Determination of the Impact of Electronic Health Information Systems upon Medical, Medical Backing and Administrative Decisions in Al-Kindy Teaching Hospital

تحديد آثر نظم المعلومات الصحية الإلكترونية على القرارات الطبية والطبية المساندة والإدارية في مستشفى الكندي التعليمي

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المستخلص

الهدف: لتحديد آثر نظم المعلومات الصحية الإلكترونية على القرارات الطبية والطبية المساندة في مستشفى الكندي التعليمي .

المنهجية: إستخدم تصميم وصفي تحليلي للفترة من 14حزيران 2015ولغاية 15 آب 2015 بعد ذلك
أختيرت عينة غرضية "غير إحتمالية" من (50) فرد. العينة مكونة من (25) طبيب وإختصاص طبي مساند و (25) إداري من المساهمين في عملية صنع القرارات في مستشفى الكندي التعليمي . تم تبني وتطوير إستمارة إستبيانية من (68) فقرة تعتمد التدوين الذاتي لغرض الدراسة الحالية ومكونة من (6) أجزاء لقياس الظاهرة الجديرة بالدراسة . رتبت ورمزت الإستبانة حسب مقياس ليكرت ذوالخمس مستويات موافق بشدة =5 وموافق=4 وغير متأكد=3 وغير موافق=2 وغير موافق بشدة =1. تم تحديد ثبات الإتساق الداخلي للإستبانة من خلال تقنية التجزئة-النصفية وحساب معامل الإرتباط كرونباخ ألفا (0،96) للمقياس الداخلي. حدد صدق المحتوى للإستبانة من خلال لجنة من (9) خبراء في حقول الطب والطب المساند والإدارة . كان جمع بيانات الدراسة من خلال إستخدام إستبانة التدوين الذاتي كأداة لجمع البيانات . تم تحليل البيانات من خلال تطبيق إسلوب تحليل البيانات الإحصائي الوصفي كالتكرارات والنسب المئوية والحساب الكلي للقيم والوسط الحسابي للقيم ومعامل الإرتباط بيرسون.

النتائج: أشارت الدراسة الحالية إلى وجود آثر كبير لأنظمة المعلومات الصحية الإلكترونية على قرارات الملاكات الطبية والطبية المساندة والإد اراية. الزيادة في مستوى صفات هذه الملاكات كعدد سنوات الخدمة ومكان العمل والتعليم يتزامن معها آثر كبير لأنظمة الم علومات الصحية الإلكترونية.

التوصيات: أوصت الدراسة الحالية إلى إقامة شبكة وطنية لأنظمة ال م علومات الصحية الإلكترونية والتي من خلال ها ترتبط المؤسسات الصحية . زيادة وعي جميع الملاكات الطبية والطبية المساندة والإدارية نحو فوائد إستخدام أنظمة المعلومات الصحية الإلكترونية . إمكانية إجراء بحوث أخرى مع عينة كبيرة ومواقع مختلفة وصفات متعددة.

Abstract

Objective(s): To determine the impact of the electronic Health Information Systems upon medical, medical Backing and administrativedecisions in Al-Kindy Teaching Hospital.

Methodology: A descriptive analytical design is employed through the period of June 14th 2015 to August 15th 2015. A purposive "non- probability" sample of (50) subject is selected. The sample is comprised of (25) medical and medical backing staff and (25) administrative staff who are all involved in the process of decision making in Al-Kindy Teaching Hospital. A self-report questionnaire, of (68) item, is adopted and developed for the purpose of the present study and it is consisted of (6) subscales that measure the phenomenon underlying the study. The questionnaire is rated and scored on 5-level type Likert scale of strongly agree= 5, agree=4, uncertain= 3, disagree=2, and strongly disagree=1. Internal consistency reliability is determined for the questionnaire through split-half technique and computation of Cronbach's AlphaCorrelation Coefficient of (r= 0.96) for the internal scale. Content validity for the questionnaire is determined through panel of (9) experts in the fields of medicine, medical backing, and management. Data are collected through the use of the self-report questionnaire as mean of data collection. Data are analyzed through the application of the descriptive statistical data analysis approach of frequencies, percentages, and computation of total scores, mean of scores and Pearson Correlation Coefficient.

