Factors Affecting Doctors' Intention to Adopt Electronic Medicine: A case From Egypt

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Abstract

Recent increases in the use of information technology in health care, especially the introduction of clinical decision support and better linkages in and among systems, resulting in process simplification that could result in substantial improvement in healthcare services. The main purpose of this article is to explore the possibility of applying e-medicine in Egypt by looking at the factors that affect the doctors' intentions to adopt e-medicine. Original data were collected by using a self-administered questionnaire. A sample of 221 Egyptian doctors in Dakahlia Governorate completed the questionnaires with usable data. The results revealed that doctors' intentions to adopt e-medicine is significantly affected by the pressure to use e-medicine, attitude toward e-medicine practice and perceived usefulness of e-medicine. The availability of the required technology and ease of use are also important factors in predicting doctors' intentions to adopt e-medicine.

INTRODUCTION

Communication technologies have evolved over time as means of overcoming two principal communication barriers: time and distance. Electronic media greatly increase our capacity to overcome barriers of time and distance. The network of electronic medicine granted an unique medical facility as effective tool for the highest standards of health care for all patients in hospitals, at the same time allow for the remote treatment and E-medicine, to put in the hands of patients, wherever they may be, the best medical expertises by installing a network capable of high-end link in other hospitals throughout the world.

The concept of e-medicine is reducing many of the expenses of health care in locations outside the hospitals, through the provision of medical advice by e-mail, telephone and video conferences, to link patients directly to providers of health care services. This unique ability to cooperate and consult is an add in all stages of the medical process e.g., diagnosis and surgery and even out-patient care,and serve most of the doctors of different careers, from the psychiatrist to a cardiologist. Where doctors and nurses can exchange information, cooperate and consult directly through a multi-service and unique large-scale wavelength network. It will also enable medical staff, patients and the Internet explorers to access the information they want online and send their questions via e-mail.

Egypt is an African country with a population of 74 million people with 10 million telephone lines and a teledensity of 10% (Ledwaba, 2002). Teledensity refers to the number of landline telephones in use for every 100 individuals living within an area. A teledensity greater than 100% means there are more telephones than people. Less developed countries may have a teledensity of less than 10%.

Egypt has established a strong base for its future through a project that has seen five million Internet users (Ministry of Communications and Information Technology, 2008). A global e-government survey conducted by Brown University in the US rates Egypt as being at the higher end of e-government readiness (49th out of 196 countries), with an implementation strategy comparable to many developed countries (Ledwaba, 2002).The creation of the Ministry of Communications and Information Technology (MCIT) in 1999 reiterated the Egyptian government’s firm commitment to encouraging technological development (International Telecommunication Union, 2005).

Dakahlia is considered to be one of the ancient Governorates in Egypt. With a population of 4,839,359, it is the third largest Governorate in Egypt. Mansoura City, the capital of Dakahlia Governorate with a population of 1,600,000 is considered the medical capital of Egypt. It contains many medical centers of different specialities.

The electronic medical network granted the unique medical facility as effective tool for the highest standards of health care for all patients in hospitals, at the same time allow for the remote treatment and E-medicine, to put in the hands of patients, wherever they may be, the best medical expertises by installing a network capable of high-end link in other hospitals throughout the world.

Appropriate increases in the use of information technology in health care— especially the introduction of clinical decision support and better linkages in and among systems, resulting in process simplification—could result in substantial improvement in patient safety (David et al., 2001).

Hence, in order to promote e-medicine in Egypt, it seems important to investigate the factors that affect doctors' intentions to adopt such a new concept. In this paper the author will consider a modified version of the technology acceptance model (TAM) and investigate factors that affect doctor' intention to adopt e-medicine.

BACKGROUND

Over the last 25 years, public healthcare delivery has been undergoing continuing changes. This has included the use of new information and communication technologies in a bid to improve services to patients, speed up waiting times, and addressing structural problems in the National Health Service (NHS). These changes have been largely driven by technical competence on the medical side but not matched sufficiently in technical organizational improvements (Osbourne, 2006).

The Internet is becoming an important tool in health care (Powell et al., 2003) both for administrative purposes and for patients. Email is increasingly used for communication between patients and health care providers. Content analysis of email communications between patients and providers have revealed that frequent topics are updates to the physicians, prescription renewals (White et al., 2004), instruction requests (Neville et al., 2004) and requests for information about medication, treatments and specific symptoms or diseases (Sittig, 2003). The Internet is also becoming increasingly important as a medical information resource, exemplified by the finding that US adult Internet users are equally likely to turn to the Internet for reliable information on medical issues as they are to contact a medical professional (Horrigan and Rainie, 2002).

As many of the possible use of electronic medical technologies in the service of human and admitted the use of electronic medical records, or the so-called (the patient's electronic medical file), as well as electronic books, forums and specialized medical dictionaries, medical, electronic mail, as well as a doctor to serve the patients and medical forums. Electronic medical books in all the various disciplines of medical.

