Libyan International Medical University

Faculty of Information Technology

Department of Health Informatics

Barriers Associated With the Implementation and Adoption of Electronic Health Records (Ehrs) At Alkiesh Polyclinic in Benghazi

By:

Salma Faraj El-harish (1339)

Supervisor:

Dr. Essam Aldenn

Declaration

This is to declare that the graduation project report produced under the supervision of: Dr. Essam Aldenna

Having the title:

Barriers associated with the implementation and adoption of Electronic health records (EHRs) at Alkiesh polyclinic in Benghazi

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Project Student(s):

Name: Salma faraj Elharish

Signature: _____

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This project entitled “Barriers associated with the implementation and adoption of Electronic health records (EHRs) at Alkiesh polyclinic in Benghazi” prepared by “Salma faraj Elharish”, under the supervision of “Dr. Essam Aldenna”, Has been approved for submission to the department of “Health informatics”, Faculty of Information technology in a partial fulfillment for the certification of bachelor’s degree in information technology.

Supervisor:

Dr. Essam Aldenna

Libyan International Medical University

Signature: _____

Candidate:

Salma Faraj Elharish

Signature: _____

Abstract

Background: In the course of the last 20 years, a visible advance in information technology have been recognized particularly in the area of health. Electronic health records is one of the many enlargements, it's considered as a computerized system to store display and collect patient information although with the many advantages there's many barriers that effect the implementation phase. Such barriers can be social, technical, financial, organizational or even legal.

Aims: The aim of this study was to identify the important barriers in the implementation of EHR at Alkiesh polyclinic. Furthermore, to measure the perception of healthcare staff and their knowledge about this system.

Method: A self-prepared modified survey was distributed at Alkiesh polyclinic in Benghazi. Participants were physicians (33%), pharmacists (18%), administrative staff (17%), nurses (15%) and lab technicians (17%). Data were collected using multiple-choice questions and a Likert-scale ranging from strongly agree to strongly disagree through three sections. SPSS software – version (20) was used to perform the statistical analyses.

Results: The participant's perspective showed that (36%) know a little about the EHRs system and they reorganize the advantage of the system. In addition, (57%) think that there is a problem with the current manual system. Furthermore, (52%) agree that the cost of implementing the system is too high and 36% with security concerns**.** Moreover, the contributors ranked the most important barriers with lack of knowledge (78%). On the other hand, the lack of human resource reported the least important (66%)**.**

Conclusion: The health care sector in Libya needs to keep up with the new technology and improvements. With the widespread of adopting EHR, a number of barriers have been recognized. Our results can help in overcoming current and potential problems and ensure better strategic plan to overcome the obtained barriers. Although the adoption of this kind of system may take a long duration, efforts need to be made to successfully implement it in the future.

Keywords. Electronic Health Records, barriers to implementation, physician's perception

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Dedication

This is dedicated to my parents who shaped my life and have sacrificed for me to be a good student and what is important a good person. They supported and inspired me the most and devoted their whole life for me to have the best knowledge, thank you.

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Abbreviations

clinical decision support (CDS)
computerized physician order entry (CPOE)
Electronic health record (EHR)
Electronic medical record (EMR)
health information exchange (HIE)
Health information system (HIS)
Information technology (IT)

Chapter I
Introduction

1. Introduction

The visible advance in information technology in the past two decades changed how we look into things particularly in the field of health. There is a lot of change happened that improved the quality of care and opens the door for enlargement. Electronic health records (EHRs) for instance is an example of improvement. (1, 2)

EHR is defined as "a digital version of a patient's paper record. EHRs are real-time, patientcentered records that make information available instantly and securely to authorized users". It has been recognized as the main tool for improving clinical service and quality healthcare delivery. Although the adoption process became one of the essential issues in health care, there is no widespread implantation of this system in many countries, particularly the developing one.

(1, 2, 3)

The process of moving to a paperless environment has plenty of benefits. It can Improve the accuracy and quality of data recorded, Make it easy for physicians to access patient's information and share it with other authorized health care providers at any time, as a result in having the information available this will improve the quality and efficiency of care while reducing its costs. Even though the adoption process of health records has many advantages but it appears to be very complicated. (2)

Different obstacles can be present at the pre-implementation stage or even through the main phase, for example lack of technical foundation, security and privacy issues, limited funding, lack of technical expertise and computer skills and much more that need to be addressed.

In addition to the above, resistance by medical and health professionals plays an important role in the change from manual to electronic document this problem can occur in both the developed and developing countries. It takes time to modify health practitioner behavior and attitudes. (2,4)

In Libya, a developing country where EHR systems are relatively new concept there is no fully use of EHR in any medical institution. However, the use of paper-based records is more common in Libya. In fact, now in the 21st century where technology is in every aspect of our life specifically medical technology, it created a huge gap in the ability of hospitals to update their systems. An urgent change must be made toward paperless work in healthcare facilities using EHR.

Studies about implementing or adopting EHR in Libya do not exist. In our research, the focus will be more on the barriers that can be an obstacle in the process of implementing EHR. In addition, we will explore the knowledge about this type of systems.

1.1 Problem statement

The health care sector is an area of social and economic interest and any change in it can improve the general economy. Therefore, the adoption of EHR is one of the steps that can be done to achieve this improvement. However, there is no roadmap to implicate the use of EHR in Libya, this is might be because of many difficulties and barriers that result in not adapting the system in health sectors. In addition, there is no available data yet about this subject in Libya, which could be helpful in resolving the problem and aiding in the implementation of the system.

1.2 Motivation

E-health is a very important subject. This research may help as a base for the future implementation of EHR. It will insight the healthcare provider about this new technology and the positive effects it can make.

1.3 Research Objectives

The scope of this research is to identify the factories associated with the delay of implementing EHR, and how it effects the quality of work.

- Identifying the important barriers in the future implementation process of EHR.
- Ranking of the barriers that effect the future implementation process in El-Kiesh polyclinic.
- Measuring the perception of healthcare provider about the use of EHR and the role it can provide.

1.4 Aims of the study

The aim of this study is to take the first step toward an EHR system by investigate the extent of some of the important barriers that can emerge in the implementation process of current Libya's health care system specifically ALkish polyclinic. In addition, it will increase healthcare provider knowledge of the existing of EHR and its potential benefits and the big role it plays at hospitals.

Chapter II
Literature Review

2.0 Literature review

This chapter provides a basis on the background of this study in addition it will provide a demonstration on the details of the most common barriers of adopting EHR that was extracted by our review. Furthermore a summary of other countries experience on pre implementation and implementation of EHR.

2.1 EHR

With the development of information technology over the 20 years, various types of EHR have been discussed and developed. Some countries are planning to release nationwide electronic health records while others are still implementing some form of EHR. (4)

EHR provides technology that helps physician practices and allow them to have access for a variety of functions that will benefit them in terms of quality safety and cost, which is less effective in a paper-based record (1, 5).

Although it became clear the benefit of health information technology in theory, it is very challenging to adopt or implement it, most of the information technology have centered on administrative and financial areas rather than clinical care (6).