Results: The present study indicates that the Electronic Health Information Systems have great impact upon decisions of medical, medical backing and administrative staff. The higher the level of these staff characteristics of years of employment, place of work and education, the greater the impact of the Electronic Health Information Systems.

Recommendations: The present study recommends that establishment of a nationwide network for Electronic Health Information Systems by which health care organizations can be connected. Increase all medical, medical backing and administrative staff awareness toward the benefits of using the Electronic Health Information Systems. Further research can be conducted with large sample size, different settings and various characteristics.

Key Words: Electronic Health Information Systems, Medical staff, Medical Backing staff, Administrative staff, Decisions.

Introduction:

Health information systems refer to each system that involve the process of gathers, storages, administers or transfersinformation about individuals health or the activities of health organizations.There are many things which are integrated among this definition, such as routine provincial-level information systems, public health and diseases surveillance systems, and, also includes systems of laboratory information's as well asthe human resource management information systems (HRMIS) and patient administration systems (PAS). In general, a perfect HIS is aunitedeffort to accumulate, process, record and use health data, information and knowledge in order to effect on the policy and decision-making, action of the health programs, individual and community health outcomes, and scientific research. Sound decision-making at all levels of a health system requiresaccurate statistical information that are classified according to sex, age, social and economic properties. At a policy level, the existence of information helps to take the appropriate decision in the distribution of resources and, at the delivery level, the presence of information about quality and services efficiency can provide an opportunity to improve outcomes[(1)].

Sound and reliable information is considered the foundation of decision-making across all health system building blocks, and is accounted essential for health system policy development and implementation, governance and regulation, health research, human resources development, health education and training, service delivery and financing [(2)].

There are four main functions of health information systemsthat can be summarizedas; generation, compilation, analysis and interpretation, and dissemination and use of health related data. These systems andthrough its functions underpin entire health decision-making process. Actually, the health information systems are gather the data from different sources such as health districts and other relevant sectors,also these systems will be analyze all of collected data to ensures their quality, relevance and timeliness, finally, this systems will converts datainto information and knowledge about health-related decision-making[(3)].

At both of developed and developing countries,the health information systems are an essential instrument in the administration of public health care activities and services. Efficient and adequate health information systems are important in the process of assessing, planning and carry out health interventionsin order to managethe health needs forindividual and populations. It is also very important for evaluation of the effectivenessand coverage of the public healthprograms[(4)].

A well-functioning health information system brings jointly all relevant partners to ensure that users of health information have access to reliable, authoritative, useable, understandable, comparative data[(2)]. So, based on the early stated facts, the present study ought to determine the impact of the Electronic Health Information Systemsupon medical, medical backing and administrative decisions in Al-Kindy Teaching Hospital.

Methodology:

A descriptive analytical design is employed throughout the present study for the period of June 14th 2015 to August 15th 2015. A purposive "non- probability" sample of (50) subject is selected. The sample is comprised of (25) medical and medical backing staff and (25) administrative staff who are all involved in the process of decision making in Al-Kindy Teaching Hospital.

A self-report questionnaire, of (68) item, is adopted and developed for the purpose of the present study[5]. It is consisted of (6) subscales of types of electronic health information systems used in Al-Kindy Teaching Hospital (5) item; the impact of the use of electronic health information systems in medical and medical backing business fields (17) item; the impact of the use of electronic health information systems upon decisions of the medical and medical backing staff (10) item; the impact of the use of electronic health information systems in administrative business fields (15) item; the impact of the use of electronic health information systems upon the administrative decisions (9) items; and Impedimenta that limit the use and efficiency of the electronic health information systems in Al-Kindy Teaching Hospital (12) item.The questionnaire is rated and scored on 5-level type Likert scale of strongly agree= 5, agree=4, uncertain= 3, disagree=2, and strongly disagree=1. Internal consistency reliability is determined for the questionnaire through split-half technique and computation of Cronbach's Alpha Correlation Coefficient of (r= 0.96) for the internal scale. Content validity for the questionnaire is determined through panel of (9) experts in the fields of medicine, medical backing, and management.