E-MEDICINE IN EGYPT

1. Egypt is the centre of the medical network

Egypt's long history and geographical location makes it the leading country in the region in terms of cooperation and interaction with all the regional countries. The experience should be used in medical and health facilities Egypt (air ambulance, all centers of excellence and the highly specialized centers, research centers, and the large number of consultants and specialists, etc). As a base for a regional project for electronic health care to follow up cases of Arabs or Africans, especially since there are already some degree of consultation in the bone marrow transplant center at the Institute of Nasser. With the expertise and facilities available in the health of other regional countries, can achieve the dream of the regional coverage of health needs.

2. communications infrastructure in Egypt

The location of Egypt has a vital importance for any network as it lies in the path of most communications networks, and with Alexandria - Egypt and the Suez to Alexandria all lines coming from Asia to Europe and America. In addition, there are lines between the west and east of the Arab region from Syria to Morocco. In addition, the satellite Nilesat - 1 satellite Nilesat – 2 cover the majority parts of the Middle East and the African continent, and their scope extends to the south of Europe, and can play an important role in facilitating the requirements of the electronic communications network.

Expected benefits

Improving the health care system in the participating countries.

Help rural doctors in the process of diagnosis.

Providing training facility of the medical (doctors and nurses) in rural areas.

To provide advanced medical service in emergency situations.

Reduce the costs of health care by improving the process of guiding the patient.

Reduce the cost of transporting patients to doctors in Cairo, for example consultants.

Increase the use of consultancy services.

Facilitate cooperation between hospitals in the North and South and between the hospitals in the south in the area of medical care.

Reducing the isolation of medical personnel in rural areas.

Establishment of a database of patients and diseases, and the registration of cases, the sick and the sick. And the establishment of a database and medical records used in epidemiological studies and medical studies.

Primary health care: detection of diseases, maternal and child in the remote areas (for example: detection of cases of disease and pregnancy to follow later in specialized centers, and the detection of congenital malformations ultrasound examination). And control of infectious diseases and other infectious fundamental, namely, detection and finding the causes and consultation, treatment and follow-up by local doctors, and management of the referral system, which would reduce the costs of medical care, and provide care more quickly.

The benefits of e-medicine and e-health (including all aspects of the services provided by this technology to access to medical records, and clinical applications, databases, education and training after) of great importance for the developed and developing countries alike. Both groups have a vision for the e-medicine. If the developed countries in view of medicine and means of providing health-care system more sophisticated, and the provision of other medical opinions and information to citizens, in order to improve the quality of care and commitment to spending in the economy, the vision of developing countries are totally different, and perhaps feeling the need for medicine and e-medicine E-mail primarily to provide medical services in areas far from medical facilities, And the reduction of referrals to central hospitals or university hospitals, and read the X-advanced (such as CT, MRI, etc.) and reading sections of disease diagnosis by experts, as well as training for employees after the medical and paramedical personnel.

ROLE OF THE INTERNET PLAY IN HEALTH CARE

Most of medical practice involves simply communication of information: gathering, assessing, distributing and acting upon the information, and then monitoring and getting feedback with information. In short, that part of medicine which is not surgery specifically, radiology specifically or chemical treatments for things is simply information. The Internet can play an extremely important role in conveying such information from anywhere to anywhere quickly, at very low cost and, if done right, with great security.

The Internet will be conveyor of medical information that's gathered at the doctor-patient interface in office practice and probably in hospital practice by the online medical record replacing the electronic medical record. The creation and keeping of medical records, including physician observations, patient observations, physical exams, lab tests, progress notes, pharmacy orders, will all be electronic fairly soon. And in the very near future, in order to have accurate information transmitted quickly and kept flawlessly, as well as the ability to guide physicians to make the right decisions at the point of care, electronic record keeping will become the usual instead of rare, and probably mandatory in most areas. The ability for Internet-based decision support systems to prevent error in medicine and get the right thing done for patients will be seen as overwhelmingly necessary in the near future. The Internet will be the method for conveying and capturing and keeping the information that matters on essentially all doctor-patient interactions (Lundberg, 2000).

Rapid change in healthcare has mandated greater attention to safety, which is essential for quality patient care, employee welfare, and morale. Safety in healthcare has received substantial attention worldwide since the late 1990s (Reichley et al., 2005).

Safety is a condition or state of being resulting from the modification of human behavior and/or designing of the physical environment to reduce hazards, thereby reducing the chance of accidents. The Institute of Medicine (IOM) report, "To Err Is Human," (Kohn et al., 2007) described the magnitude of the patient safety problem in some detail, yet it provided only a high level view of how organizations might change in order to improve care delivery. The IOM report also highlighted an actionable conclusion that "the biggest challenge to moving toward a safer health system is changing the culture from one of blaming individuals for errors to one in which errors are treated not as personal

failures, but as opportunities to improve the system and prevent harm." (Abbas et al., 2008).

