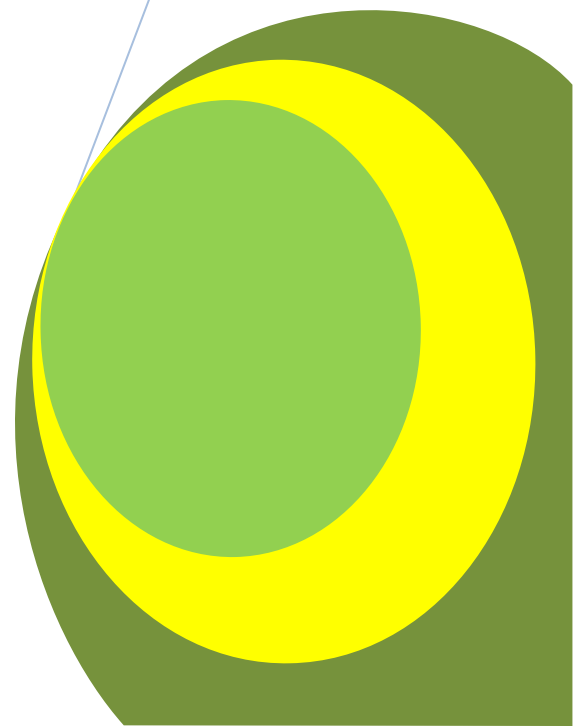# Knowledge, Attitude and Practice of E-health among Health Care Providers in Kuwait

By

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Knowledge, Attitude and Practice of E-health among Health Care Providers in Kuwait

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ABSTRACT

Background: The nature and functions of e-health services are expanding rapidly and have the potential of not only improving health, but also to reduce health care costs, enhance scientific understanding of health issues, increase equity of health care, and improve communication between health care providers and patients.
Objectives: The aim of the present study is to highlight e-health knowledge, attitude and practice among health care providers in Kuwait.
Methods: This study was carried out in the 6 general hospitals during 2015 - 2016. 438 health care workers who agreed to participate in the study were asked to fill a predesigned questionnaire that included information regarding socio-demographic characteristics, computer and internet experience as well as knowledge, attitude and practice regarding e-health.
Results: 99.5% of health care participants are users of the internet, 98.2% of them used it for seeking health information. Their e-health attitude percentage score (68.8 ± 10.7) was higher than both knowledge (58.9 ± 24.2) and practice (59.2 ± 20.3) scores.
Conclusion: There is a gap between participants' attitude which was generally positive on one side and their knowledge and practice of e-health that were generally moderate on the other side.

Keywords: perception   health   information   technology.

INTRODUCTION

In recent years, there has been considerable attention towards the development of information and communication technology (ICT) in health care delivery known as 'E-Health'. The term "E-Health" is almost a new concept and the E-Health projects mainly aim to improve service delivery to people, though different countries might have different approaches in using E-Health (Moghaddasi H. et al., 2012).

It refers to internet-based health-related information seeking and developing to support health service locally, regionally and globally (Ilic D, 2010). E-health technology could have an important effect in controlling many epidemic diseases due to the improvement, efficiency, and better access to the general public (Naseem A. et al. 2014). World Health Organization defined e-health as "the combined use of electronic communication and information technology in the health sector" (WHO, 2006).

In a recent study that was conducted in the US, the authors estimated that application of health information technology (HIT) in 30% of the physicians' offices, would reduce the need for physicians by about 4-9%. Introducing HIT-supported health care by nurse practitioners and physician assistants could reduce the future demand for physicians by 4-7 %. Also, the HIT-supported delegation from specialists to general practitioners could reduce the need for specialists by 2-5 %. The authors also reported that the use of health HIT could help in overcoming regional shortages of physicians by delivering of 12% of care remotely or asynchronously. These estimated impacts would be double in case of adopting comprehensive health HIT systems by 70% ambulatory settings (Weiner JP. et al., 2013).