EHR is defined as a computerized information system that helps to collect store and display individual information from birth to death (7) .There is a different type of information registered in EHR from personal information to clinical information and more. With all the possible capabilities that EHR can offer there are three tasks that may be very beneficial in improving quality and cost reduction these are(8): -

- Clinical decision support (CDS) which will help physician in terms of making decision by giving patient information regarding their health and patient issues,
- Computerized physician order entry (CPOE) this function allows them to enter information on computer rather than papers, this process increases efficiency and reduces medical errors caused by bad handwritten.

- Health information exchange (HIE) this process allows information exchange between different organizations and real-time sharing.

2.2 Advantages of EHR

There is a lot of advantage in using EHR some studies examined the benefits considering clinical, social, and organizational outcomes. In the clinical part, the benefits include improvement in the quality of care which is defined as “doing the right thing at the right time in the right way to the right person and having the best possible results” (9), reduction in medical error, and better patient safety. The organization's outcomes benefits go from better financial and operational performances to satisfaction among patients and clinician who use EHR.

Implementing EHR increases the revenue also reduces in the cost. The increase in the revenues comes from different sources including a decrease in billing errors, which will lead to better cash flow. As well, the use of EHR will reduce all the supplies that used to be needed in paperwork. (8)

In the social part, the advantages are more in the research areas on how to conduct them and improve population health. Having data stored in one place electronically increases the availability and make it easy for public health researchers to use these data to monitor disease outbreak and produce studies that are beneficial to society (8)

2.3 Limitation of Paper medical records

Sharing of patient information has been considered necessary in disease diagnosis, controlling, monitoring and treatment of patients. According to many research using paper-based record can be an obstacle to achieve the desired outcomes due to many limitations.

One of the first limitation that comes to mind is the time wasted because only one person can access the record at a time. In addition, misplacement of the files is very common among

patients and physicians due to poor habits. Moreover, the delivery of paper record to different local facility can be delayed due to many circumstances like the distance, unavailability of paper for duplication and many more. The quality of paper record cannot be insured since paper can be stained torn or faded. Furthermore, the use of paper record can be expensive from activities like duplication, distribution, staffing for record management and supply of paper copies. Lastly, productivity can be absent due to time wastage during the search for paper and charts. (10)

2.4 Barriers for adopting Electronic health records

Despite the potential advantages that will emerge by using EHR, the implementation process is not easy nor low-cost. These problems may be due to lack of infrastructure, change in workflow and resistance of health care provided, unavailability of financial resources, security issues and much more (2,8).

This section, talks about different barriers effecting the implementation process it is important to identify them and there effect to start the roadmap for execution. According to varies studies the main barriers are the cost of implementing and maintenance of an EHR system, lack of knowledge, physician resistance, and ethical concerns about patient information. Generally, the barriers can be categorized into financial, technical, Ethical, and social barriers. (7)

2.4.1 High Cost

Financial issues are one of the most significant barriers to adopting EHR, lack of strategic planning for the budget and absence of funds appears to be one of the most important factors that limit the adoption of EHR as said by the Medical Records Institute of America in 2005. In addition, the provided has to be responsible for the high cost of computers and computer system and all the equipment needed, also be responsible of creating and supporting the IT structure and application using external vendor. (4)

Other financial concerns can include adoption and implementation cost, loss of revenues, maintenance cost like hardware that must be replaced every occasionally and software must be updated constantly. According to a study conducted on 2014 solo primary care practices, estimated the ongoing maintenance of EHR cost approximately cost US$8412 per provider per year. (7, 8,11)

2.4.2 Complexity, lack of knowledge and absence of computer skills

Electronic health record hardware and software cannot be used simply, different users of the system struggle to accomplish their tasks. Physician sometime do not take enough time to get familiar with the system and how it works this will lead to inefficiency and complexity of work. Some studies have mentioned that the lack of computer skills from users and physician made their organization fails to adopted with the new EHR system this social barrier can be from the providers under estimating the level of skills needed from physician to deal with this new software further more good typing skills to enter patient data and prescriptions. Although good training and practice can help the physician to get used to the system and overcome this technical barrier knowledge about how to deal with the system software, need to be present (5, 11, 12).

2.4.3 Employees Resistance

One of the major barriers in introducing electronic health records is changing from paper-based record to electronic, overcoming this resistant and uncertainty to change can take plenty of time and effort. Various physicians did not want the use of a new system because they assumed it will disrupt the workflow, also the pen and paper way is less time-consuming. (12)

To resolve this issue a good strategy must be implemented and to have all the users of EHR involve in discussions and talks about the benefits and efficiency that it could bring to the

workplace. In addition, a good training program must be carried out to help those who have an absence of computer skills to help them adopted with the new change (4, 11)

2.4.4 Concern about security and privacy

By implementing EHR several security issues with patient data can be hard to avoid for example lack of control of unauthorized access, also a concern of break through the confidentiality of health data.

In the WHO Electronic Health Records Manual for Developing Countries (2006) mentioned that everyone including the patient, healthcare professional and the general population, need some assurance that the data used is maintained in a secure environment. (4)

Still, some strict internal and external policies and procedures should be adopted to overcome this ethical barrier by the organization to prevent users from illegal activity, a study from the Department of Computer and Information Science, in Norway, developed a method to "semi automate" EHRs this method allows to store and retrieve patient information without violating patient's privacy. Thus, Ultimate security can only be achieved by appropriate strategies (7,12)

2.4.5 General issues

This issue emerge more in the developing countries where fundamental things sometimes cannot be available like software, computers and other necessary equipment's, electricity etc. Overall organization must be somehow ready for the new change and adoption. (4, 11, 13) Furthermore, the lack of venders and organization to build this huge software is a very important barrier. In addition the maintenance of this type of systems need professional staff, which is not available in the polyclinic.

2.5 Previous experience in implementing EHR

Many hospitals around the world have implemented EHR systems to increase efficiency and to improve their data recording process. Each country has a different experience some successfully implemented the system and others have not. However, it is important to mention these experiences to get the advantage out of them.

2.5.1 Saudi Arabia

As said by Rihab Abdulaziz et al (12) "The Kingdom of Saudi Arabia (KSA) is one of the countries facing several barriers for implementing electronic health records (EHR) in public and private hospitals. Such barriers can be social, technical, managerial, financial, organizational or even political. This study aims at identifying solutions to overcome both technical and social barriers hindering EHR implementation in the Saudi public and private hospitals." The author conducted that the lack of knowledge and experience with using computers was the main barrier. Which mean that the users in Saudi hospitals have low skills in dealing with computers, this information will help in the future implementation of EHR.

Secondly, the complexity of the used EHR system is considered a barrier; this problem can be solved by testing the comfort of the system before it is implemented also guiding interviews with the end-users and obtain their feedback regarding the system those interviews will test the knowledge of the end users.(12)

2.5.2 Iran

As Haleh Ayatollahi et al(7), states "EHR systems help to facilitate use of e-health and are the most important and most complex type of health information system. In terms of the availability, accessibility, and accuracy of data, EHR systems are highly dependent on other information systems in the field of healthcare." (7)

This study shows technical and individual barriers (such as resistance to change) are more important than other barriers. (7)

A survey was completed in 2011 with 62 expert participation Included. The experts were faculty members who worked in departments of health information technology and individuals who worked in the Ministry of Health in Iran and were in charge of the development and adoption of electronic health records. As the researchers published their results, "The response rate was 51.6 percent. The participants' perspectives showed that the most important barriers in the process of design and adoption of electronic health records were technical barriers (mean = 3.84). Financial and ethical-legal barriers, with the mean value of 3.80 were other important barriers, and individual and organizational barriers, with the mean values of 3.59 and 3.50 were found to be less important than other barriers from the experts' perspectives.'