Data are collected through the use of the self-report questionnaire as mean of data collection. Data are analyzed through the application of the descriptive statistical data analysis approach of frequencies, percentages, and computation of total scores, mean of scores and Pearson Correlation Coefficient. contribution to the impact of Electronic Health Information Systems upon medical, medical backing and administrativedecisions.
Mean of scores is computed for the determination of items'significance A mean of score equal to less than (3) is considered not significant, equal to three is considered significant and more than (3) is considered highly significant.

The impact of the use of Electronic Health Information Systems is determined through computation of total scores of items and rated a high (36.5- 50), moderate (22.8-36.4), and low (10-22.7) for the impact of the use of electronic health information systems upon decisions of the medical and medical backing staff; and high (34-45), moderate (22-33),and low (9-21)for the impact of the use of electronic health information systems upon the administrative decisions.

The association between the impact of the Electronic Health Information Systems upon decisions making and the subjects' demographic characteristics is determined through the computation of Pearson Correlation Coefficient.

Results:
Throughout the course of data analysis, results of the study are tabulatedand presented with regard to the study objective.

Table 1. Types of Electronic Health Information Systems in Al-KindyTeaching Hospital

Type of Information System	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	M.S.	Sig.
1. Automation systemfor offices and documents management, such as word processor, graphics, databases, and electronic tables.	**16**	**26**	**7**	**0**	**1**	**4.12**	**HS**
2. Decisions' support system and high level management information systemthat providesmanagers withinformatics tools that help in solving programmatic and non-programmatic problems.	**15**	**26**	**7**	**1**	**1**	**4.06**	**HS**
3. Career informationsystem and paperwork treatment, such as patients registration system, medicalrecords system, blood bank system, radiology system, pharmacysystem, laboratory system, medical report system, customeraccount system, electronic reports system, storages andpurchase orderssystem, and internaldepartments, outpatient clinics,and emergency department system.	**13**	**26**	**9**	**1**	**1**	**4.52**	**HS**
4. Mailing systems, such as e-mail and audio mail.	**12**	**28**	**8**	**0**	**2**	**3.96**	**HS**
5.Knowledge systems, such as experiencesystems, artificial intelligence, and remote medicine.	**13**	**23**	**12**	**1**	**1**	**3.92**	**HS**

M.S.= Mean of scores, Sig.= Level of significance, HS= Highly significant.

This table presents that mean of scores for types of Electronic Health Information Systems in Al-Kindy Teaching Hospital are highly significant.

Table 2. The impact of Electronic Health Information Systems upon Decisions of Medical and Medical Backing Staff in Al-Kindy Teaching Hospital

The impact of Electronic Health Information Systems upon Decisions of Medical and Medical Backing Staff in Al-Kindy Teaching Hospital		
Low 10-22.7	Moderate 22.8- 36.4	High 36.5- 50
0	5(20%)	20(80%)

Results out of this table depict that Electronic Health Information Systems have great impact upon decisions of medical and medical backing staff in Al-Kindy Teaching Hospital (80%).

Table 3. Mean of Scores for Items of the Impact of Electronic HealthInformation Systems upon Decisions of Medical and Medical Backing Staff in Al-Kindy Teaching Hospital

Item	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	M.S.	Sig.
1. It contributes to the activation of the medical monitoring process on the mechanism of decisions implementation.	**6**	**17**	**2**	**0**	**0**	4.16	HS
2. It provides sufficient and comprehensive information about the patient health status	**4**	**14**	**7**	**0**	**0**	3.88	HS
3. It presents precise information for making therapeutic decisions relative tothe patients' status.	**5**	**13**	**5**	**2**	**0**	3.84	HS
4. It contributes to speed the decision making process on large scale due to its quick presentation of required information.	**3**	**19**	**3**	**0**	**0**	4	HS
5. It reduces financial cost of decision-making processes.	**5**	**15**	**5**	**0**	**0**	4	HS
6. It updates data and information on a regular base.	**9**	**13**	**3**	**0**	**0**	4.24	HS
7. It increases the speed of information exchange between different medical boards relative to patient's diagnosis and treatment.	**8**	**14**	**3**	**0**	**0**	4.6	HS
8. It provides theopportunity for using quantitative approaches in decision making, such as estimating the waiting lists, resources planning, quality monitoring, employees planning…etc.	**6**	**11**	**8**	**0**	**0**	3.92	HS
9. It results into the speed of decisions implementation of nursing boards and backing boards of staff.	**10**	**5**	**8**	**2**	**0**	3.92	HS
10. It promotes the quality of makingdecisions.	**9**	**9**	**6**	**1**	**0**	4.04	HS

MS= Mean of Scores, Sig.= Level of significance, HS=Highly significant.