The IOM estimated that 98,000 preventable deaths occur each year due to medical errors, with no significant improvement in 5 years due to failure to improve patient safety (Institute of Medicine, 2001 and Frankel et al., 2003). Since the IOM report, organizations have struggled to develop effective programs for improving safety (Kohn et al., 2007).

E-MAIL CONSULTATIONS IN HEALTH CARE

In 1971 Ray Tomlinson programmed and sent the first email message. Widespread public use began in the early 1990s and rapidly spread to the extent that email now represents an integral part of daily life for about 60% of the UK population. Increased opportunities for electronic communication have revolutionized many industries and customer services, such as banking and retail, but email's promise for improving delivery of health care remains largely untapped (Institute of Medicine, 2001).

POTENTIAL ADVANTAGES OF EMAIL IN DELIVERING HEALTH CARE

CONVENIENCE

Increased convenience in time and space for patient and doctor. Email can be sent and received at any time from almost anywhere—via computer, digital television, personal digital assistant, or mobile phone

May reduce the need for face to face consultations (time savings)

Useful for information that patients would have to remember or write down if it were given orally (such as addresses and telephone numbers of services to which patients are referred, test results with interpretations and advice, instructions on how to take drugs, and preoperative and postoperative instructions)

Unlimited length (in addition to text, users can send virtually any kind of electronic file as an attachment)

ACCESS

Increased access to care (for those with physical disabilities or those living in a remote area, for example)

INFORMATION SHARING

Increased opportunities for information sharing (such as sending patients information leaflets or highlighting relevant information on the internet)

User friendly medium for patients to ask for further clarification after a face to face consultation

Potential for increased reporting of unpleasant events

Allows patients to discuss content of messages with family or friends to improve understanding

SATISFACTION

Potentially a more egalitarian medium of communication as traditional barriers of age, rank, and unfamiliarity tend to dissolve in the informality of electronic communication

Free style of writing (people increasingly favour a direct parlance, which minimises the time taken to write and read messages but also suggests a desire for greater immediacy and directness in conversation)

Possibility of anonymity for patients

Speed of communication

May be particularly suitable for groups that are difficult to reach by traditional, face to face contact

QUALITY OF CARE

Doctors can consult with colleagues and other professionals to provide a more considered response

Email creates a written record of consultations and avoids possible problems of illegibility associated with handwritten notes

IMPROVED EFFICIENCY

Ability to offer routine transactions and patient education information to several people simultaneously

POTENTIAL COST SAVINGS

TECHNOLOGY ACCEPTANCE MODEL (TAM)

The technology acceptance model "TAM" (Davis, 1993) (Figure 1) is described as the most dominant theoretical model in information technology acceptance (Misiolek et al., 2002) and is an adaptation of the Theory of Reasoned Action "TRA" (Fishbein & Ajzen, 1980).

Figure 1

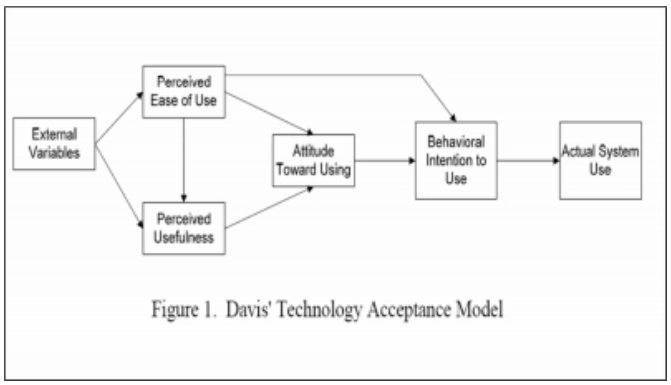

Figure 1. Davis' Technology Acceptance Model

The TAM's goal is to provide an explanation of the determinants of computer acceptance that is generally capable of explaining user behaviour across a broad range of end-user computing technologies and user populations (Davis et al., 1989). The TAM identifies two beliefs perceived usefulness and perceived ease of use, as being of primary importance for computer acceptance behaviour. The model posts that a users adoption of an information system is determined by behavioural intention, which is determined by the user's belief about the system, similar to the TRA. The model differs from the TRA in that behavioural intention is viewed as being determined by the individual's attitude and perceived usefulness. The TAM does not however include the subjective norms of the TRA as itwas not found to be significant (Davis, 1989).