E-health may involve communications between healthcare professionals such as online referrals, prescriptions and sharing of patient health records. Also, it can support the availability of databases, knowledge and information for physicians that helps in health service delivery (AMRC, 2011 and Rodrigues J. 2012). Internet health sites can replace face-to-face consultations; enhance existing forms of care; strengthen patient participation in the management plan; and enforce more patient participation. Considering these proposed aspects of e-health will help as guidance for further research (Dedding C. et al., 2011).

In highly developed countries, with well-organized health care systems, most the health care professionals and stakeholders were supported by a long list of technology tools such as electronic and personal health records (EHRs and PHRs), biometric and telemedicine devices, and internet applications (Weiner JP. Et al., 2013).

Despite the affirmative effects of HIS use in healthcare process, such systems were under practiced and met refusal (to accept) from healthcare workers and barriers appeared upon implementation of these systems (Khalifa M, 2013).

In spite of the most modern healthcare infrastructures in Kuwait, the country faces an increasing overload on its health facilities due to the high proportion of the non-Kuwaiti inhabitants. The country depends on its own resources for financing of health care. There is a challenge to determine and implement the most cost-effective way for supporting and funding the health care services in a manner that ensure equity of health care provision for both Kuwaiti citizens and non-Kuwaiti population. Shortage of physicians, particularly specialists, has been met in many developed countries including Kuwait. This could lead to dissatisfaction of health care workers as well as patients. Also, the expenses on health care with the recent and advanced means are progressively increasing leading to overload on the governments and people. E-health implementation could be a clue for a many of these problems. Adequate knowledge, positive attitude and awareness are necessary among physicians and other health care workers for the proper practice and implementation of e-health services and for the success of this technology. The aim of the present study is to highlight e-health knowledge, attitude and practice among health care providers in Kuwait.

SUBJECTS AND METHODS

Setting:

All residents in Kuwait, Kuwaiti and non-Kuwaiti, are health insured by law. Ministry of health provided health care for patients through a well-organized system including primary, secondary and tertiary facilities. Kuwait has one of the most advanced health care facilities in the region. It also has relatively strong indicators of the process of care, outcome of care and country's level of health care quality. However, there is an overload on health care facilities due to the shortage of doctors, particularly specialists because the nature and functions of e-health services are expanding rapidly. This study was conducted in the 6 general hospitals (one in each health region of Kuwait) during 2015 – 2016.

Study design:

A cross-sectional study was adopted to describe the awareness of computer skill and internet, and assessment of participants' e-health knowledge, attitude and practice. The study populations were the physicians, nurses, laboratory and radiological technicians, office clerks working in the selected health care facilities during the study period.

A pre-designed structured self-administered questionnaire was designated for data collections. Participant responded to sentences related to knowledge by "yes, no or do not know", sentences related to attitude by "strongly agree, agree, not sure, disagree or strongly disagree" and sentences related to practice by "no or yes". Some sentence related to knowledge and attitude were stated in a reverse direction. The questionnaire included domains related to Socio-demographic characteristics (age, gender, occupation, job, years of experience, education, housing, family income, and civil status), Computer experience (level of computer skill, use of smart phone, use of internet, purpose of use of internet, getting health related information through the internet, and use of computer at work), Knowledge regarding e-health (definition, fields of application and method of using e-health), Attitude towards e-health (usefulness of internet in the field of health, difficulty of using the internet in the field of health, saving time on using the computer by physician, using computer in all health centers, using the computer relieves pressure on hospital outpatients, applying patient electronic records in all health settings, usefulness of e-health in controlling chronic diseases, and interest in receiving e-health training, and Practice of e-health (searching the internet for health related information, use of patient electronic records, attending e-health training course, using e-health in the field of work, and participation in videoconference).

All ethical issues related to research were addressed according to the guidelines of standard and universal research ethical review. All the required approvals for conducting the study were obtained as that of the Kuwait Ministry of Health Ethical Committee. The permission of the Deputy Ministry of Health in Kuwait as well as manager of each selected hospital was obtained. A written formal consent was prepared and signed by respondents after clarification of the aim and process of the study. Confidentiality of collected information was ensured. Filled questionnaires were kept in the central office of the researchers. A pilot study was conducted prior to the field work on a small sample of participants aiming to test the clarity of the questions, questionnaire validity, and its suitability of

use in Kuwaiti culture. This study revealed that the questionnaire was valid, and the questions were suitable with some minor modifications of certain expressions (Alkhatlan H. et al., 2016).

