging the healthcare professionals and providing strong organizational support to them before and during the implementation activities. These could reduce resistance and negative attitudes and will increase level of acceptance and satisfaction of e-HIS by healthcare professionals. **(11).**

Significance of the study

Introduction of e-HIS considered initiatives to transform existing paper-based information systems in most teaching healthcare institutions in developing countries has usually been a difficult process of change, often faces with several challenges and problems such as lack of adequate resources (poor financial resources) and rough infrastructural development, inadequate skills and knowledge at a local level to handle new systems and technologies**.** An effective e-HIS is one that serves its intended purposes after implementation**.** The success of the system is achieved through user satisfaction with the system, which is a result of prolonged use, consequently producing the desired benefits. **(12)**

Al-Rajhy University Hospital has a fully automated e-HIS since its opening in (2012). The implementation of e-HIS to a hospital is a new system in Assuit University Hospitals as a whole , in an attempts to convert the paper-based health records system to a fully automated electronic records system which is very problematic for nurses and some employees and faced with resistance at the beginning and hospital administration overcome this resistance by providing support and training on e-HIS, then the e-HIS is stabilized and most of health care providers start to be satisfied and stabilized.

Aims of the study

The aim of the study was to assess user's satisfaction of using e-HIS at Al-Rajhy Assiut University Hospital for Liver.

Research Question

Dose the users of electronic hospital information system are satisfied of using it?

Methodology
Subjects & Method
Study Design

Descriptive comparative research design will be used for this study.

Study setting

The present study conducted at Al-Rajhy Assiut University Hospital for Liver in the following units: general ward, intensive care unit, critical care unit, endoscopic unit, operating room, outpatient clinics, laboratory, and X- ray units.

Subjects
The study subjects included all users of the e-HIS, (n= 250) categorized as follows; physicians (n=20), staff nurses (200), and employees (n=30) from admission office, human resources, and a financial department.

Tool of data collection
One tool was used to collect data through self- administered questionnaire. It consists of 2 parts:

Part (1):Personal and professional characteristics data sheet.
Designed to collect data about study participants as; age, gender, marital status, educational qualification, current job title, years of experience, and duration of using electronic records system by each category in hospital.

Part (2): User's Satisfaction questionnaire
It developed by **(13)** consists of 12 questions asking respondents to indicate agreement or disagreement about their satisfaction of e-HIS with the statement measured on a five point likert-scale; (1) completely disagree, (2) disagree, (3) indifferent, (4) agree, and (5) completely agree.

Scoring system:
The scores of the items were summed-up and divided by the number of items, giving the mean score. These scores were converted into a percent. Then the mean and standard deviations were computed. If the mean scores percent of responses were $\geq 60 \%$ means high level but if $\leq 60\%$ means low level.

Administrative design
An official permission had been obtained from the medical director of Rajhy hospital to collect the necessary data from all users of hospital information system; also the oral consent permission was obtained from all users of EHIS to participate in the study.

Validity and reliability
To achieve the criteria of trustworthiness of the tools of data collection in this study, validity of tool were revised and validated for their face validity by five experts in the field of study. They were three assistant professor of Nursing Administration Department – Faculty of Nursing – Assuit University and lecturer of Nursing Administration Department – Faculty of Nursing –Minia University,and professor of IT unit-Faculty of Information Technology- Assuit University. Accordingly the modifications required already done by researcher.

The reliability of the data collection tool was assessed through measuring their internal consistency by Cronbach Alpha Coefficient test, and it was proven test **(0.719)**.

Pilot study:
A pilot was done to investigate and ensure the feasibility, applicability, clarity and reliability of the study tool. The pilot study included 10% of total number as follows (2 physicians, 3 employees, and 20 staff nurses). And they included in the main sample.

Ethical Consideration
•Approvals were taken from ethical committee of Faculty of Nursing of Menia University.
•The purpose of this study was explained to all participants and oral consent taken from the participants in the present study.
•Confidentiality of data, voluntary participation and right to refuse to participate in the study was emphasized to subjects.

Operational design
This phase took about 3month from January to March 2018 for reviewing the available literatures concerning the topic of the study, translation of the assessment tools from English to Arabic was done .Accordingly, modifications were done and the final form was developed. This phase took about 2 month from April to May 2018.