All mean of scores for items of the impact of Electronic Health Information Systems upon decisions of medical and medical backing staff in Al-Kindy Teaching Hospital are highly significant.

Table 4. The impact of Electronic Health Information Systems upon Administrative Decisions in Al-Kindy Teaching Hospital

The impact of Electronic Health Information Systems upon Administrative Decisions in Al-Kindy Teaching Hospital		
Low 9-21	Moderate 22-33	High 34-45
0	2(8%)	23(92%)

Results out of this table reveal that Electronic HealthInformation Systems have great impact upon Administrative Decisions in Al-Kindy Teaching Hospital (92%).

Table 5. Mean of Scores for Items of the Impact of Electronic Health Information Systems upon Administrative Decisions in Al-Kindy Teaching Hospital

Item	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	M.S.	Sig.
1. It saves time in gathering all required information and it compares alternatives.	**12**	**10**	**3**	**0**	**0**	4.36	HS
2. It saves efforts in gathering all required information and it compares alternatives.	**12**	**10**	**3**	**0**	**0**	4.36	HS
3. It presents precise information for decision-making process.	**11**	**12**	**1**	**1**	**0**	4.32	HS
4. It provides necessary information for decision-making.	**11**	**12**	**1**	**1**	**0**	4.32	HS
5. It provides all the information that weneed.	**11**	**12**	**1**	**1**	**0**	4.32	HS
6. It facilitates the process of exchanging decisions making information between different offices and department	**11**	**13**	**1**	**0**	**0**	4.4	HS
7. It promotes the quality of issued decisions.	**7**	**16**	**2**	**0**	**0**	4.2	HS
8. It reduces thefinancial cost of decision-makingprocesses.	**7**	**13**	**5**	**0**	**0**	4.08	HS
9. It promotes the follow up of the implementation of theissued decisionsby theemployees.	**8**	**14**	**3**	**0**	**0**	4.2	HS

MS= Mean of scores, Sig. = Level of significance, HS=Highly significant.

This table depicts that all mean of scores for items of the impact of Electronic Health Information Systems upon decisions of administrative staff in Al-Kindy Teaching Hospital are highly significant.

Table 6. Pearson Correlation Coefficients for the Association betweenthe Impact of the Electronic Health Information Systems upon Decision-making and the Demographic Characteristics of Medical and Medical Backing Staff in Al-Kindy Teaching Hospital

Demographic Characteristics of Medical and Medical Backing Staff	Impact of the Electronic Health Information Systems
Years of Employment	0.94
Place of Work	0.89
Education	0.87

Pearson correlation coefficients out of this table indicate strong positive association between the impact of the Electronic Health Information Systems upon decision making and the demographic characteristics of medical and medical backing staff of years of employment, place of work and education in Al-Kindy Teaching Hospital.

Table 7. Pearson Correlation Coefficients for the Association betweenthe Impact of the Electronic Health Information Systems upon Decision-making and the Demographic Characteristics of Administrative Staff in Al-Kindy Teaching Hospital

Demographic Characteristics of Administrative Staff	Impact of the Electronic Health Information Systems
Years of Employment	0.97
Place of Work	0.90
Education	0.91

Pearson correlation coefficients out of this table indicate strong positive association between the impact of the Electronic Health Information Systems upon decision-making and the demographic characteristics of administrative staff of years of employment, place of work and education in Al-Kindy Teaching Hospital.

