



Factors Influencing Attitudes of Physicians in Lebanon towards the Use of Electronic Health Records

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Abstract

This research aimed to determine the factors affecting attitudes of Lebanese physicians towards the use of electronic health record using an online survey as a method to collect information. The data was collected through a questionnaire that was sent via email to a convenient sample composed of 384 units of physicians registered in the Lebanese order of physicians and practicing medicine in Lebanon. A total of 71 questionnaires were received with a response rate equal to 18.5%. The study used the descriptive design. Descriptive statistics, Pearson correlation coefficients, and linear regression were used to test hypotheses. The results showed a statistically significant positive relationship between the management support, physicians' involvement, training, and the attitude to use the EHR. The results also showed a statistically significant negative relationship between physician-patient relationship and the attitude to use the EHR. In addition, the results revealed a statistically significant positive relationship between perceived usefulness, perceived ease of use and the attitude to use the EHR. Moreover, the study found an overall positive attitude towards the use of electronic health record among Lebanese physicians. The study also proposed some recommendations for hospitals, program designers, and researchers.

Keywords: EHR, Attitudes, Lebanese physicians.

I. Introduction

To succeed in today's competitive marketplace, hospitals seek to adopt the electronic health records in order to improve quality provided to patients, and minimize medical errors. As a clinical information system, an electronic health record (EHR) supports integrated care, improves patient safety, improves communications between health professionals, and access to information (Malley, Berri & Sharp, 2010, p.1).

Despite its importance, the studies have shown a number of factors that might contribute to physicians not accepting this technology. Training, time needed to document, worry about the impact of this technology on the workflow, and contextual factors such as management support, physicians' involvement, autonomy, training, are helpful factors in explaining the attitudes of physicians towards the use of electronics health records (Morton, 2008, p. 10, 116, 121). The studies also, indicate that increasing the perceived risk will lead to a reduction in perceived usefulness and in the perceived ease of use, and thus subsequent decrease in the use of electronic health record (Ayache & Gannam, 2014, p. 162).

The entry of the medical sector into the digital world raises many questions (Khayrallah, 2018, p. 1). In addition, technology is continuously developing (Alkam, 2015, p. 54), which requires follow up and continuous research in this field. Hence, this study deals with the factors influencing the attitudes of physicians in Lebanon to use the electronic health records.

The literature indicates that physicians will not adopt this technology if it interferes with their workflow or changes the way a physician practices his profession (Morton, 2008, p. 2). When factors that lead to low adoption or use of electronic health record are known, they can be tackled; which would enhance the rate of user adoption (Ahlan & Ahmad, 2015, p.42). The problem to be addressed in this research is determining the factors that influence the attitudes of physicians in Lebanon towards the use of electronic health record. It can be formulated in the following main question: what factors influence physicians' attitudes towards the use of electronic health record in Lebanon? The research problem leads to the following research questions:

- 1- What is the nature of the relationship between management support and the attitude to use the electronic health record by Lebanese physicians?

- 2- What is the effect of physicians' involvement on the attitude to use the electronic health record by Lebanese physicians?
- 3- What is the effect of training on the attitude to use the electronic health record by Lebanese physicians?
- 4- What is the nature of the relationship between physicians' autonomy and the attitude to use the electronic health record by Lebanese physicians?
- 5- Does the physician-patient relationship affect the attitudes of physicians in Lebanon towards the use of electronic health record?
- 6- Does the perceived ease of use affect the attitude towards the use of electronic health record by Lebanese physicians?
- 7- What is the effect of perceived usefulness on the attitude towards the use of electronic health record by Lebanese physicians?

This paper was organized as follow: First, the paper reviews the literature and previous studies on the factors influencing the attitudes to use the electronic health record by Lebanese physicians. Then the methodology is presented, followed by the results and the main discussions. The research paper ends with a list of references and sources preceded by the conclusion.