THE TRIANDIS THEORY OF INTERPERSONAL BEHAVIOUR

The Triandis model (Triandis, 1980) explains individuals' behaviour in terms of what they have always done (habit), by what they think they should do (social norms) and by the consequences, they associate with a behaviour (perceived consequences). The model also contains aspects that are directly related to the individual, for example attitudes, genetic factors, intention, and behaviour and others that are related to the individual's environment, for example culture, facilitating conditions, and social situations (Osbourne, 2006).

Numerous studies have identified a variety of factors that affect innovation adoption in business organization. Fishbein and Ajzen (1975) developed a general model that explains and predicts behavioral intentions in many general settings. The model is referred to as TRA (Theory of Reasoned Action). The theory hypothesizes that a person's behavioral intention (BI) to perform (or not to perform) a behavior is determined by that person's attitude (A) and subjective norms. Behavioral Intention is a measure of the strength of one's intention to perform a specific behavior. Attitude (A) describes an individual's positive or negative feelings about performing the target behavior. Subjective norms (SN) refers to the person's perception that most people who are important to him or her think he/she should or should not perform the behavior in question (e.g., Fishbein and Jazzed, 1975). Davis et al. (1989) found that behavioral intention to use a system is significantly correlated with usage, and that behavioral intention is a major determinant of user behavior. Hill et al. (1987) also indicated that behavioral intentions significantly predict action. Likewise, Sheppard et al. (1988), in a meta-analysis of 86 TRA studies, found an average correlation of 0.54 between intentions and actions.

Davis (1985) adapted Ajzen and Fishbein's (TRA) Theory of Reasoned Action (1980) to model intentions to accept information technology. Davis' model is referred to as the TAM (Technology Acceptance Model). It explains the causal links between beliefs (for example, beliefs about the usefulness and ease of use of an information system (IS) and users' attitudes, intentions, and actual usage of the system. Perceived usefulness (U) and perceived ease of use (EOU) are independent variables in the model. The dependent variable is the behavioral intention (BI). One mediating variable of the TAM is the individual's attitude toward use. Numerous studies discovered that the technology acceptance theory (TAM) yields consistently high explained variance in users' choices to utilize information systems (Mathieson, 1991 and Pavri, 1988). Hence, the technology adoption model put forward by Davis will be utilized in this study.

ATTITUDE TOWARDS ELECTRONIC MEDICINE

According to Fishbein and Ajzen (1980), "attitude is a learned predisposition to respond in a consistently favorable or unfavorable manner with a given object." Attitude is directly related to behavioural intention and adoption because people will only intend to perform behaviour for which they have positive feelings (Marino, 2004 and Han et al., 2005). Osbourne (2006) hypothesise that attitude is positively related to the users intention to use new technology in healthcare.

USEFULNESS OF ELECTRONIC MEDICINE

Davis et al. (1989) defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance". The following is a summary of why e-medicine might be perceived as useful for both doctors and patients.

Internet-based consultation may act as a complement to regular health care (Umefjord et al., 2006). One of the major uses of Internet-based Ask the Doctor services outside pre-existing doctor–patient relationships will probably be to provide a second opinion, which cannot easily be accessed in most countries' regular health care. Communication between a doctor and the patient cannot always be 'perfect' for several reasons. Frustration and communication problems with the existing doctor–patient relationship is not an uncommon problem in regular health care (Ong et., 1995, Blanchard et al., 2004, Johansson et al., 1996 and Perneger et al., 1996) and might be the reason to turn to an anonymous Ask the Doctor service. However, it is not undisputed that a right to a second opinion should be taken for granted (McGinnis, 1995 and Rippere, 1995). Furthermore, the value of second opinions has been questioned (Mustafa, 2002).

Many participants in e-medicine service expressed it as a complement to regular health care, that can be explained in several ways. In general, written communication, as in Internet-based consultation, allowing the patient to be able to read the answer repeatedly and to reflect on it without hurry, is probably underused in regular care (Johnson et al., 2003). Information has been shown to be an important factor for success in doctor–patient communication and patient satisfaction (Williams et al., 1998). Another important success factor is patient-centredness, enabling the patient to express his/her own reasons, ideas, feelings and expectations without being interrupted by questions (McWhinney, 1997).

Also, internet consultation could be regarded as patient-centered as it is led by the enquirer (patient) with the full freedom to choose what to tell the Internet doctor. From the enquirer's point of view, communication between doctor and patient based on text only often seems to be sufficient since participants did not comment at all on the lack of a previous relationship or a physical examination. However, potential limitations of this service may be the participants accepted these prerequisites for getting a written answer or maybe they, as lay persons, were unaware how much valuable medical information and communication is based on the personal relation and body language (Umefjord et al., 2006).