Table 8. Mean of Scores for Items of Impedimenta that limit the use and Efficiency of the Electronic Health Information Systems in Al-Kindy Teaching Hospital

Item	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	M.S.	Sig.
1. Lack of training opportunities for employees on the use of health information system.	**23**	**20**	**6**	**0**	**1**	**4.28**	**HS**
2. Centralization of ElectronicHealth InformationSystem and lack of freedom inobtaining the required information.	**12**	**26**	**10**	**2**	**0**	**3.96**	**HS**
3. Shortage of equipment in all departments for the work to be done.	**16**	**20**	**11**	**2**	**1**	**3.96**	**HS**
4. The time for the use of the health information system is not sufficient.	**14**	**23**	**10**	**2**	**1**	**3.94**	**HS**
5. People do not trust the system to have the work done.	**11**	**18**	**11**	**6**	**4**	**3.52**	**HS**
6. The nature of the work does not need the system to have the work done.	**11**	**13**	**13**	**11**	**2**	**3.4**	**HS**
7. Lack of awareness and limited experience about the role of the system.	**19**	**16**	**10**	**4**	**1**	**3.96**	**HS**
8. Lack of financial credits that are required for providing and updating the system.	**22**	**16**	**7**	**5**	**0**	**4.1**	**HS**
9. The high-level management does not support the necessity to use the health information system.	**16**	**13**	**15**	**6**	**0**	**3.78**	**HS**
10. Lack of maintenance.	**13**	**22**	**10**	**4**	**1**	**3.84**	**HS**
11. Lack of required skillful technicians to operate and maintain the system.	**13**	**20**	**13**	**4**	**0**	**3.84**	**HS**
12. Lack of effective monitoring and protection to the system.	**14**	**19**	**14**	**3**	**0**	**3.88**	**HS**

MS= Mean of scores, Sig.= Level of Significance, HS= Highly Significant.

All mean of scores for items of impedimenta that limit the use and efficiency of the Electronic Health Information Systems in Al-Kindy Teaching Hospitalare highly significant.

Discussion:

Discussion and interpretation of the study findings are presented relative to the study objective. Supportive evidence is provided as being available in the literature.

Part I: Typesof Electronic Health Information Systems in Al-Kindy Teaching Hospital

Analysis of data related to such issue has revealed that the vast majority of the medical, medical backing and administrative staff have used more than one Health Information Systemto accomplish their tasks. This has been very obvious in the highly significant mean of scores for the types of Electronic Health Information Systems which are used in Al-Kindy Teaching Hospital (Table 1).Types of used Electronic Health Information Systems are priorities according to their significance as Automation system for offices and documents management, career information and paperwork treatment, Decisions' support system and high level management information system, mailing systems and knowledge systems.

Supportive evidence for this finding is reported as that a good number of MIS used today, as fundamental point, can perform multiple tasks all at the same time. This potential to multitask increases efficiency in an organization since several business operations can be conducted simultaneously[6].

Part II: The Impact of Electronic Health Information Systems upon Decisions of Medical and Medical Backing Staff in Al-Kindy Teaching Hospital

Relative to the impact of these systems upon the decision making of the medical and medical backing staff, the study findings indicate that Electronic Health Information Systems in Al-Kindy Teaching Hospital have great impact upon the decisions of the medical and medical backing staff (Table 2). Such evidencecan be noted in the mean of scores for items of the impact of these systems upon decisions of medical and medical backing staff which are highly significant (Table 3). This finding has emerged due to the fact that the medical and medical backing staff is using the appropriate systems which make perfect match with multitask.

ComputerizedHealth Information Systems have major effect on medical decisions. They contribute to their improvement; update the information on a regular base; reduce the costs of decision making; speed of already made decisions by different departments; activate the medical monitoring on the mechanism of decisions' implementation; present accurate and sufficient information about therapeutic and diagnostic decision making; and provide sufficient and comprehensive information about patient's condition[5]. Furthermore, information systems have great impact upon decisions of staff in the medical field. They provide accurate, sufficient and comprehensive information concerning patient care, particularly selection of treatment[7].

With special regards to decision making, the capacity to multitask ensures that decisions are made speedily when compared to those systems which can only handle one task at a time[6].

Part III:The Impact of Electronic Health Information Systems upon Administrative Decisions in Al-Kindy Teaching Hospital

The data analysis of the impact Electronic Health Information Systems upon administrative decisions in Al-Kindy Teaching Hospital has depicted that these

systems have major impact upon decisions of administrative staff (Table 4). Such evidence is supported by the fact that mean of scores for items of this impact is highly significant ones (Table 5). As a result, decisions of administrative staff are influenced by the Electronic Health Information Systems more than decisions of medical and medical backing staff. This has emerged may be due to their wide-range experience with these systems.