II. Literature review and hypotheses development

1. Concept of Electronic Health Record

There is no difference between the electronic health record and the traditional paper record in term of function and purpose. But it is characterized by its precise content and its accessibility through computer networks (Alsultanny & Zandan, 2014, p. 6). In fact, the implementation of such information system does not eliminate the paper health record in one step, and the patient data is stored as text, numbers or images (Laerum, karisen, & Faxvaag, 2004, p 1, 2)

The health record includes the patient's personal information, medical history, diagnosis, progress notes, the results of laboratory tests, and the prescribed medication. It also includes the patient's health care plan. The patient's name and ID number should be recorded on each page of the record (Elsawy, 2017, p 299,300).

2. Importance of Electronic Health Record

Organizations are turning to information systems technology to provide business units with competitive advantage. They use the information systems to form closer

relationship with both their customers and suppliers through the extranets. (Weelen & Hunger, 2004, p. 176)

The increasing transformation into the digital number, supported by the technological development and the demographic and cultural variation, make the entry of information technology and communication into the health sector very important (World Health Organization, 2013, p. 1). Alkosaymi & Toubia (2012, p. 13) pointed out some of the benefits of the electronic health record as follow:

- i. Provides clear clinical observation in a new way.
- ii. Supports in decision making regarding the quality of care given to the patient.
- iii. Provides notifications about the dates of medication and vaccines.
- iv. Management of chronic diseases such as diabetes, high blood pressure and heart failure.

3. Characteristics of a good electronic health record

The system must support: (Mahmoud, 2017, p. 30)

- i. Security and privacy of information.
- ii. Ensure that information is shared between all the medical teams to ensure that the medical care is provided efficiently.
- iii. Overcoming problems and reducing errors in the paper medical record
- iv. Good integrated documentation from the patient's admission to the patient's discharge. In addition to the documentation of the signature and name of the person registered for the data.
- v. Ease of use: taking into consideration that not all physicians are computer experts.
- vi. Adopting standards issued by accredited entities to reduce errors.

4. Factors affecting the attitudes to use the electronic health record.

Many factors affect the attitudes of physicians to use the health information system. In 2008, Morton studied the physicians' characteristics and sociotechnical factors that may contribute to their acceptance of an EHR. It was found that some factors contributed to the physician acceptance and use of EHR which are: management support, physicians' involvement, physicians' autonomy, physician-patient relationship, perceived ease of use, and perceived usefulness. While Alkam in 2015 identified the factors affecting the adoption of management information system through Sudanese services firms, and examined the mediating

role of ease of use and the moderating role of users' awareness. The results showed that the ease of use contribute positively in adopting the system, and it played a mediating role between affecting factors (information technology and communication, changes resistance, organizational factors) and adopting the system. It was also found that the user's awareness has an influence as a moderating role on the relationship between ease of use and adopting the system. Another study done by Binyamin in 2010 identified the organizational and contextual factors associated with the adoption of HIT (Health Information Technology) in US acute care hospitals by examining the relationships between the adoption of HIT and patient safety and quality of care. The result showed that the better the quality of care performance of hospitals the higher the adoption of HIT. It also showed that organizational and contextual factors affect the adoption of information technology in hospitals.

These factors are briefly discussed in this section:

- i. Management support: a lack of leadership support can lead to user resistance which can be detrimental to successful implementation of any health information system. Ongoing commitment for financial and human resources is needed for success (Morton, 2008, p. 29).
- ii. Physicians' involvement: organizations and program designer have to involve physicians in system design and modification, and take their needs into consideration throughout the entire process (Morton, 2008, p. 30).
- iii. Training: physicians have not performed data entry by themselves, which can be a barrier to use the system. In addition, some physicians may have insufficient computer skills. Training is necessary to use the system effectively (Morton, 2008, p. 33).
- iv. Physicians' autonomy: physicians have concern about the system's ability to monitor and control his work; when autonomy is affected, resistance is likely to occur (Morton, 2008, p. 30).
- v. Physician-patient relationship: the electronic health record changes the way physicians record, retrieve and use the clinical data. It impacts the workflow, the policies, ant the interaction among individuals (Morton, 2008, p. 31).
- vi. Perceived ease of use: it has an important effects on physicians' attitudes (Bahadori, et al., 2017, p. 3). Hospitals may provide physician's accessibility to

- the system in his office or home. In addition, technical assistance and saving time are significant issues relating to ease of use (Morton, 2008, p. 33).
- vii. Perceived usefulness: Users may intend to use the system when thinking it may help them to do their job better (Ahlan & Ahmad, 2015, p. 31). The EHRs improve clinical processes and solve problems. Thus, it provides benefit to medical staff (Morton, 2008, p. 32).