Statistical analysis:

Data were tested to find out possible mistakes by sorting of variable, determining the range, minimum and maximum values of each variable. Also, frequency distribution and cross tabulations were performed to detect controversy between variables. Data were revised for completeness. Questionnaire with missing data were excluded, so analysis of results did not contain missing values. Many new variables were created before the analysis of data in order to make new categories of certain variables, categorization of quantitative variables and calculation of certain indicators such as:

- Knowledge score was calculated by recoding of variables denoting sound answer for each statement (sound answer = 1, do not know or wrong answer = 0).
- Attitude score was calculated by using 5 Likert's score "from 0 to 4". Strongly agree on positive attitude sentence = 4, agree = 3, not sure = 2, disagree = 1, strongly disagree = 0.
- Practice score: (1 for practicing and 0 for non-practicing).
- The total score for each respondent was calculated by summing scores for all sentence, then transferred into percentage score.

Score was categorized into low < 50%, intermediate 50% - 75% and high > 75%

Simple descriptive statistics were used as frequency and percentage distribution for categorical variables, and mean and standard deviation for quantitative variables.

RESULTS

The recruitment effort resulted in participation of 438 health care persons: 198 physicians, 148 nurses, 38 laboratory technicians, 20 radiology technicians, 8 office clerks and 26 pharmacists.

General characteristics of the study population

As shown in table 1, male participants constituted 53.0% versus 47.0% for females. Their age ranged from 22 to 69 years with a mean of 35.6 ± 8.8 years, with the highest proportion in the age category 30 – 39 (47.0%). The proportion of Kuwaiti health care participants was only 26.0% whereas the proportion of non-Kuwaiti was 74.0%. Half of the participants had M.B.B.Ch. degree, 15.1% had a certificate less than that, 25.8% had master degree and 9.1% had a doctorate degree. Experience duration ranged from 1 to 38 years with a mean = 8.7 ± 7.8 years. Just less than three quarters (71.9%) of participants were married, 24.7% were single and 3.4% were either widowed or divorced. The mean monthly family income was 1193 ± 710 KD ranging from 290 to 4900 KD with the higher proportion (39.7%) in the 500 – 999 category. The minority rated their quality of health as bad (1.4%) or accepted (4.6%), whereas 38.1% rated their health as good, 31.3% as very good and 24.7% as excellent.

Only 1.1% of the participants did not know how to use the computer, 5.5% had minor skill, 16.4% rated their skill as accepted, 47.0% as good, and 29.9% as excellent. The vast majority of the 438 health care participants have used the internet (99.5%) and the majority (98.2%) used it for getting health information, 82.4% used it for work, 82.2% for communication and 60.7% used it for entertainment.

Table 1: General characteristics of the study population

Variable	No.	%
Gender		
Male	232	53.0
Female	206	47.0
Age (years)		
< 30	118	26.9
30 – 39	210	47.9
40 – 49	70	16.0
$\geq$ 50	40	9.1
Nationality		
Kuwaiti	114	26.0
Non-Kuwaiti	324	74.0
Education		
< M.B.B.Ch.	66	15.1
M.B.B.Ch.	219	50.0
Master	113	25.8
Doctorate	40	9.1
Years of experience		
< 5	154	35.2
5 – 9	126	28.8
$\geq$ 10	158	36.1
Marital state		
Single	108	24.7
Married	315	71.9
Divorced / widowed	15	3.4
Family income / month (KD)		
< 500	41	9.4
500 – 999	174	39.7
1000 - 1499	96	21.9
$\geq$ 1500	127	29.0
Self-rating of quality of health		
Bad	6	1.4
Accepted	20	4.6
Good	167	38.1
Very good	137	31.3
Excellent	108	24.7
Total	**438**	**100.0**