It has been concluded that good management of information systems leads to good decision-making in business just in the same way poor management leads to poor decision-making[8].

With this relation, it is stated that based on the significant role that information plays in choice of decision to be made, organizations must ensure that they have agood management information system[9].

So, the quality of managerial decision-making depends directly on the quality of available information" and the managers should therefore cultivate an environment that encourages the growth and viable sprouting of quality information[10].

Part IV: The association between the Impact of Electronic Health Information Systems and the Subjects' Demographic Characteristics in Al- Kindy Teaching Hospital

Analysis of such association depicts that there are strong positive associations between the impact of the Electronic Health Information Systems and the medical, medical backing and administrative staff's characteristics (Table 6 and 7). Moreover, characteristics of administrative staff have experienced more association with the impact of Electronic Health Information Systems than those of medical and medical backing staff.These findings can be interpreted in a way that the higher the level of the demographic characteristics of years of employment, place of work and education; the greater the impact of Electronic Health Information Systems in Al-Kindy Teaching Hospital.

Part V: Impedimenta that limit the use and efficiency of the Electronic Health Information Systems in Al-Kindy Teaching Hospital

According to analysis of impedimenta that limit the use and efficiency of the Electronic Health Information Systems in Al-Kindy Teaching Hospital, the study findings present that the impedimenta can be categorized into two priority groups. The first priority group is comprised of lack of training and lack of financial credits. The second priority group is consisted of centralization of Electronic Health Information System and lack of freedom in obtaining required information, shortage of equipment, lack of awareness and limited experience, insufficient time for the use of the system, lack of effective monitoring and protection to the system, lack of maintenance, lack of required skillful technicians, no support of the high level management to the necessity of using the system, people do not trust the system, and the nature of the work does not need the system (Table 8).

It is concluded that the establishment of well co-ordinated information collection systems at the various levels of the health care system in developing countries, using appropriatestaff, could contribute greatly to improvements in health care delivery [11].

Information systems can provides numerous benefits such as reduce costs, rise the speed and accuracy of patient care and management information, improve service ability, minimize health worker costs and inventory levels, and enhance the quality of patient care. At any case, the experiments proved that many of these advantages do not take place automatically after systemimplementation. The existence of operational obstacles may lead toreduce

information timeliness, accessibility, and precision; policies and procedures of the system may not sufficiently designed to reflect the realities and objectives of the systems; and the worker sduties may not have been sufficiently restructured. Therefore, the health care institutions must plan for and carried out strategies, which are prepared to maximize these benefits[12].

Achievements of better health outcomes require to strong health systems. The backbone for any strong health system is the strong health information system. A well-functioning HIS provides the accurate information into the accurate person at the accurate time, authorize decision-makers, administrators, and those who provide services for individual to make informed decisions amongany thing from patient or client care to national budgets. Strong health information systems also can play a great role in transparency and accountability through increasing the ability for obtaining of the information[13].

In sum, conclusion can derived as result to the early presented discussion and interpretation of the study findings. Such conclusion depict that all available Electronic Health Information Systems are used with respect to their priority. The Electronic Health Information Systems have great impact upon decisions of medical, medical backing and administrative staff. The higher the level of these staff characteristics of years of employment, place of work and education, the greater the impact of the Electronic Health Information Systems. Impedimenta that limit the use and efficiency of the Electronic Health Information Systems in Al-Kindy Teaching Hospital are categorized into first and second priority ones.

Recommendations:

According to the early stated facts, the present study recommends that:

1. Establishment of a nationwide network for Health Information Systems by which health care organizations can be connected.
2. Increase all medical, medical backing and administrative staff awareness toward the benefits of using the Electronic Health Information Systems.
3. Presenting the staff with appropriate training opportunities by which their experience can be improved.
4. Special attention can be forwarded to the impedimenta that limit the use and efficiency of the Electronic Health Information Systems in Al-Kindy Teaching Hospital with respect to their prioritization.
5. Further research can be conducted with large sample size, different settings and various characteristics.

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