5. Hypotheses development

The first Hypothesis:

H0: There is no relationship between management support and the attitude to use the electronic health record by Lebanese physicians.

H1: There is a positive statistically significant relationship between management support and the attitude to use the electronic health record by Lebanese physicians.

The second hypothesis:

H0: There is no relationship between physicians' involvement and the attitude to use the electronic health record by Lebanese physicians.

H2: There is a positive statistically significant relationship between physicians' involvement and the attitude to use the electronic health record by Lebanese physicians.

The third hypothesis:

H0: There is no relationship between training and the attitude to use the electronic health record by Lebanese physicians.

H3: There is a positive statistically significant relationship between training and the attitude to use the electronic health record by Lebanese physicians.

The fourth hypothesis:

H0: There is no relationship between physicians' autonomy and the attitude to use the electronic health record by Lebanese physicians.

H4: There is a positive statistically significant relationship between physicians' autonomy and the attitude to use the electronic health record by Lebanese physicians.

The fifth hypothesis:

H0: There is no relationship between physician-patient relationship and the attitude to use the electronic health record by Lebanese physicians.

H5: There is a positive statistically significant relationship between physician-patient relationship and the attitude to use the electronic health record by Lebanese physicians.

The sixth hypothesis:

H0: There is no relationship between the perceived ease of use and the attitude to use the electronic health record by Lebanese physicians.

H6: There is a positive statistically significant relationship between the perceived ease of use and the attitude to use the electronic health record by Lebanese physicians.

The seventh hypothesis:

H0: There is no relationship between perceived usefulness and the attitude to use the electronic health record by Lebanese physicians.

H7: There is a positive statistically significant relationship between perceived usefulness and the attitude to use the electronic health record by Lebanese physicians.

III. Methodology

A descriptive design was chosen for this research. The study used an online based survey, Lime survey, as a technique to obtain information from the respondents. A questionnaire was used as a research tool. The population is composed of all physicians registered in the Lebanese order of physicians and practicing medicine in Lebanon, during the period between 28 May and 7 Jun 2019. A convenient sample of physicians working in Lebanon were surveyed from 28 May to 7 Jun 2019. The sample size was 384 units (Sekaran, 2003, p. 294). This study used the questionnaire as a tool for gathering information by the physicians in Lebanon. The questionnaire was designed based on the survey instrument in the literature and published studies.

The data collected were imported to Excel and converted into SPSS format. The study analyzed the data using frequencies, percentages, mean, standard deviation, and linear regression. In addition, correlation coefficient Pearson was used to determine the strength of the relationship between independent and dependent variables. The questionnaire was validated by presenting it to a number of specialists. To ensure the internal consistency of the questionnaire items, the Cronbach's alpha was calculated. This value amounted to 89.7% which is excellent.

IV. Results

The result showed that most of the studied physicians were male 76.1%, with 64.8% of respondents are less than 50 years old, and the Internal Medicine specialty had the highest percentage (25.4%). Half of the sample had more than 10 years of work experience 50.7% .The result also indicated that 23.9% of the respondents used the computer for Patient's medical information, and 35.2% did not use the information systems. The most of the answers focused on "agree" of all the variables (management support, physician's involvement, training, ease of use, usefulness) except for physicians' autonomy and patient- physician relationship where the mean was 3.24 (neutral) and 2.52 (neutral) respectively.

The study also showed the strength of correlation between the variables, as shown by the value of Pearson coefficient which was between 0.508 and 0.845. A positive and good relationship was noted between all variables, except for the correlation between patient-physician relationship and attitudes to use the systems which was negative and good relationship (-0.435). The results also showed weak correlation between autonomy and attitudes to use the systems.