EASE OF ELECTRONIC MEDICINE PRACTICE

Ease of use (EOU) is the degree to which a person believes using a particular system would be free of effort, and if the performance benefits of usage are outweighed by the effort of using the technology (Davis, 1989). Hence, the more complex the innovation of an information technology, the lower the probability of its adoption will be (Rogers, 1995). Applying this to technology adoption in the medicine, technologies perceived to be user friendly will be more appealing to both patients and practitioners. Perceived ease of use refers to ease of using the technology, sending data electronically as in the case of mobile technology, obtaining the data necessary to proceed with consultations as in the case of General Practitioners (Osbourne, 2006).

PRESSURES TO USE ELECTRONIC MEDICINE

An individual's perception of social pressure to perform or not perform a behaviour affects intention, (Fishbein & Ajzen, 1975). Perception of social pressure refers to an individual's perception of whether individuals close to or important to them think that they should or should not perform a behaviour. Consequently, we view social factors as norms, values, and roles, which influence an individual's intention to adopt medical technology. These values in our context may be conveyed by interaction with patients and peers. There are varying views on physicians being influenced socially. It has been suggested that general medical practitioners are influenced in their decision-making by medical specialists, who are seen as being innovative and creative. (Blumberg, 1999). Such opinion leaders can activate local networks to diffuse an innovation by facilitating transfer of information (Young, et al., 2003).

RESOURCES REQUIRED FOR IMPLEMENTING E-MEDICINE

Communication may be the single most important factor in any e-medicine arrangement. However, doctors' reliance on the use of communication technologies is affected by:

Currently available communication technology. The currently available communication technology should provide the overall means by which doctors communicate with and stay linked to their patients.

Doctors' ability to use the currently available communication technology. It is crucial for the medical institutes to have experts available to develop a Web site, train on Internet use and email

Facilitating conditions are the objective factors that make a behaviour easy or difficult. In the Triandis model, facilitating conditions are important determinants of behaviour. Even if intentions to perform the behaviour are high, the habits are well established and the physiological arousals are optimal, there may be no action/behaviour if the

situation or objective factors do not warrant the behaviour (Triandis, 1980). A simplified explanation of this is that facilitating conditions are important in that individuals with the intention of accomplishing something may be unable to do because their environment prevents the activity from being performed. We define facilitating conditions as those factors in an individual's environment that facilitate the act of adopting technology. Empirical investigations have shown that facilitating conditions could also have a significant positive impact on attitude (Chang and Cheung, 2001). We expect facilitating conditions to have a positive influence on technology adoption.

Eysenbach and Diepgen (1999) found examples for the beneficial effects of the provision of medical information on the World Wide Web but also evidence suggesting that patients are trying to use information on the Internet as a supplement for physicians and that teleadvice might be overused by chronically ill and frustrated patients looking desperately for additional information. This advice via e-mail could substitute a physician visit or telephone call in some cases, but many principal problems must be solved beforehand.

RESEARCH QUESTIONS

Based on the previous literature review, the following research questions were posed for empirical investigation and statistical analysis:

To what extent Egyptian doctors can adopt the use of e-medicine?

What are the factors that can affect the adoption of e medicine?

Can e medicine affect the progress in the medical service?

METHOD

In this section, the following will discussed:

1) the design of the survey instrument,

2) survey population and sample selection,

3) data analysis and the results.

DESIGNING THE INSTRUMENT

To accomplish the objectives of the study, An e-medicine adoption questionnaire was developed by the author (see Appendix A) to gain as much information as possible regarding the factors that affect doctors' intentions to adopt e-medicine. There are two sections in the questionnaire:

Section one was used to collect demographic data. Section two consisted of a set of 18 items in the questionnaire, four of which refer to each of the following dimensions:

1- Attitude towards e-medicine (is represented by items 6, 12, 18).

2- Intention to adopt e-medicine (is represented by items 5, 11, 17).

3- Availability of Resources (is represented by items 4, 10, 16).

4- Pressure to Use e-medicine (is represented by items 3, 9, 15).

5- Ease of E-medicine Use (is represented by items 2, 8, 14).

6- Usefulness (is represented by items 1, 7, 13).

Respondents were asked to rate their opinion about each item using 5-point Likert scale.

A definition of e-medicine was presented in the introductory part of the questionnaire as follows: "The provision of medical advice by e-mail, telephone and video conferencing, to link patients directly to providers of health care services. The unique ability to cooperate and consult in all stages of the medical process from diagnosis and surgery and even out-patient care, and serve most of the doctors of different careers, from the psychiatrist, a cardiologist to exchange information and cooperate and consult directly through a large-scale wavelength, multi-service and unique network. It also will be able medical staff and patients and the Internet servers to access to information they want online and send questions via e-mail and how to respond to them".

SURVEY SAMPLE

The sample subjects were randomly selected to participate in the survey through purposive sampling. Purposive sampling used to obtain desired information from specific target group. The target group came from medical professional (221) working at different hospitals in Dakhlia governorate.

Questionnaires were handed to the respondents at their places of work. Completed questionnaires were collected through several visits to respondents at work.