E-health knowledge, attitude and practice:

As shown in table 2, knowledge regarding e-health was categorized into definition of e-health, field of its use and method of its application. Participants answers on definition of e-health shows that 82.9% of participants answered correctly regarding "Use of the internet and other technology to improve health" and 78.8% regarding "Exchange of medical information and medical communication between doctors". The proportion of sound answers as regards "Provide electronic patient records" was 74.4%, and "Education of doctors through the use of electronic sources" was 70.1%. Two thirds of participants had sound answers regarding "Monitor the health of patients through electronic technologies", "Health Care Online", "Control of medicine supply for patients through electronic software", and "Provide medical advice to the patient through the use of the Internet". Less than half of participants had sound answer regarding "Organization of health care for patients including surgical operations via the Internet", "Shopping", "Communication between friends", "Patient examination through the use of the Internet" and "Entertainment between working hours"

Table 2: Participants answers regarding e-health knowledge

Domain / Item	No	Yes	DK
Definition of e-health			
Health Care Online –	16.7	63.7	19.6
Use of the Internet and other technology to improve health –	7.5	82.9	9.6
Entertainment between working hours* –	59.4	17.6	23.1
Shopping* –	36.8	40.0	23.3
Social communication between friends* –	36.8	40.0	23.3
Control of medicine supply for patients through electronic software –	17.8	63.2	18.9
Provide medical advice to the patient through the use of the Internet –	19.6	62.8	17.6
Patient examination through the use of the Internet –	48.2	28.1	23.7
Organization of health care for patients, including surgical operations via – the Internet	33.1	44.3	22.6
Provide electronic patient records –	10.3	74.4	15.3
Monitor the health of the patient through electronic technologies –	13.2	68.3	18.5
Education of doctors through the use of electronic sources –	11.6	70.1	18.3
Exchange of medical information and medical communication between – doctors	6.4	78.8	14.8
Fields of applications of e-health			
Clinical –	13.7	69.6	16.7
Educational –	5.3	81.7	13.0
Administrative –	10.0	68.0	21.9
Policy maker –	25.1	44.3	30.6
Research –	8.0	76.5	15.5
Video gamed* –	51.8	14.6	33.6
Watching entertainment movies* –	47.7	18.9	33.3
Methods of using e-health			
Visual communication –	20.5	56.8	22.6
Paper post* –	36.3	32.0	31.7
Fax* –	27.9	42.5	29.7
Internet –	7.1	82.4	10.5
Land line telephone* –	33.6	34.7	31.7
E-mail –	12.3	68.9	18.7

Data are raw percentage, total = 438, *: statements are in reverse direction

Regarding the fields where e-health could be applied, more than two thirds of participants answered correctly regarding using e-health in the clinical fields (69.6%), education (81.7%), administration (68.0%), and research (76.5%). However, sound answers were encountered among 44.3% regarding policy maker, 51.8% regarding video games, and 47.7% regarding watching entertainment movies.

Most of participants (82.4%) agreed that internet is a method of using e-health, 68.9% stated that email is another method and only 56.8% had sound answer regarding visual communication. However, only a third or less of participants had sound answers regarding paper post, fax and land line telephone.

Table 3 shows that the majority of participants had positive attitude towards the use of e-health as more than two thirds strongly agree or agree on positive attitude sentence. However, 48.5% strongly disagree or disagree on a negative attitude sentence "I think that the use of the Internet in the field of health is difficult". Also, only 10.5% of participants strongly agree or agree regarding "Doctor use of computer during patient interview saves time".

Table 4 shows that 98.2% have searched for health information through the internet, 81.7% were using electronic medical records, 69.6% were using e-health in their work. However, only 25.6% have participated in visual communication at work and 20.8% attended e-health training programs.