In this study, we found that strategic planning and adopting of electronic health records while creating a team of experts to assess the potential difficulties and develop a plan to solve them, in addition to allocating financial resources can help in the process of overcoming the most important barriers. (7)

2.5.3 Vietnam

In another study that points out similar ideas on how important EHR is and how it can have a good impact on health system. A good implementation of EHR system can be seen as a foundation for a positive outcome, in this study they focuses on EHR systems in developing countries by investigating the current situation in Vietnam and assessing the core readiness (14). The data collecting methods used in this research is observation, document analysis and an indepth interview. The Ministry of Health in Vietnam is working on making a good base for implementing an EHR system by investigating the obstacles that can emerge in the process of implementing (14). The conclusion from this study is some of the obstacles that effect the implementation process, for instance physician are aware about the benefits of EHR but they are concern about the risks that can come from it such as violation of privacy. In addition, there is a lot of concern about the limitation of venders that can integrate all the EHR system with each other.

Chapter III

Material and Methods

3.0 Material and methods

3.1 Ethics

A letter was issued by the faculty to Alkiesh polyclinic in order to facilitate the work and takes an approve to conduct it (Appendix 1). 123 subjects who agreed to take part in the study did sign a consent form with response rate (70.4%). All candidates have the right to ask any question and withdraw at any time of the test without reasoning.

3.2 Subjects

A cross sectional study was conducted at alkiesh polyclinic at Benghazi from October to the end of December 2019. Out of 123 returned questionnaire, just 100 ones were included in the study. This is because these were considered as completed data compared to the excluded ones that were considered incomplete data. Hence, 100 volunteers from both genders (males, females) were involved in the statistical analysis. The most frequent age group of the volunteers was (from 25 to 44) years. Their job categories was as followings: 33% physicians, 18% pharmacists, 17% administrative staff, 15% nurses and 17%lab technicians.

3.3 Protocol

A self-prepared modified questionnaire adopted from Alghamdi 2011(15) was distributed. The questionnaire did include three sections. Section A was concerned with the personal data such as gender, age, level of education and job title. Section B was related to the knowledge / attitude and the candidates' perception towards EHR such the level of the patrician's skills on computing, their perception regarding the implementation of the EHR, what are the main five obstacles in the implementation of the system. Section C was focused on the practical implementation of the e-health record such as what volunteer's perception about the benefits of the implementation of the system, and do the institute have a computing system and data base to start the implementation of the record system. (Appendix 2) shows the full questionnaire

3.4 Statistical analysis

Data which collected were uploaded to SPSS software – version (20). Simple analytical statistics were applied. Data were presented as means / standard deviations (±) and percentages.

Chapter IV

Results

4.0 Results

142 surveys were distributed in AL-KISH polyclinic, with 123 received surveys. From the 123 returned survey, 23 were excluded due to incomplete responses (70.4% response rate).

4.1 Descriptive statistic of the data

4.1.1 Gender Distribution

Males and females were contributors to this study, (41%) male were part of this study while they were (59%) females' participants. The table below shows the percentages of the sample by gender (table1)

Table1: Gender distribution

	PERCENT
Male	41%
Female	59%
Total	100%

4.1.2 Age Distribution

We divided the age groups into three sections, the first group (24 years old or less) with only (7%), and the second group (25 to 44 years old) with (57%) the largest percentage and lastly the last group (45 years old) with (36%). The table below shows the percentages of the sample by age group. (See table2)

Table2: Age distribution

	Percent
24 Or Less	7%
25 - 44	57%
45 Or More	36%

4.1.3 Educational level Distribution

The results showed, (53%) of the participants were bachelor's degree. Furthermore (18%,) (15%), (14%) were high school, master's degree, PHD respectively. The figure below shows the percentages of the sample by educational level (figure1).

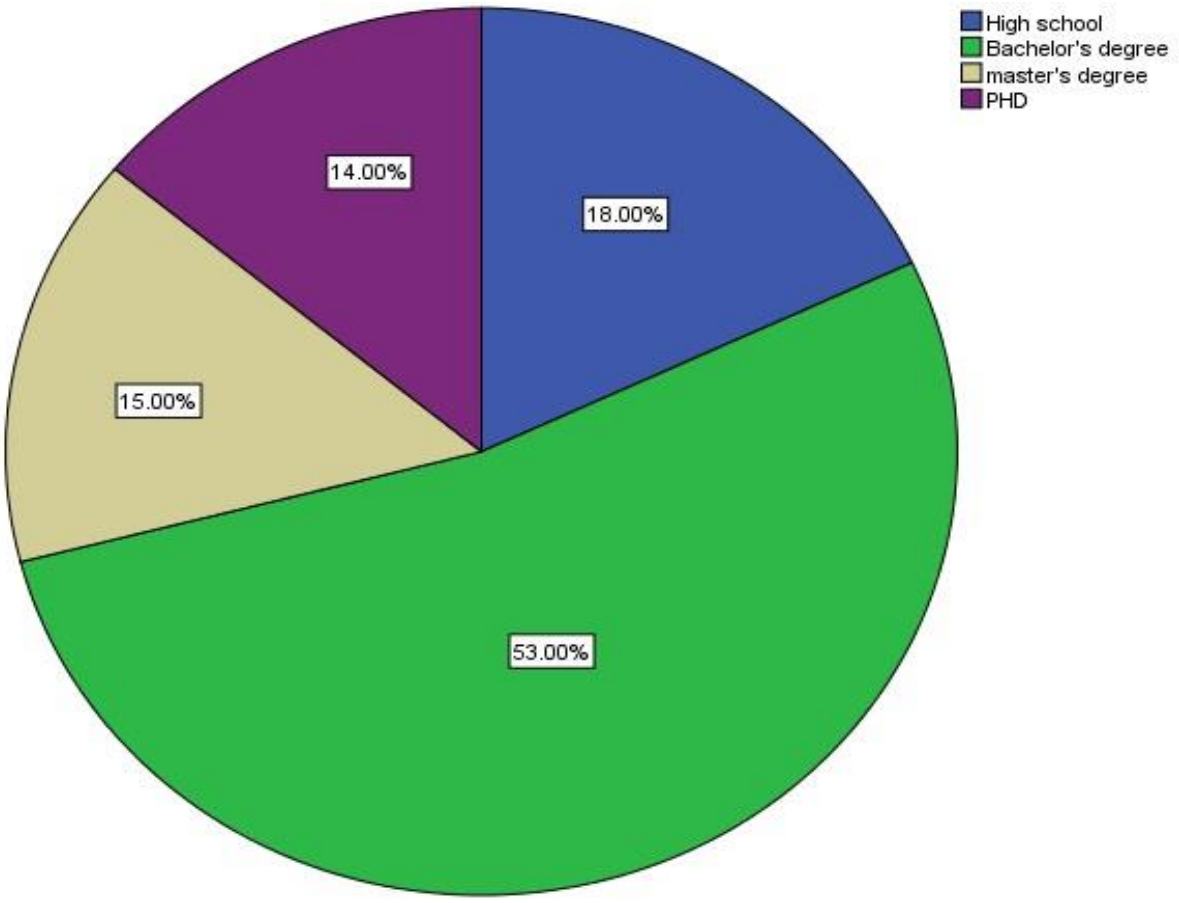

Figure 1:educational level distribution

4.1.4 Health care profession Distribution

The sample population was varied in this job title. They were divided into five: Physicians were (33%), Nurses (15%), Pharmacists (18%), Administration staff with (17%) and lastly lab technician with (17%). The figure below shows the percentages of the sample by their health care professionals. (Figure 2).