Data collection phase:
The data collected through self- administered questionnaire with users for collection the necessary data, this took about 15 minutes for each participant. The duration took about 4 months from May to August 2018.

Statistical design:
The data were reviewed, prepared for computer entry, coded, analyzed and tabulated. Descriptive statistics (i.e., frequencies, percentage, mean standard deviation, etc.) was done using computer program SPSS

version 11. Anova test, used to compare differences in the distribution of frequencies among different groups. It is considered * significant when P- value were less than 0.05 or (P< 0.05). Finally, data were analyzed by using suitable tests via the computer.

II. Results

Table (1): Personal and professional characteristics of studied subjects (n=250)

Items	Occupation					
	Physicians (n= 20)		Nurses (n= 200)		Employees (n= 30)	
	No.	%	No.	%	No.	%
Age: (years)						
< 25	0	0.0	79	39.5	0	0.0
25 - 30	12	60.0	78	39.0	6	20.0
> 30	8	40.0	43	21.5	24	80.0
Mean ± SD	**30.25 ± 3.49**		**27.11 ± 6.22**		**36.37 ± 6.38**	
Sex:						
Male	12	60.0	9	4.5	22	73.3
Female	8	40.0	191	95.5	8	26.7
Marital status:						
Married	12	60.0	138	69.0	27	90.0
Not married	8	40.0	62	31.0	3	10.0
Years of experience:						
< 5	1	5.0	49	24.5	0	0.0
5 - 10	13	65.0	100	50.0	6	20.0
> 10	6	30.0	51	25.5	24	80.0
Mean ± SD	**9.25 ± 3.49**		**8.76 ± 6.05**		**15.20 ± 4.29**	
Duration of electronic system use in hospital:						
< 2	7	35.0	26	13.0	0	0.0
2 - 4	11	55.0	119	59.5	10	33.3
> 4	2	10.0	55	27.5	20	66.7
Educational level:						
Technical secondary school	0	0.0	53	26.5	1	3.3
Technical institute	0	0.0	121	60.5	9	30.0
Bachelor or higher	20	100.0	26	13.0	20	66.7

Table (2): Percentage distribution of physicians satisfaction of using e- HIS (n=20)

Items	Completely agree		Agree		Indifferent		Disagree		Completely disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
1-Do you think the electronic health record system provides sufficient information for you?	4	20.0	13	**65.0**	2	10.0	1	5.0	0	0.0
2-Do you satisfied with the format of output from the system?	4	20.0	14	**70.0**	2	10.0	0	0.0	0	0.0
3-Is the system easy to use?	16	**80.0**	4	20.0	0	0.0	0	0.0	0	0.0
4-Are you satisfied with the accuracy of the system?	6	30.0	11	55.0	3	15.0	0	0.0	0	0.0
5-Do you have the ability to see and analyze the patient data as a whole?	18	**90.0**	2	10.0	0	0.0	0	0.0	0	0.0
6-Do you have the ability to retrieve faster and reliable data for scientific research?	20	**100.0**	0	0.0	0	0.0	0	0.0	0	0.0
7-Does the electronic records system provide an easy access to patient data and easy retrieval?	20	**100.0**	0	0.0	0	0.0	0	0.0	0	0.0
8-Does the electronic record reduce scope of errors?	0	0.0	5	25.0	6	30.0	8	40.0	1	5.0
9-Does the electronic record provide better cost control?	7	35.0	11	55.0	2	10.0	0	0.0	0	0.0
10-Does the electronic records increase security?	13	**65.0**	6	30.0	1	5.0	0	0.0	0	0.0
11-Does the electronic record provide easy monitoring for supplies?	6	30.0	12	60.0	2	10.0	0	0.0	0	0.0
12-Does the electronic records improve turn-around time?	2	10.0	18	**90.0**	0	0.0	0	0.0	0	0.0

Table (3): Percentage distribution of nurses satisfaction of using e-HIS (n=200)