DATA ANALYSIS

The sample characteristics are shown in Table1. Of the 221

respondents, 123 were males and 98 were females. 2 of the respondents were less than 20 years old, 74 fell between 20-<30 years of age; 79 between the ages of 30 – < 40; 45 between the ages of 40 - < 50; 21 were ≥ 50 years old. With respect to educational level, 75 had college degree; 45 had diploma; 53 had master degree and 48 had MD. With respect to income, 34 responders have < 500 LE monthly; 58 have 500 – < 750 LE monthly; 29 have 750 - < 1000 LE monthly and 49 have 1000 - < 1500 LE monthly and 51 have ≥ 1500 LE monthly.

Figure 2

Table (1): Sample characteristics

Sample Characteristics					
Maital Status		**Sex**		**Residence**	
Married	71	Male	123	Rural	53
Unmarried	79	Female	98	Urban	168
Age		**Income**		**Education**	
< 20 years	2	< 500 LE	34	College degree	75
20 - < 30	74	500 – < 750 LE	58	Diploma	45
30 - < 40	79	750 - < 1000 LE	29	Master	53
40- < 50	45	1000 - < 1500 LE	49	MD	48
≥ 50 years	21	≥ 1500 LE	51		

Figure 3

Table 2: Respondents' scores of the studied variables related to doctors' adoption to e-medicine

	strongly disagree & Disagree (Score=5-9) N (%)	Neutral (Score=10) N (%)	Agree & strongly agree (Score=11-15) N (%)
Usefulness	39 (17.65%)	21 (9.5%)	161 (72.85%)
Ease of use	55 (24.89%)	36 (16.29%)	138 (62.44%)
Pressure to use	16 (7.24%)	11 (4.98%)	194 (87.78%)
Resources	92 (41.18%)	25 (11.31%)	105 (47.51%)
Attitude	47 (16.29%)	36 (16.29%)	138 (62.44%)
Intention	32 (14.48%)	26 (11.76%)	168 (68.78%)

Figure 4

Table 3: shows the correlations between behavior intention (BI) to adoption e medicine and independent variables (i.e. attitudes, resources, pressure to use, ease of use, and usefulness).

	Intention to adopt e medicine	Usefulness	Ease of use	Pressure to use	Resources
Usefulness	0.291 0.00				
Ease of use	0.175 0.011	0.290 0.000			
Pressure to use	0.405 0.000	0.419 0.000	0.280 0.000		
Resources	0.214 0.002	0.241 0.000	0.338 0.000	0.261 0.000	
Attitude	0.329 0.000	0.338 0.000	0.431 0.000	0.453 0.000	0.374 0.000

Figure 5

Table 4 shows stepwise regression of behavior intention versus attitude, resources, pressure to use, ease of use, and usefulness.

Step	1	2	3
Constant	5.428	4.499	3.860
Pressure to use	0.494	0.395	0.350
T-Value	6.42	4.71	3.98
P-Value	0.000	0.000	0.000
Attitude		0.196	0.174
T-Value		2.78	2.43
P-Value		0.006	0.016
Usefulness			0.122
T-Value			1.58
P-Value			0.115
S	2.03	2	1.99
SR-Sq	16.73	19.76	20.74
R-Sq(adj)	16.32	18.98	19.57

The table shows that the most useful subset of variables that can be used in modeling intentions to adopt e-medicine: pressure to use (PTU), attitude (A), usefulness (U). Accordingly, the best regression model that could be used in predicting behavioral intention is:

Intention = 3.87 + 0.343 Pressure to use + 0.171 Attitude + 0.132 Usefulness.

S = 1.984 R-Sq = 20.6% R-Sq (adj) = 19.4%

Analysis of the dependent variable (BI): The above model is used to predict behavioral intention scores among the sample subjects. Table 5 shows the statistical description of the predicted values of BI among the sample subjects:

Figure 6

Table 5: statistical description of the predicted values of behavior intention (BI) by the sample subjects:

Analysis of Variance					
Source	**DF**	**SS**	**MS**	**F**	**P**
Regression	3	209.909	69.970	17.76	0.000
Residual Error	206	811.372	3.939		
Total	209	1021.281			

Source	DF	Seq SS
Pressure to use	1	86.585
Attitude	1	100.441
Usefulness	1	22.884

Table 5 shows that among the sample subjects, the mean of intention to adopt e-medicine among the studied group is 11.576. Doctors with low intention to adopt e-medicine have BI score range from 5 to 10 and doctors with high intention to adopt e-medicine have BI score range from 13 to 15.

Figure 7

Table 6:shows a test of differences between the two groups' scores in the independent variables (Usefulness, Pressure to use and attitude).