Table 3: Participants answers regarding attitude towards using e-health

Item	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
– I think that the use of the Internet is useful in the field of health	0.0	0.7	8.7	39.7	50.9
– I think that the use of the Internet in the field of health is difficult	10.5	38.1	37.4	9.1	4.8
– I think that doctor use of computer during patient interview saves time	12.8	45.9	30.8	7.3	3.2
– I think doctor use of computer must be applied at all health centers	0.5	5.5	16.4	50.5	27.2
– I think that the use of computer relieves pressure on hospital outpatient	0.2	1.8	14.2	48.4	35.4
– I think that patient's electronic file must be applied in all centers and hospitals	1.1	4.6	23.5	41.3	29.5
– I think e-Health can be used to increase awareness and prevention of communicable diseases	0.5	1.1	12.3	50.2	35.8
– I am interested in receiving training for the use of electronic health	0.2	5.5	26.0	37.9	30.4

Data are raw percentage, total = 438

Table 4: Number of health care participants practiced e-health

Item	No.	%
Searching for health information	430	98.2
Using electronic medical records	358	81.7
Attending e-health training programs	91	20.8
Using e-health in work	305	69.6
Participating in visual communication in work	112	25.6

Data are raw percentage, total = 438

E-health knowledge, attitude and practice score:

The participants' answers regarding e-health knowledge, attitude and practice were assessed and transferred into percentage score. Table 5 demonstrates minimum – maximum, mean ± standard deviation and the median of the overall and individual percentage score for each domain. Also, table 6 illustrates the distribution of health care participants according to the level of e-health knowledge, attitude and practice percentage score.

Table 5: Health cate participants' knowledge, attitude and practice percentage score

Domain	Min - Max	Mean ± Standard deviation	Median
Knowledge			
Definition of e-health	0.0 – 100.0	60.5 ± 28.3	69.2
Fields of use of e-health	0.0 – 100.0	62.8 ± 29.5	71.4
Methods of e-health	0.0 – 100.0	51.0 ± 27.6	50.0
Overall	0.0 – 100.0	58.9 ± 24.2	65.4
Attitude			
Beliefs towards himself	25.0 – 100.0	59.7 ± 10.8	56.3
Beliefs towards systems	25.0 – 100.0	76.1 – 15.9	75.0
Overall	38.9 – 100.0	68.8 – 10.7	69.4
Practice of e-health	0.0 – 100.0	59.2 ± 20.3	60.0

Table 6: Distribution of health care participants according to e-health knowledge, attitude and practice percentage score level

Domain	Low (< 50%)		Intermediate (50% - 75%)		High (> 75%)	
	No	**%***	**No**	**%***	**No**	**%***
Knowledge						
Definition of e-health	133	30.4	123	28.1	182	41.6
Fields of use of e-health	143	32.6	140	32.0	155	35.4
Methods of e-health	157	35.8	182	41.6	99	22.6
Overall	124	28.3	181	41.3	133	30.4
Attitude						
Beliefs towards himself	31	7.1	383	87.4	24	5.5
Beliefs towards system	11	2.5	250	57.1	177	40.4
Overall	11	2.5	309	70.5	118	26.9
Practice of e-health	142	32.4	164	37.4	132	30.1

*: Raw percentages

The mean percentage score for knowledge about "definition of e-health", "fields of application of e-health", and "methods of use of e-health" were 60.5 ± 28.3, 62.8 ± 29.5 and 51.0 ± 27.6. The overall mean e-health knowledge percentage score was 58.9 ± 24.2.

The percentage score regarding definition of e-health was low in 30.4% of health care participants', intermediate in 28.1% of them, and high in 41.6% of participants.

Regarding the fields of use of e-health, participants were nearly equally distributed in the three category with slight higher proportion in high score category (low: 32.6%, intermediate: 32.0% and high: 35.4%). As regards to the methods of using e-health, the proportion of participants with high score was lower than the two other domains (22.6%) with 35.8% of participants having low score and 41.6% with intermediate score. Overall e-health knowledge percentage score was low in 28.3%, intermediate in 41.3% and high in 30.4% of participants.

The mean percentage score for participants' attitude about "Beliefs towards participants' themselves", and "Beliefs towards systems" were 59.7 ± 10.8 and 76.1 ± 15.9 with an overall mean e-health attitude percentage score equals 68.8 ± 10.7.