Items	Completely agree		Agree		Indifferent		Disagree		Completely disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
1-Do you think the electronic record system provides sufficient information for you?	51	25.5	107	**53.5**	15	7.5	25	12.5	2	1.0
2-Do you satisfied with the format of output from the system?	48	24.0	119	**59.5**	15	7.5	18	9.0	0	0.0
3-Is the system easy to use?	77	38.5	111	55.5	5	2.5	7	3.5	0	0.0
4-Are you satisfied with the accuracy of the system?	57	28.5	94	47.0	29	14.5	20	10.0	0	0.0
5-Do you have the ability to see and analyze the patient data as a whole?	65	32.5	119	**59.5**	9	4.5	7	3.5	0	0.0
6-Do you have the ability to retrieve faster and reliable data for scientific research?	55	27.5	114	**57.0**	23	11.5	8	4.0	0	0.0
7-Does the electronic records system provide an easy access to patient data and easy retrieval?	71	35.5	122	61.0	3	1.5	4	2.0	0	0.0
8-Does the electronic record reduce scope of errors?	37	18.5	97	48.5	27	13.5	39	19.5	0	0.0
9-Does the electronic record provide better cost control?	49	24.5	122	**61.0**	29	14.5	0	0.0	0	0.0
10-Does the electronic records increase security?	71	35.5	112	56.0	17	8.5	0	0.0	0	0.0
11-Does the electronic record provide easy monitoring for supplies?	75	37.5	114	**57.0**	9	4.5	2	1.0	0	0.0
12-Does the electronic records improve turn-around time?	73	36.5	106	53.0	20	10.0	1	0.5	0	0.0

Table (4): Percentage distribution of employees satisfaction of using e-HIS (n=30)

Items	Completely agree		Agree		Indifferent		Disagree		Completely disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
1-Do you think the electronic record system provides sufficient information for you?	22	**73.3**	8	26.7	0	0.0	0	0.0	0	0.0
2-Do you satisfied with the format of output from the system?	20	**66.7**	9	30.0	1	3.3	0	0.0	0	0.0
3-Is the system easy to use?	24	**80.0**	5	16.7	0	0.0	1	3.3	0	0.0
4-Are you satisfied with the accuracy of the system?	23	**76.7**	7	23.3	0	0.0	0	0.0	0	0.0
5-Do you have the ability to see and analyze the patient data as a whole?	20	**66.7**	7	23.3	3	10.0	0	0.0	0	0.0
6-Do you have the ability to retrieve faster and reliable data for scientific research?	14	46.7	14	46.7	2	6.7	0	0.0	0	0.0
7-Does the electronic records system provide an easy access to patient data and easy retrieval?	20	**66.7**	9	30.0	1	3.3	0	0.0	0	0.0
8-Does the electronic record reduce scope of errors?	10	33.3	18	60.0	2	6.7	0	0.0	0	0.0
9-Does the electronic record provide better cost control?	21	**70.0**	9	30.0	0	0.0	0	0.0	0	0.0
10-Does the electronic records increase security?	24	**80.0**	6	20.0	0	0.0	0	0.0	0	0.0
11-Does the electronic record provide easy monitoring for supplies?	14	46.7	14	46.7	2	6.7	0	0.0	0	0.0
12-Does the electronic records improve turn-around time?	25	**83.3**	5	16.7	0	0.0	0	0.0	0	0.0

Table (5) User Satisfaction of using e-HIS system for studied subjects (n=250)

Items	Physicians		Nurses		Employees		P-value
	No.	%	No.	%	No.	%	
Dissatisfied($< 60\%$)	0	0.0	4	2.0	0	0.0	0.602
Satisfied ($\geq 60\%$)	20	**100.0**	196	98.0	30	**100.0**	

Personal and professional data of studied subjects (physicians, nurses, and employees) depicted at **table (1).Regarding to physicians** high percent of physicians **(60%)** were male, married. Their mean age was **(30.25)** years old, while the mean year of experience was **(9.25)** and duration of electronic system used in hospital from 2-4 years. **Regards to the nurses**, the majority of them were female, married and graduated from technical institute, secondary school **(95.5%,69.0% and 60.5%)** respectively. Their mean age was **(27.11)** years old, while the mean year of experience was (8.76) and duration of electronic system used in hospital from 2-4 and >4 **(59.5%,27.5%).Regarding to employees**, the highest percent of them were married, male, and had bachelor degree or higher **(90.0%, 73.3%)** and **(66.7%)** respectively. Their mean age was **(36.37),** the mean years of experience was **(15.20)** and duration of electronic system used in hospital more than 4 years.