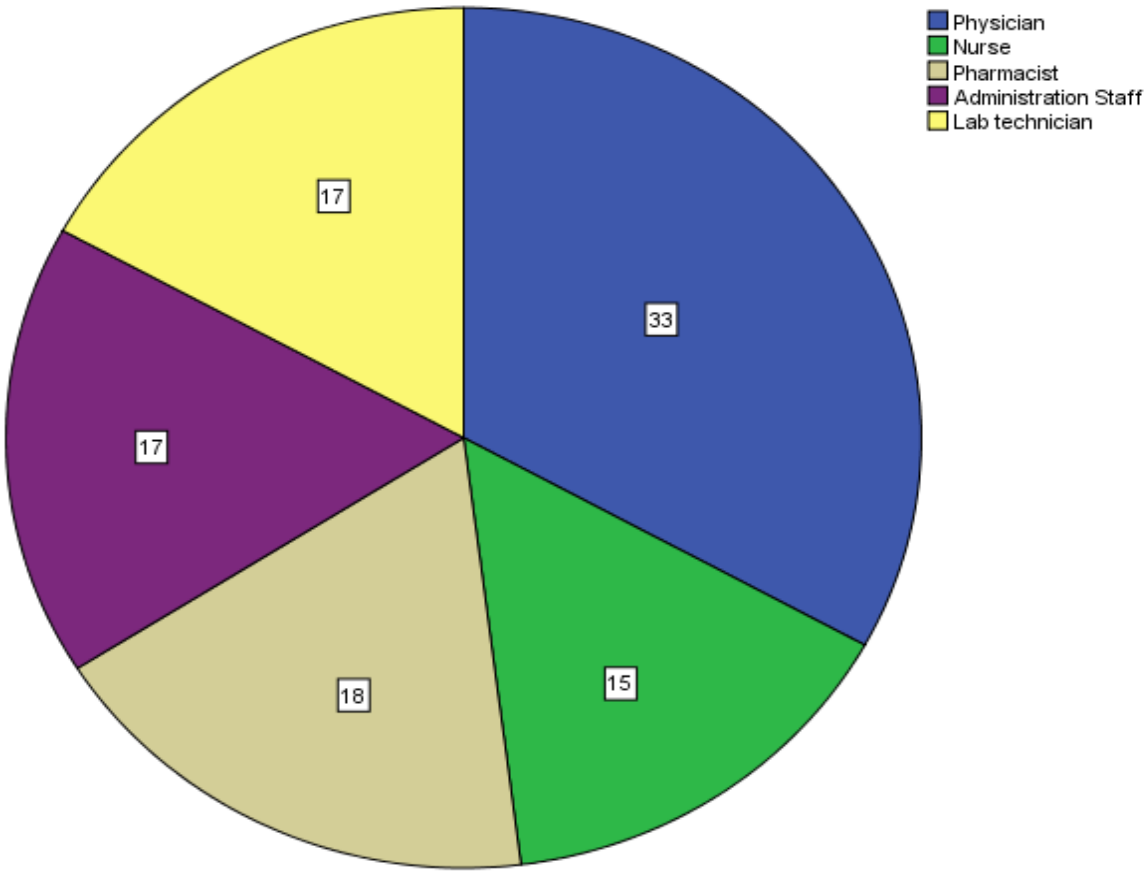

Figure 2: health care professional level distribution

4.1.5 Basic computer skills Distribution

Regarding the level of knowledge on basic computer skills The results showed that (59%) of the canditaters were good and just (14%) were poor The figure below shows the percentages of the sample by their level of knowledge of basic computer skills (Figure 3)

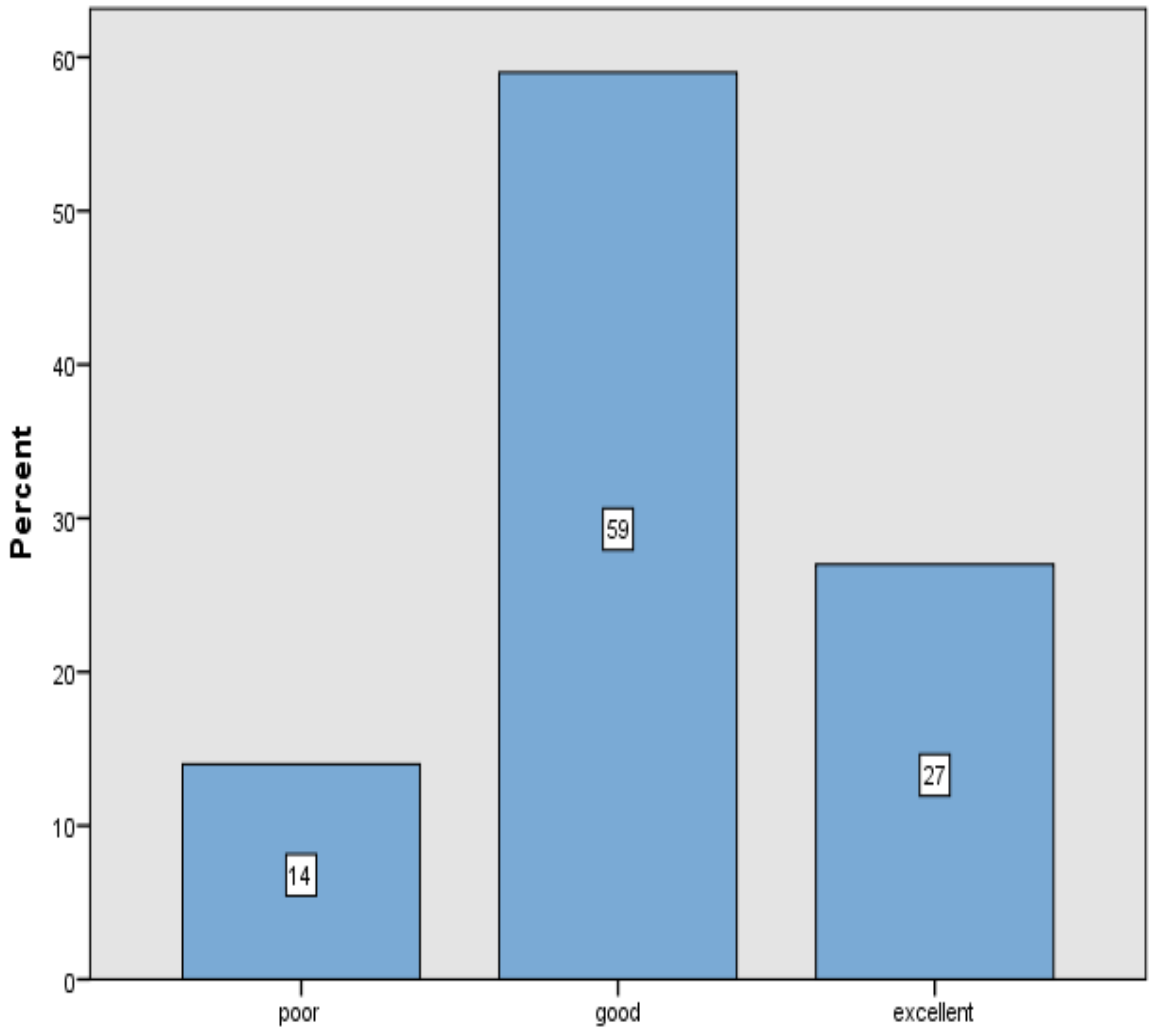

Figure 3: Regarding level of knowledge of basic computer skills distribution

4.1.6 English language knowledge Distribution

Concerning the level of knowledge of the English language among participants. The results obtined showed that (63%) of the canditaters were good , (8%) were poor and (29%) of them were excellent .The figure below shows the percentages of the sample by their level of knowledge of the English language (Figure 4)