The majority of participants had intermediate percentage score regarding beliefs towards themselves (87.4%) whereas only 7.1% had low score and 5.5% had high score. Better scores were recorded regarding beliefs towards health care system whereas only 2.5% of participants had low score, 57.1% had intermediate score and 40.4% had high score. Overall e-health attitude percentage score was low in 2.5%, intermediate in 70.5% and high in 26.9% of participants.

The mean e-health practice percentage score was 59.2 ± 20.3. E-health practice percentage score was low in 32.4%, intermediate in 37.4% and high in 30.1% of participants.

DISCUSSION

The attitudes, knowledge, and awareness of Kuwaiti health care professional about computing in health care have not been documented. We have therefore attempted to obtain a broad picture of the current practice, perceptions, awareness and attitudes of Kuwaiti doctors, nurses, and other healthcare workers towards computing and e-health initiatives, including telemedicine and patient electronic records .

The results of the present study showed that only 1.1% of the health care participants did not know how to use the computer, 5.5% had a minor skill, 16.4% rated their skill as accepted, 47.0% as good, and 29.9% as excellent. Few participants did not use the internet or smart phone. The majority of participants (98.2%) used it for getting health information. This indicated that healthcare workers had good experience in applications of this technology as the required tools were available and commonly used in all hospitals in Kuwait. This goes in accordance with previous studies that indicated availability of tools and applications of e-health increased the level of healthcare professionals' skills and experience (Kipturgo MK et al., 2014 and Samuel M. Et al., 2014). Comparatively, in a survey that was conducted on Indian physicians, the author reported that few of the respondents (1%) had no experience in using the computers. However, 27% were happy with their knowledge of computer applications in their day-to-day activities, 18% used the internet regularly for research purposes and the same number of respondents also used software to assist them with their everyday practice (George JT. et al., 2007).

In the present study, participants were tested for knowledge regarding e-health definition, fields of application and methods of using it, their attitude and practice towards e-health. The study revealed that the proportion participants answered correctly regarding "Use of the Internet and other technology to improve health" was 82.9%, "Exchange of medical information and medical communication between doctors" was 78.8%, "Provide electronic patient records" was 74.4%, and "Education of doctors through the use of electronic sources" was 70.1%. Two-thirds of participants had sound answers regarding "Monitor the health of the patient through electronic technologies", "Health Care Online", "Control of medicine supply for patients through electronic software", and "Provide medical advice to the patient through the use of the Internet". In comparison, Ugandan healthcare professionals defined e-health as an improvement over the current practices in the medical field. They believed that e-health technology was suitable for the need and practices of healthcare professionals, easy to use, its implementation could be tested and that it was easy to be learned and trained upon in the workplace (Olok GT. et al., 2015). In a similar study that was conducted on Indian doctors, 61% of respondents felt that the World Wide Web formed an effective means of providing continuing medical education, 71% saw telemedicine as a potential tool in future health-care delivery in India, a potential tool in future health-care delivery in India, computers and multimedia had a role to play in patient education. When asked whether they would like to learn more about the ways in which computers could improve health care, the majority (88%) responded with 'Yes' (George JT. et al., 2007).

E-health is used for different health purposes as the clinical, educational, preventative, research and administrative fields at the local and remote levels (Minichiello V. et al., 2013). In the present study, more than two-thirds of participants answered correctly regarding using e-health in the clinical fields (69.6%), education (81.7%), administration (68.0%), and research (76.5%). Also, most of the health care participants (82.4%) agreed that the internet is a method of using e-health, and 68.9% stated that email is another method. In their study, Olok et al found that the IT facilities and tools available in medical centers determined the level of practice skills of health care workers in using e-health technology in Northern Uganda. Also, they reported that the most commonly used tools by the physicians were cell phones and computers (Olok GT. et al., 2015).