Physicians' satisfaction of using electronic records system**: table (2)**showed that; all of them (100%) agreed that it provides an easy access to patient data & easy retrieval, and they have the ability to retrieve faster and reliable data for scientific research. Also; the highest present of them (90.0%, 80.0% and 70.0%) have the ability to see & analyze patient data as a whole, the electronic records improve turn- around time, and the system easy to use, and they satisfied from format output of the system, also; about two third of them agreed that the electronic records provide easy monitoring for supplies and they satisfied with the accuracy of the system (60.0%, and 55.0%).

Nurses' satisfaction of using electronic records system **Table (3):** clarified that about two third of them agreed that the electronic records provide an easy access to patient data & easy retrieval, and provides better cost control (61.0%). While more than half of nursesagreed that they satisfied with the format of output from the system, they have the ability to see & analyze patient data as a whole (59.5%), and it provides easy monitoring for supplies, the electronic records increase security, provides sufficient information for them, and improves turn-around time (57.0%, 56.0%, and 53.0%) respectively.

Employees satisfaction of using electronic records system: **Table (4)** revealed that, the high percent of them agreed that the electronic system improve turn- around time, it increase security, and easy to use and they satisfied with the accuracy of the system (83.3%, 80.0%, and 76.6%) respectively.Also; they think the records provide sufficient information for them, and it provides better cost control(73.3%, and 70.0%). And more than two third of them (66.7%) agreed that they satisfied with the format of output from the system, they have the ability to see & analyze patient data as a whole, and it provide an easy access to patient data & easy retrieval.

Regarding user satisfaction of using e-HIS system for studied subjects (n=250) **Table (5)** showed that; all physicians, employees and highest percent of nurses were satisfied with using of e- HIS.

III.   Discussion

The electronic documentation system has a significant role to create user satisfaction through making working with it more efficient, decrease costs and confusion, removing failures, improving management control , increasing users' skills to use the system, improving the efficiency, , increasing the adoption and usage of a system and enhancing the end users' satisfaction **(14).** .

User satisfaction is the corner stone to assess the efficiency and effectiveness of adoption e-HIS. So measuring the value and effectiveness of the electronic information system through evaluating users' satisfaction is one of the most important criteria for system success. The user's acceptance and the most successful in the implementation of electronic hospital information system (e-HIS) had been identified as the contributing factors of the failure of a number of systems **(9)**

The current study was conducted with the aim of assessing users' satisfaction of using e-HIS at AL-Rajhy University hospital for liver.

The study finding revealed that;all physiciansagreed that the using of electronic system provide an easy access to patient data & easy retrieval; they have the ability to retrieve faster and reliable data for scientific research. Also; the majority of them agreed that it has the ability to see & analyze patient data as a whole, and the system easy to use. Moreover; the high present of them agreed that the electronic records improve turn-around time, and they satisfied from format output, with the accuracy of the system, and also the electronic records provide easy monitoring for supplies.

With this respect,**(15)** mentioned that; using electronic health records (EHRs) create complete clinical documentation representing a rich source of data concerning medical and non-medical patient information, leading to accurate decision-making and decreased medical errors, leading to customers' satisfaction .

Furthermore; **(16)** mentioned that; e-HIS has the ability to generate a complete, useful record of a clinical patient encounter as well as supporting other care-related activities directly or indirectly via interface including evidence-based decision support, quality management and outcomes reporting.

Also, **(17)** showed that, with effective-HIS, give medical personnel the opportunity to spend more time with their patients, thus potentially improving the general quality of healthcare and patient satisfaction. The implementation and usage of EHRs system is a positive social change which could result in the hospital becoming more competitive.

Moreover;**(18)** reported that, the EHRs allow gathering all information related to a patient in one place (e.g. lab results and radiology reports) that helps in making therapeutic decisions. Also, it allows viewing drug formulary information, allows to access, view patients" assessments easily & quickly, and has the option to send reminders to healthcare providers (e.g. surgeries appointments and nurses to give medications to inpatients) increasing users satisfaction.

These findings contradicted with the study findings of **(19)**who argued that one of the main limitations of implementing EHRs in healthcare services is that EHR does not reflect the physician's needs and provides little space for physicians to express their own ideas, opinions and the way they prefer to structure the patient's medical record. This may be due to lack of efficient and effective EHR design, from the point of view of structure, contents and design.