Testing the first hypothesis: The correlation coefficient between the independent variable (management support) and the dependent variable (attitudes to use the EHR) was 0.724. Thus, there is a positive and strong relationship between the two variables. The result also showed that 52.4% of the change in the dependent variable is due to the changes in the independent variable. The impact score was 0.917. This means that the change in the independent variables in one degree results in an improvement in using the system by 0.917. And $p= 0.000$ when $\alpha=5\%$. Thus, the null hypothesis is rejected and the alternative one is accepted. There is a statistically significant positive relationship between management support and attitudes to use the electronic health record by Lebanese physicians.

Testing the second hypothesis: The correlation coefficient between the independent variable (physician's involvement) and the dependent variable (attitudes to use the EHR) was 0.643. Thus, there is a positive and strong relationship between the two variables. The result also showed that 41.3% of the change in the dependent variable is due to the changes in the independent variable. The impact score was 0.691. This means that the change in the independent variables in one degree results

in an improvement in using the system by 0.691. And $p= 0.000$ when $\alpha=5\%$. Therefore, the null hypothesis is rejected and the alternative one is accepted. There is a statistically significant positive relationship between physician's involvement and attitudes to use the electronic health record by Lebanese physicians.

Testing the third hypothesis: The correlation coefficient between the independent variable (training) and the dependent variable (attitudes to use the EHR) was 0.508. Thus, there is a positive and good relationship between the two variables. The result also showed that 25.8% of the change in the dependent variable is due to the changes in the independent variable. The impact score was 0.619. This means that the change in the independent variables in one degree result in an improvement in using the system by 0.619. And $p= 0.000$ when $\alpha=5\%$. Thus, the null hypothesis is rejected and the alternative one is accepted. There is a statistically significant positive relationship between training and attitudes to use the electronic health record by Lebanese physicians.

Testing the fourth hypothesis: The correlation coefficient between the independent variable (autonomy) and the dependent variable (attitudes to use the EHR) was -0.185, and $p= 0.126$ when $\alpha=5\%$. Thus, the null hypothesis is accepted and the alternative one is rejected.

Testing the fifth hypothesis: The correlation coefficient between the independent variable (physician-patient relationship) and the dependent variable (attitudes to use the EHR) was (-0.435). Thus, there is a negative and good relationship between the two variables. The result also showed that 18.9% of the change in the dependent variable is due to the changes in the independent variable. The impact score was (-0.360). This means that the change in the independent variables in one degree affects the use of the system by 0.360. And $p= 0.000$ when $\alpha=5\%$. Thus, the null hypothesis is rejected and the alternative one is accepted. There is a statistically significant negative relationship between physician-patient relationship and attitude to use the electronic health record by Lebanese physicians.

Testing the sixth hypothesis: The correlation coefficient between the independent variable (perceived ease of use) and the dependent variable (attitudes to use the EHR) was 0.629. Thus, there is a positive and good relationship between the two variables. The result also showed that 39.6% of the change in the dependent variable is due to the changes in the independent variable. The impact score was

0.776. This means that the change in the independent variables in one degree result in an improvement in using the system by 0.776. It should be noted also that $p = 0.000$ when $\alpha = 5\%$. Thus, the null hypothesis is rejected and the alternative one is accepted. There is a statistically significant positive relationship between perceived ease of use and attitude to use the electronic health record by Lebanese physicians.

Testing the seventh hypothesis: The correlation coefficient between the independent variable (perceived usefulness) and the dependent variable (attitudes to use the EHR) was 0.845. Thus, there is a positive and strong relationship between the two variables. The result also showed that 71.5% of the change in the dependent variable is due to the changes in the independent variable. The impact score was 0.737. This means that the change in the independent variables in one degree result in an improvement in using the system by 0.737. Note that $p = 0.000$ when $\alpha = 5\%$. Thus, the null hypothesis is rejected and the alternative one is accepted. There is a statistically significant positive relationship between perceived usefulness and attitudes to use the electronic health record by Lebanese physicians.