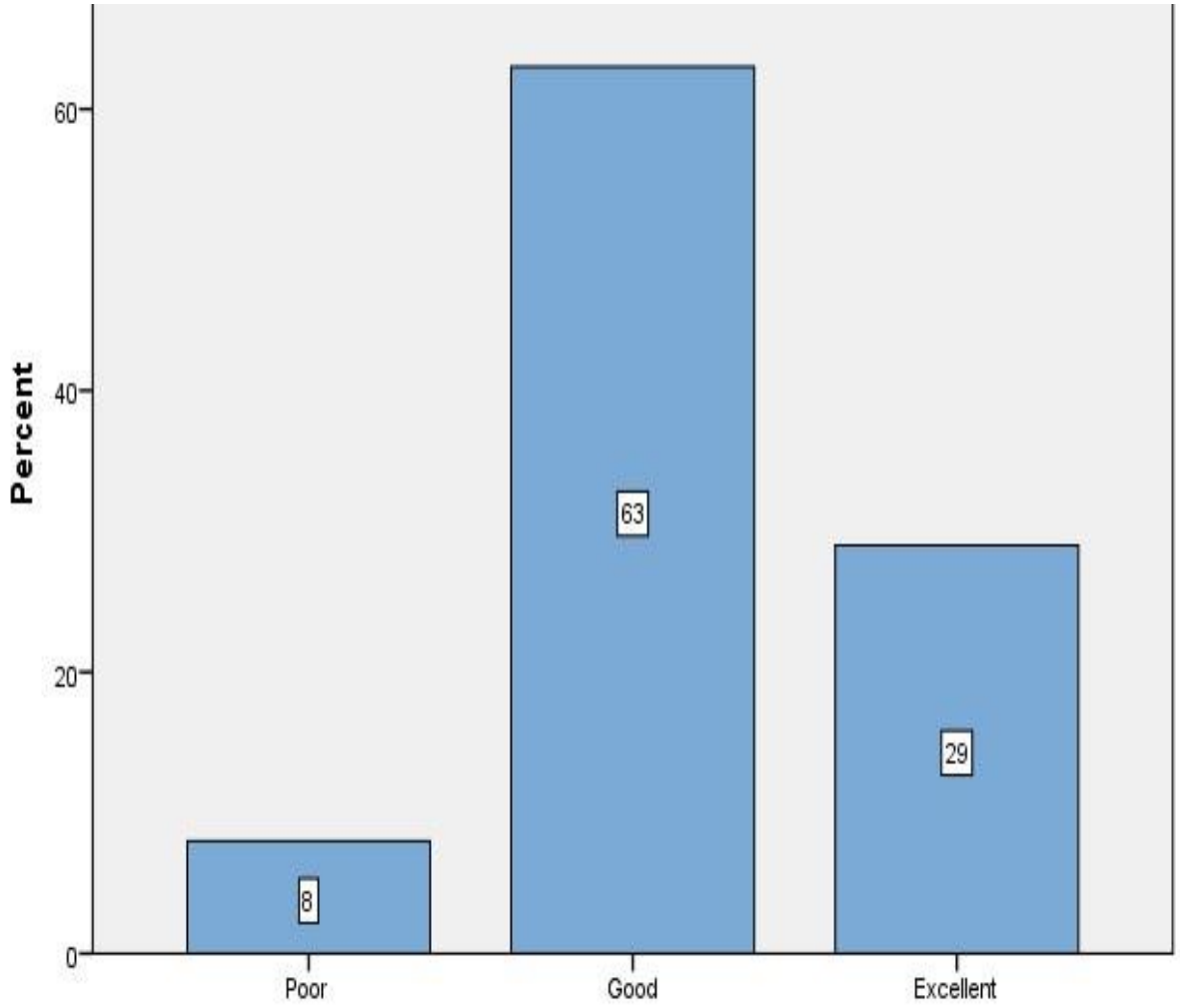

Figure 4: level of knowledge of the English language distribution

4.1.7 Knowledge about the EHR system

Regarding the level of knowledge about the EHRs system. The results revealed that (47%) knows a few things about the system ,(36%) knows a little and (12%) with very little information. The figure below shows the percentages of the sample by their level of knowledge about the EHR system (Figure 5)