Regarding to nurses satisfaction of using EHRs;more than two third of them agreed that the electronic records provides an easy access to patient data & easy retrieval, and provides better cost control. While more than half of nurses satisfied with the format of output from the system, they have the ability to see & analyze patient data as a whole; and it provides easy monitoring for supplies, also the electronic records increase security, provides sufficient information for them, and improves turn-around time.

This findings supported by the study finding of **(20)** about user documentation through use of e-HIS in health care computerization can leads to improve turn-around time , improves record keeping, increases accuracy, enhances the flow of information, improves the quality of clinical data available, and reduces paperwork leads to user satisfaction.

Similarly, **(21)** stated that, Nurse Information Systems (NIS) allows the nursing tasks to be done easily and quickly, such as assessment, monitoring, identification of the nursing aspects of the disease, preparation, presentation and analysis of health care plans, it provides a decision support system for nurses in nursing practice, nursing process, development of phases through the data management and improve workflow leads to satisfaction.

On the other hand**(22)** showed that,by using information technology in nursing services, workload and error rates have decreased. Communication between the nurse and the patient has been strengthened.

Moreover; **(23)**stated that; the findings indicate that the highest level of satisfaction belongs to screen interface is related to the integration of system with the daily duties of users, the integration of new functions and features as well as system reliability. So, the nurses' satisfaction was affected by system usability and usefulness.

Also;**(23)** shown that; a poor HIS design, difficult-to-use interface and low usability of e-HIS result in the nurses' dissatisfaction. Therefore, nurses' feedbacks regarding the usability and user-friendliness of e-HIS should be continually monitored.

The study finding clarified that; the majority of employees agreed that the electronic system improve turn- around time, increase security, and easy to use. Furthermore; most of them agreed that they satisfied with the accuracy of the system, they think the records provide sufficient information for them, provide better cost control, they satisfied with the format of output from the system, they have the ability to see & analyze patient data as a whole, and provide an easy access to patient data & easy retrieval.

This was in line with; **(24)**who mentioned that, the use of electronic record system allows for increased security of data and enhanced patient confidentiality through controlled provider access while implementing electronic methods for sharing with other caregivers and patients.

In contrast; **(25)** argued that the use of electronic record system allows accessibility to patient records at different locations and this increases the security of the information, possibly violating the patient's privacy and resulting in data theft.

On the other hand; **(26)** clarified that, in terms of data collection, e-HIS tools such as patient admissions-discharge-transfer systems help administrative staff to register and update treatment progress of a patient from admission until discharge or referral while minimizing errors with short time.

Additionally; **(27)** stated that, the functions of e-HIS should correspond with the duties and operations of users in their work environment; otherwise, the dissatisfaction and human errors are increased. And e-HIS should be capable to support the users in their daily tasks efficiently.

This finding in accordance with study finding of **(28)** who reported that, hospital clerk would need to acquire record the demographic and medical history details as well as the purpose of patients' visits to the healthcare institution .In this process, accuracy as well as the time taken and security of each record are of paramount significance and would determine the quality of healthcare services the patient will receive.

This in agreeing with the study of **(29)** were noted that the main barriers obstructing satisfaction withelectronic record system were lack of knowledge and experience using EHR systems; and staff resistance to using the system.

With this respect **(11)** showed that; planned training of healthcare professionals is needed to foster positive attitudes about e-HIS, and build confidence in the benefits of these systems.

IV. Conclusion

In the light of the study results, the following conclusions can be drawn:

- It is concluded that the total percent of the studied groups (100%) are already using e-HIS and most of them are using the systems in all or most of their job tasks.
- Regarding the age groups with the most studied groups were from the middle groups, between 20 and 50 years of age and this is also expected, because people who are younger than 20 years and those who are older than 50 years are already less in the healthcare field in AL-Rjhy hospital.
- Most of studied subjects (physicians, nurses, and employees) were satisfied of using e-HIS.

Recommendations

- Organizational support of users, through providing more training to new and old users, providing more time during working hours for users to learn and practice on the system after implementation or upgrade.
- Open more channels of communication to receive users feedback and suggestions for improvement of e-HIS.
- Make documentations and instructions more practical, simpler and easily accessible for all users of HISs.
- Use online assistance as possible; to provide the users with the possibility of revising of the errors and wrong information, the system should be easily reversible and flexible in the shortest time.
- Support IT department personnel should constantly be available to the users so that losing the data is minimized.
- Motivate e-HISs users to participate in process designing as they will be the future users of the new system.

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