	N	N°	Mean	SE Mean	SD	Max	Min	Q1	Q3
Intention to adopt e-medicine	210	11	11.576	0.153	2.211	15	5	10	13

Figure 8

Table 6: Test of difference between the independent variables in the two groups

	Group 1 Doctors with higher predicted intention to adopt e-medicine (N = 77)	Group 2 Doctors with higher predicted intention to adopt e-medicine (N=58)	T	P
Usefulness	12.58	11.41	-3.38	0.000
Pressure	13.40	11.66	-5.57	0.000
Attitude	10.03	11.86	-4.85	0.000

The results in Table 6 indicate that:

Doctors with higher intention to adopt e-medicine (group1) have more perception of usefulness of e-medicine than doctors with lower intention to adopt e-medicine (group2).

The pressure to use e-medicine is higher on Group 1 than it is in Group 2.

Doctors with higher intention to adopt e-medicine (group1) have more positive attitude toward e-medicine than doctors with lower intention to adopt e-medicine (group2).

The above results are compatible with the TAM model, which receives further support through the data presented in this study.

DISCUSSION

This study advances knowledge about doctors' intentions to adopt e-medicine in the Egyptian governorate of Dakahlia. The research questions outlined earlier in this study will now be re-examined. The questions were concerned with determining the extent to which doctors can adopt the use of e-medicine and to determine predictors that can affect the doctors' intention to adopt e-medicine. Using stepwise regression analysis, the results suggest that the best subset of predictors that can affect the doctors' intention to adopt e-medicine includes:

Pressure to use e-medicine.

Attitude towards e-medicine.

Usefulness of e-medicine.

So, it can be concluded that e-medicine could be adopted by doctors in Egyptian Governorate of Dakahlia if:

Doctors are under pressure to use e-medicine.

Doctors have positive attitude towards e-medicine, and believe in its usefulness.

Although, perceived ease of use was not a predictor factor here , the author believes that there is some logic in such a result. This is because the studied category (doctors) was nearly all have no problems with use of this technology and are familiar with it during study of medicine.

The results reveal that 62.44% of the respondents have positive attitudes towards e-medicine, 72.85% believe in the usefulness of e-medicine, and 87.78% agree that they are under pressure to use e-medicine. But, only 47.51% of the respondents agree that their organizations have the required resources to adopt e-medicine. The results also revealed that although the pressures to adopt e-medicine are high (87.78%), weak resources (47.51%) are possible reasons for the current lack of e-medicine practice in Egyptian health organizations.

A widely cited research instrument was developed by Teach and Shortliffe (1981) to evaluate physicians' attitudes toward computer usage. It was updated and revalidated by Cork et al., 1998 and Detmer & Friedman, 1994 and has since been modified and utilized in numerous additional studies (Gadd & Penrod, 2000; Likourezos et al., 2004; van der Meijden et al., 2001). These studies essentially found that physicians are accepting of information systems that improve job performance or patient care processes, but resist those that have a negative impact on their autonomy (Anderson & Aydin, 1994; Teach & Shortliffe, 1981). Other concerns include those relating to privacy and security of online information, legal and technical problems (Anderson & Aydin, 1994; Gaster et al., 2003; Parekh et al., 2004). Prior studies have produced mixed findings regarding significant predictors of computer attitudes. Some studies have found age (Aydin & Ischar, 1994; Detmer & Friedman, 1994), computer experience (Cork et al., 1998; Detmer & Friedman, 1994) and practice site (Gaster et al., 2003) to be accurate predictors, while other studies have not. Variables that were positively correlated with attitudes include computer literacy, system training, clinical specialty, occupation and job satisfaction (Aydin & Ischar, 1994; Cork et al., 1998; Detmer & Friedman, 1994; Drazen, 1994; Moore, 1994; Versel, 2004). System complexity has been

found to be negatively correlated with attitudes (Aydin & Ischar, 1994) and gender traditionally has not impacted physician attitudes toward computer use (Detmer & Friedman, 1994; Gaster et al., 2003; Moore, 1994). Brown and Coney (1994) evaluated physician attitudes toward clinical information systems and found computer skills and experience to be predictors of computer acceptance. Age, gender and attitudes toward physician data entry were found to be nonsignificant.

Attitude of Egyptian doctors toward e-medicine is not so high that may be related to the nature of the Egyptian community that overestimate the intimate physician-patient relationship. This in agreement with other researchers who found that some physicians may perceive a computer in the examination room to be an obstacle, hindering workflow efficiency and disturbing patients (Gadd & Penrod, 2000; Hsu et al., 2005; Wager et al., 2005). Little research has been conducted in this area; however, it has been suggested that technology may improve the patient provider relationship, and that some patients are even enthusiastic and encouraging of technology use (Baron et al., 2005). Studies examining patient attitudes toward physician use of computers have been generally positive; however, further research is needed regarding this issue (Hsu et al., 2005; Wager et al., 2005).