V. Discussion

This study identified the factors influencing the physicians' attitudes in Lebanon towards the use of electronic health records. The findings indicate that respondents acknowledge the usefulness of electronic health records. The results showed that physicians use the computer either for scientific research purposes, reading journals, using e-mail, or to obtain clinical information about the patient. Thus, the basic requirements to use the information systems are available, especially that about 63.4% of physicians agreed that the use of the electronic health record will make the work more effective, and 53.5% of physicians indicated that the systems will make them work faster. However, this requires the support of the management especially the medical management in terms of providing resources and training physicians. The importance of both management support and training, in improving the use of the information systems has been demonstrated. Training is one of the most important investments in human capital. It helps reduce errors in the medical records and to emphasize the needs of patients. This is reflected on the trust between the patient and the physician thus improving their relationship.

The mean score of the physicians' autonomy was 3.24 (neither agree, nor disagree). While physician seem to think that the electronic health record will increase the management's ability to control their practices (mean = 3.73), the study revealed no significant relationship between physician's autonomy and the attitude to use the electronic health record. While autonomy seems to be very important to physicians, it does not appear have an impact on their opinions towards using EHR.

The results revealed a statistically significant positive relationship between the management support, physician involvement, training, perceived ease of use, perceived usefulness, and physicians' attitudes to use the electronic health record. This is consistent with prior researches. However, this study found no relationship between physicians' autonomy and attitudes to use the electronic health record. It appears that their perception of autonomy is not necessary correlated to their attitudes to use the electronic health record. This is perhaps due to previous experience with EHR.

A positive relationship between doctor-patient relationship and physician's attitude to use the EHR was expected to be found. According to the literature review, this technology will improve the quality of care and reduce the medical errors, in addition, most patients are now familiar with the computers and the internet, thus they are able to access their personal medical information and reach out their physicians from any place. However, the results showed a negative relationship between these variables. This could be attributed to the physicians' concern regarding the risk of reducing the verbal communication and in-patient visits.

The study found that the proposed factors: management support, physicians' involvement, adequate training, doctor-patient relationship, perceived ease of use, and perceived usefulness, are antecedents of physicians' attitudes to use the electronic health record. Which provided support for the research questions (q1, q2, q3, q5, q6, and q7). The only exception was "physicians' autonomy" (q4). Although this finding was unpredicted, it was not surprising where prior study (Morton, 2008, p. 115) has found weak effect of the autonomy on physician's attitude. The factors with the strongest effects on physicians' attitudes were: management support (0.917), perceived ease of use (0.776), perceived usefulness (0.737), physicians' involvement (0.691), and training (0.619).

Ultimately, the most important thing is that most physicians (81.7%) had positive attitudes to use the electronic health record; they had willingness to use the system. Positive attitudes to use the EHR by physicians in Lebanon will play an important part in the success of such system. Also, it is important that physicians who will use the system are given a voice, and their concerns must be taken into account in software development and system implementation. The development of standards related to privacy and security can also help improve the quality of provided services. In addition training physicians to use the system is recommended. In addition, understanding the attitudes and the needs of medical staff will help develop the electronic health record according to the users' needs, and hospitals are able to develop a system that is both useful and user-friendly to the end users (Ajami, Bertiani, 2012, p. 5).

VI. Conclusion and limitations

This study focused on determining the factors influencing the physicians' attitudes in Lebanon towards the use of electronic health records. The survey instrument and scale variables were found to be suitable in examining the physicians' attitudes to use the electronic health record. The study concluded that the proposed factors: management support, physicians' involvement, adequate training, doctor-patient relationship, perceived ease of use, and perceived usefulness, are antecedents of physicians' attitudes to use the electronic health record. In conclusion, an overall positive attitude towards the use of electronic health records among Lebanese physicians suggests a strong acceptance and use of this technology.

The study is constrained by some limitations such as time needed to collect data from the physicians. Therefore, it is suggested to apply this study within a longer period of time to include a good sample size and a wide variety of physicians. In addition, other factors might also be studied such as the organizational culture and the demographic factors that may affect the attitudes to use the EHR by physicians in Lebanon. In addition, this research was conducted using one user group, future research could address additional group such as nurses. The findings highlighted the strong effect of perceived usefulness of such technology, future research should evaluate the impact of electronic health record on improving the health care quality.

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