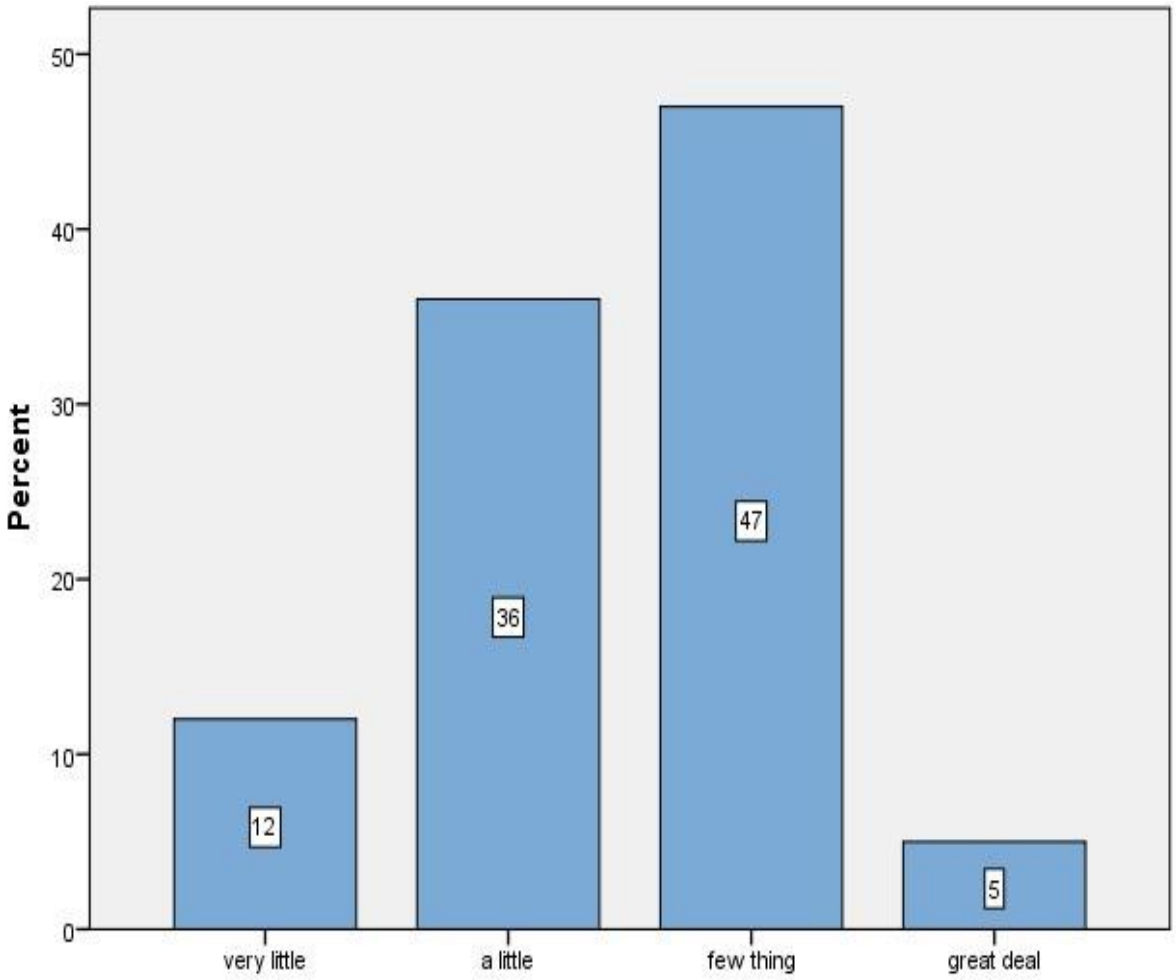

Figure 5: Regarding the level of knowledge of EHRs system distribution

4.1.8 Responses rate of problems in the current health record

Participants were asked if there is any problem in the manual health record they are currently using. The results showed that (57%) think that yes there is a problem, (21%) do not think that there is a problem, (22%) do not know if there is a problem. The figure below summarizes the participant responses. (Figure 6)

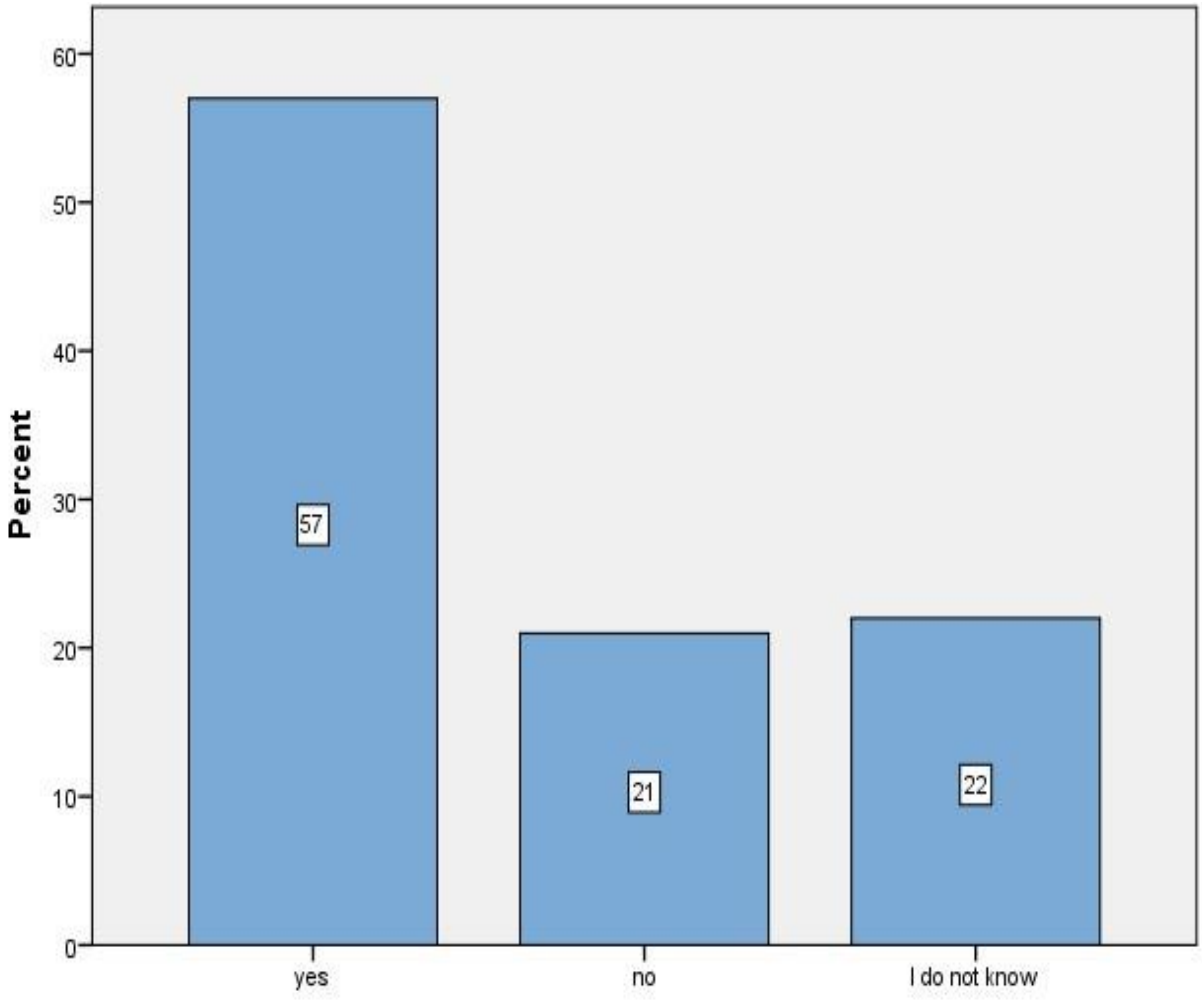

Figure 6: Regarding the problems in the current health record distribution

4.1.9 The future using of the EHR system expectation

Participants in this survey were asked about their expectations of implementing the EHR system in the future. The results obtained indicate (67%) have a positive expectation of the system in improving productivity and efficiency, (21%) think that the EHRs system is just a replacement for the traditional system. (3%).have a negative expectation of the system. The table below summarizes the participant responses. (Table 3)

Table 3: Regarding expectation of the new EHR system

	PERCENT
EHRs System Will Improve Productivity And Efficiency	67%
The EHRs System Is Just A Replacement For The Traditional Paper-Based Folders	21%
The EHRs System Is Unlikely To Improve Productivity And Efficiency	3%

4.1.10 Respondents choice for the five main barriers

In this survey, participants were asked to report the five most important barriers in their opinion in the implementation of EHR. They were given a list of the following seven barriers.