Hence, it can be recommend that in order to achieve the competitive advantages of e-medicine, Egyptian organizations should spend more to improve the infrastructure. Furthermore, organizations should offer training workshops that put emphasis on the pluses of e-medicine for organizations, individuals, and societies, and second offer training programs for doctors on technologies, hardware and software.

LIMITATION OF THE CURRENT STUDY

Mangers may form their attitudes towards e-medicine in two different ways: either through direct experience with the concept, or through population responses to e-medicine concept. Egyptian doctors and patients may still have some adherence to the traditional practice of medical intimate relationship between doctor and patient.

However, the author believes that, the continuous growth in population numbers in Egypt and the rapid progress in the medical field can be a forcing factor that can convince both doctors and patients to practice e-medicine.

DIRECTIONS FOR FUTURE RESEARCH

To the best of the author's knowledge, this study is among the few to study e-medicine in Egypt. Hence, the study may persuade other researchers to investigate the application of e-medicine in Egypt and other African countries. Future research should focus on the entire nation in order to obtain a better representation of the population. A longitudinal study that uses the TAM (with the additional variables) could be used to obtain a better picture of the factors that affect doctors' intentions to adopt e-medicine in Egypt and other African countries.

Figure 9

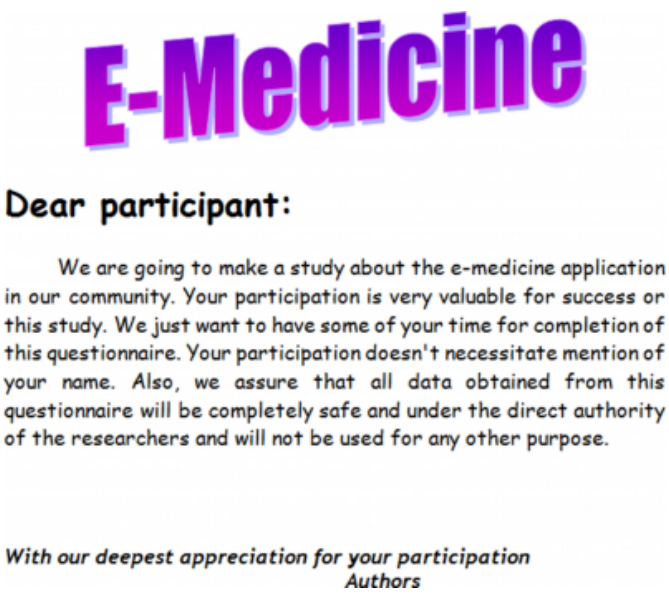

Figure 10

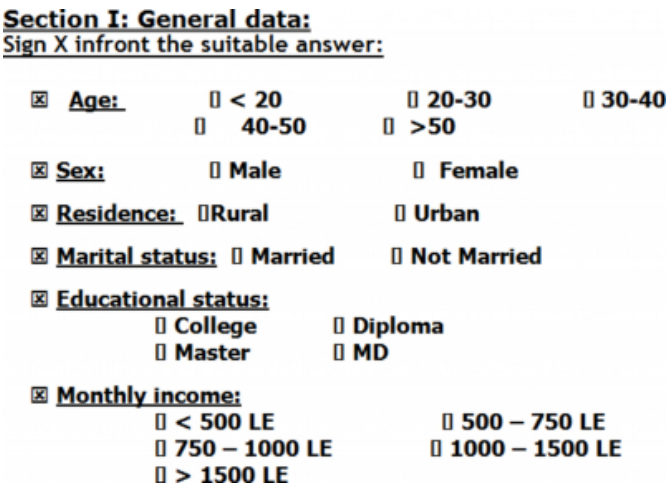

Figure 11

Section II:
Sign X infront the suitable answer:

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1) E medicine helps to accomplish scientific reseach effectively and effeciently					
2) It's difficult to use internet					
3) E medicine should be used to decrease travel stress					
4) My hospital have web site					
5) I'll buy computer in my home to follow up this service.					
6) I prefere to use e medicine because it raises my scientific performance					
7) E medicine can transfer medical service to distant places					
8) I have the skill to practice e medicine					
9) There is a need to use e medicine to raise doctor's skill in hospitals					
10) there is experts in the hospital for training on e medicine					
11) I'll take specialized courses in internet to be able to use e medicine					
12) I don't prefer e medicine because it negatively affects the physician – patient relationship					
13) E medicine helps in performance remote surgery					
14) I have the ability to explore different web sites					
15) We should apply e medicine to give the chance for qualified doctors to use internet skillfully					
16) My hospital have the techniques needed for application of e medicine					
17) I'll advice patients' relatives to use e medicine for medical follow up					
18)I do not Preferred use of E-medicine because it needs to be high skilled					

Thank you for your kind cooperation

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