The most frequently faced barriers that hindered the successful application of HIS were the human barriers that were related to negative attitude of healthcare professionals towards e-health systems and their resistance to change (Altuwaijri M. et al., 2011). The present study showed that the majority of participants had a positive attitude towards the use of e-health. However, only 48.6% strongly disagree or disagree with a negative attitude sentence "I think that the use of the Internet in the field of health is difficult". Also, 98.2% have searched for health information, 81.7% were using electronic patient records, 69.6% were using e-health in their work. However, only 25.6% have participated in visual communication in work and 20.8% attended e-health training programs . These results goes in accordance with that found in a study from Saudi Arabia, in which 78.1 % of health professional declared their willingness to adopt e-health in healthcare service when available and after given proper training on its usage (El-Mahalli AA. et al., 2012). In contrast, only 23.4% of respondents, in a new teaching hospital in Lagos, Nigeria, believed that telemedicine would support access to health care services, 14.1% believed that it improve the quality of healthcare and 6% agreed that it reduces the expenses of health care (Shittu LA. et al., 2007). Khalifa M, in his study, reported that all respondents strongly agreed or agreed on the expected benefits of applying EMRs particularly improvement of patient information access, increasing productivity, improvement of the accuracy of disease as well as general improvement of healthcare quality, and decreasing healthcare cost (Khalifa M., 2013).

E-health depends mainly on healthcare workers' attitudes towards e-health. In their study, Olok and his co-authors reported that healthcare workers' attitude towards e-health ranged from moderate to strongly positive (Olok GT. et al., 2015). Many authors supported the idea that successful application of e-health depends mainly on the positive attitude of healthcare professionals towards e-health and their ability and skills for its tools (Dünnebeil S. et al., 2012 and Qureshi QA., 2014). Shoaib et al., in 2009 carried on a study to assess the level of e-health knowledge among healthcare workers and their willingness to practice at work. The results revealed that 57% of participants heard of e-health before this study, only 28% believed that e-health should be studied in medical college; and half of them believed that e-health services were useful if applied in developing countries. Forty percent of participants stated that before application of e-health projects, necessary information should be disseminated. Although 67% of participants had access to the internet, the majority of them did not use it in health-related purposes (Shoaib SF. et al., 2009). In an another study that was carried in Nigeria for the assessment of health care workers' knowledge and perception, 41.5% of the participants had poor knowledge of e-health and only 21% were aware of the country's telehealth program, 70.5% will use telehealth services and 69% will recommend its use to others. Two-thirds of respondents believed that it should be included in the their health system, while 57% thought it should be a special program, 81% of the participants had positive attitude towards the relevance and benefits of e-health introduction to the health system (Banjoko SO. Et al., 2009).

Regarding practicing of e-health, the present study shows that 98.2% have searched for health information, 81.7% were using electronic medical records, 69.6% were using e-health in their work. However, only 25.6% have participated in visual communication in work and 20.8% attended e-health training programs. The results were comparable with 92% of surveyed UK nurses used a computer at work daily and only 1% had never used the computer at work (Royal College of Nursing, 2015). On the other hand, our results were higher than that obtained by Olok et al. who found that only 57.4% healthcare workers used a computer and 48.5 % used the internet facilities (Olok GT. et al., 2015).

In the present study, the overall mean e-health knowledge percentage score was 58.9 ± 24.2, mean e-health attitude percentage score equals 68.8 ± 10.7, and the mean e-health practice percentage score was 59.2 ± 20.3 . This indicated that e-health knowledge was moderate in general and the behaviors of health care participants were under-practiced. However, the majority of respondents had a better attitude towards e-health role in improving healthcare in the future .

CONCLUSION

There is a gap between participants' attitude on one side and their knowledge and practice of e-health on the other side. This means that health care worker knowledge and practice was less than expected. Hence, more resources should be directed to elevate healthcare workers' knowledge and to motivate them to practice e-health using the available tools

This study will provide basic information regarding health care workers' knowledge, attitude, and practice towards e-health. This would help policy makers and education planners in developing appropriate evidence-based strategies and curriculum in medical and health institutes to successful implementation and use of e-health systems.

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