- Lack of computer skills
- Cost of EHRs system
- Adaption to the new technology
- Privacy and security concerns
- EHR maintenance
- Lack of human resource

- No service venders

The results showed that lack of computer skills has (78%) and the cost of implementation (75%). Moreover, (75%), (72%), (67%), (66%), (69%) were adaption to the new technology, privacy and security concerns, maintains, lack of human resource, and no service venders respectively. The table below summarize the participant responses (Table 4)

Table 4: Ranking of reported barriers

	PERCENT
Lack Of Computer Skills	78%
Cost Of EHRs System	75%
Adaption To The New Technology	75%
Privacy And Security Concerns	72%
EHR Maintenance	67%
Lack Of Human Resource	66%
No Service Venders	69%

4.1.11 Respondent choice on a number of questions

The Likert-scale was used from Q12 to Q19 ranging (from 1 for 'strongly agree to 5 'strongly disagree). Participants were asked to self-report their thoughts regarding

many topics like, selfimprovement, point of view on implementation of EHR, and the benefits. The table below summarizes the participant responses (table 6)

Table 5: Respondents choice regarding the implementation of EHR

	Strongly Agree	agree	neutral	disagree	Strongly disagree
12 As a health care employee I plan to improve my computer skills through proper training, to be more positive in my work	23%	70%	5%	1%	1%
13 Implementing of EHRs system will increase the quality of work and efficiency in hospitals, together with providing better patient care, and safety	2%	65%	2%	0%	1%
14 In general, I think the our facility will support the use of this system	25%	48%	15%	12%	0%
15 The electronic health records system gives easier control over who has access to information	25%	46%	17%	8%	4%
16 I think the EHRs system to be more useful in the health facility, but I think that the costs for a full Implementation too high.	15%	42%	22%	15%	6%
17 In my opinion, I think that EHRs system will protect the privacy of our patients more than Paper-based medical records.	26%	50%	9%	11%	4%

18 I think EHRs System will be more useful to transferring the patients information and contact with other hospitals	33%	49%	6%	8%	4%
19 The electronic medical records system will simplify my job and save time	35%	49%	9%	5%	2%

4.1.12 Respondents choice for fear regarding the implementation of EHRs

Various question concerning the fear of implementing the EHRs system were asked. Likertscale was given to choose from ranging (from 1 for 'strongly agree to 5 'strongly disagree). Furthermore, we calculated the mean (3.402) for the group as a whole to discover the average answer, which will be used to represent this dimension. The tables below summarizes the participant responses and the group mean (See table 7 and table 8)

Table 6: Respondents choice of fear regarding the implementation of EHR

	Strongly Agree	agree	neutral	disagree	Strongly disagree
The cost of implementing an EHR system is too high.	7%	52%	29%	7%	5%
Maintaining and updating EHR systems is too expensive.	5%	45%	33%	11%	6%
Our facility does not have enough staff to maintain the system.	20%	48%	17%	12%	3%

Training our employees to use an EHR system is too expensive.	15%	23%	25%	32%	5%
The system may limit freedom of professional conduct in patient care decisions	12%	38%	22%	21%	7%
The security of patient medical information is a major concern	10%	36%	24%	24%	6%
Staff not knowing the legal consequences of losing or leaking information	15%	41%	24%	15%	5%
The hospital lack the necessary infrastructure to implement the system	14%	45%	23%	13%	5%
I expect the process of converting paperbased data into electronic records to take a lot of time	18%	48%	14%	13%	7%

Table 7: The mean for the whole group

	mean	**Std. deviation**
The group avg. answer	3.402	.53829

4.1.13 Respondents choice for the benefits regarding the implementation of EHR

Participants in this survey were asked to self-report their opinion regarding the expected benefits from the application of the EHRs system. Participants were given the Likert-scale to choose from ranging (from 1 for 'strongly agree to 5 'strongly disagree). Furthermore, we calculated the mean (3.96) for the group as a whole to discover the average answer, which will be used to represent this dimension. The table below summarizes the participant responses and the group mean (See Table9, Table 10)

Table 8: Respondents choice for the benefits regarding the implementation of EHR

	Strongly Agree	agree	neutral	disagree	Strongly disagree
Reduce medical errors.	16%	72%	7%	5%	0%
Reduce cost.	18%	66%	10%	4%	2%
Reduce treatment time/ length of stay	17%	58%	16%	7%	2%
Minimize malpractice claims	24%	56%	12%	4%	4%
I think using electronic medical records is easier than using paper-based records	27%	53%	13%	6%	1%
Using the system will increase the efficiency of my job	26%	62%	8%	3%	1%
Easier data exchange	27%	63%	6%	3%	1%
Improving patient safety	19%	58%	14%	9%	0%
Using this system will enable me to get things done more quickly	39%	50%	14%	2%	0%

Table 9: The mean for the whole group

	mean	**Std. deviation**
The group avg. answer	3.9620	.48633

Chapter V
Discussion

5.0 Discussion

E-health is very wide subject and the EHRs is a complex part of it, with all the benefits associated with implementing it theirs many barriers that can affect the process. The survey we conducted shows that the majority of our participants are females (59%), and the most common age group are from 25 to 44 (57%), most of them with Bachelor's Degree(53%).

The results of the current study show that the financial barrier is a major concern in the adoption process. In this context, 52% of participant agreed that the cost of implementing it is too high. The results are consistent with the Medical Records Institute of America in 2005 that shows that the financial resource is one of the main issues (15).

Concerning the awareness about the existing of the EHRs system, Just (47%) of our participants knew few things about the EHRs system while only (12%) with a little to no information about it. (57%) of our applicants thinks that there is a big problem with the current manual system in the primary clinic. However, there was an expectations of the future implementation of the EHRs system in the productivity and efficiency part which was reported by (67%) of the sample population.

The legal and ethical issues like security and privacy are not a very big concern in our result.

With only (36%) agree that security of patient medical information is a major problem. These findings are inconsistent with Haleh Ayatollahi study 2011, which found that the security and data confidentiality was a very important barrier. This difference may perhaps be because our participants considered other technical and financial barrier are more important, for the reason that the participants were not very familiar with legal and ethical consequences and how immoral breaching the confidentiality and unauthorized access to health data (41%).

In addition, the finding showed that the technical barrier is one of the main concerns in the adoption process. Among the technical barriers are the hardware and software infrastructure which from our participants view they think that the facility have the necessary infrastructure

to implement the system (45%). Also (49%) of our participants reported that the System will be more useful in transferring patients information and exchange data with other hospitals. Similarly, Thakkar and Davi 2006 found that the technical barriers was among the top barriers in adoption process.

Regarding the individual barriers, the experience with using computer skills vary (see fig 3).

The participants agreed (70%) to improve their computer skills to keep up with the health informatics technology also they thought (49%) that the future use of EHR system can simplify their job and save them time . Furthermore, the participants agreed (48%) that the facility do not have enough employee to keep up with the system to maintain it.

Also in the ranking of the top barriers, the adoption of the new system was among the top ones. It is considered hard for employees to be familiar with the Change in culture required to embrace technology and they expect that the process of converting paper-based data into electronic records will take a lot of time (48%). Our results were consistent with Amatayakul(16) who emphasized on the importance of the change in organization culture prior to the adoption of the EHRs because it may prevent the healthcare staff from joining in the process of implementation and design.

According to the finding of this study, the category of organizational barriers was in the least important barriers in the adoption process. One of the examples of organizational barriers is the senior management support, which from our participant point of view they think that the facility will support the use of this system in the long run (48%). In another study by Ayatollahi (7) which is consistent with our results found that that the organization barriers was not one of the top important barrier.

Our results showed from out respondent's perspective that the overall ranking for the most important barriers are lack of computer skills, cost of implementation, adoption of new technology and security concerns then the lack of vender and work force.

As we discussed the potential barriers of the system we also addressed the benefits that may be visible in case of implementation of the system like the reduce medical errors (72%) , reduce in cost (66%), reduce in treatment time (58%), easier data exchange (63%), improving patient safety (58%), and increasing the efficiency of the job (62) etc. As will we calculated the group mean (3.9620) which was in the agree interval that means that the participants agreed on the advantage that the system can bring to their health facility.

This study shows a positive correlation (.431) between the perception of the participants that implementing of EHR will increase the quality of work and efficiency in hospitals, together with providing better patient care and safety. And their perception that the use of EHR would protect the privacy of the patients' more than Paper-based medical records". This relation indicates that people who believed that EHR system would protect the privacy of their data more then paper-based records are more likely to believe that the implementing of EHR system will increase the quality and efficiency of work.

In addition, a negative correlation (-.197) was found between perception of the participants that implementing of EHR will increase the quality of work and efficiency in hospitals, together with providing better patient care and safety. Moreover, their concerns about the high cost of implementation and training of employees. This relation shows a negative correlation which means that participants who believed that training the employees to use the system cost were too high were less likely to believe that the EHR system would protect the privacy of their data more than paper-based records.

A positive correlation (.262) between the participants' knowledge of using computer skills, and their perception about the implementing of EHR system will make my job easier and will save my time. This points out that the participants with higher computer skills are more likely to believe that the use of EHR will make their job simpler and less time consuming

5.1 Limitation of study

The study limitation is the research demographics were only limited to one healthcare facility in Libya. Moreover, due to the tight timeframe to conduct this study the quantity of the sample size was limited to 100 participants only. Furthermore, there was no trial implementation of the system; future research can design a demo for EHRs system and study the attitude of healthcare employees' toward the effect of EHRs system implementation

5.2 Conclusion and recommendation

In conclusion, the study showed the lack of knowledge about the EHRs system and the experience with using computer by the healthcare employees and unawareness of the widespread of the new technology is one of the main barriers, as well, the technique and financial barriers were on the top of the barriers list. On the other hand organizational and security, barriers were among the least impermanent. Therefore, these results would help in overcoming current and potential problems and ensure better strategic plan although the adoption of this kind of system may take a long duration. The EHRs helps in improving the quality of healthcare in many aspects from data management, information sharing, and decisions making, reducing cost, preventing data loss and much more. , extra efforts needs to be made to successfully implement EHRs system in the future. Therefore, further studies can investigate more in those barriers in order to determine possible solutions to overcome them also a demo design for the system could be used by the physician to evaluate their perception on using the system.

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Appendix 1

الجامعة الليبية الدولية للعلوم الطبية
Libyan International Medical University
LIMU

التاريخ: 2019/09/29 م
الاشاري: ج.ل.د.ع.ط/2019/09/10/452

السيـــد مدير العيادة المجمعة الكيش / المحترم

بعد التحية والسلام ،،،

في إطار التعاون الإيجابي بين الجامعة الليبية الدولية للعلوم الطبية والمؤسسات الصحية وذلك لزيادة التحصيل العلمي لدى الطلبة والرقي بمستواهم في كافة العلوم ، عليه نأمل منكم تمكين الطالبة :

- سلمى فرج صالح الهريش

المسجلة في قسم المعلوماتية الصحية كلية تكنولوجيا المعلومات للحصول علي معلومات بخصوص بحث التخرج .

شاكرين لكم حسن تعاونكم ومساهمتكم في دفع حركة التقدم بالمجتمع

د. توفيق محمد الطويل
عميد الكلية

صورة لكلا من :
لملف الدوري العام
زينب منصور المقصبي

Appendix 2

The questionnaire of the study

A- Personal Data

1. **Gender**
   - Male
   - Female

2. **Age**
   - 24 or less
   - 25 - 44
   - 45 or more

3. **What is your educational level?**
   - High School or below
   - Two Years Diploma or Certificate
   - Bachelor Degree
   - Masters and higher Education

4. **Knowledge of information technology - basic skills - for example, keyboard use skills**
   - Poor
   - Good
   - Excellent

5. **Knowledge of the English language?**
   - Poor
   - Good
   - Excellent

6. **What is your job title?**
   - Physicians
   - Nurses
   - Pharmacists
   - Administration Staff
   - Lab technician

B- Knowledge and attitude

7. How much do you know about Electronic Health Records (EHRs) system?

□ Very Little

□ A little

□ A few things

□ A great deal

8. Are there problems regarding the management of patients' manual health records at this time?

□ Yes

□ No

□ I do not know

9. What are your expectations of the use of EHRs system?

□ The EHRs system will improve productivity and office efficiency over time

□ The EHRs system is just a replacement for traditional paper -based patient folders

□ The EHRs system is unlikely to improve prod uctivity and office efficiency

10. From the following list, choose the most 5 barriers that affect the successful of EHRs implementation

□Lack of computer skills

□Cost of EHRs system

□Adaption to the new technology

□Privacy and security concerns

□EHR maintenance

□Lack of human resource

□No service venders

Do you agree or disagree with each of the following statements?	Strongly Agree	agree	neutral	disagree	Strongly disagree
11. As a health care employee I plan to improve my computer skills through proper training, to be more positive in my work	□	□	□	□	□
12. Implementing of EHRs system will increase the quality of work and efficiency in hospitals, together with providing better patient care, and safety	□	□	□	□	□
13. In general, I think the our facility will support the use of this system	□	□	□	□	□
14. The electronic health records system gives easier control over who has access to information	□	□	□	□	□
15. I think the EHRs system to be more useful in the health facility, but I think that the costs for a full Implementation too high.	□	□	□	□	□
16. In my opinion, I think that EHRs system will protect the privacy of our patients more than Paper-based medical records.	□	□	□	□	□
17. I think EHRs System will be more useful to transferring the patients information and contact with other hospitals	□	□	□	□	□
18. The electronic medical records system will simplify my job and save time	□	□	□	□	□

C- Practical

19. Please rate each of the following concerns over the implementation of an EHR system:

	Strongly Agree	agree	neutral	disagree	Strongly disagree
The cost of implementing an EHR system is too high.	□	□	□	□	□
Maintaining and updating EHR systems is too expensive.	□	□	□	□	□

Our facility does not have enough staff to maintain the system.	□	□	□	□	□
Training our employees to use an EHR system is too expensive.	□	□	□	□	□
The system may limit freedom of professional conduct in patient care decisions	□	□	□	□	□
The security of patient medical information is a major concern	□	□	□	□	□
Staff not knowing the legal consequences of losing or leaking information	□	□	□	□	□
The hospital lack the necessary infrastructure to implement the system	□	□	□	□	□
I expect the process of converting paper-based data into electronic records to take a lot of time	□	□	□	□	□

20. Please rate each of the following perceived benefits that you believe will occur because of implementing the EHRs system

	Strongly Agree	agree	neutral	disagree	Strongly disagree
Reduce medical errors.	□	□	□	□	□
Reduce cost.	□	□	□	□	□
Reduce treatment time/ length of stay	□	□	□	□	□
Minimize malpractice claims	□	□	□	□	□
I think using electronic medical records is easier than using paper-based records	□	□	□	□	□
Using the system will increase the efficiency of my job	□	□	□	□	□
Easier data exchange	□	□	□	□	□
Improving patient safety	□	□	□	□	□
Using this system will enable me to get things done more quickly	□	□	□	□	□