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Assessment of Professionals' Literacy in Information and Communication Technology at the Administration of Food and Nutrition in Kuwait

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Abstract

With the progress of technology over the last two decades and the diffusion of informatics into the healthcare field, including nutrition, the role of the healthcare professionals that adopt the technology has changed dramatically. The success of information and communication technology (ICT) implementation in healthcare organizations has been directly linked to the knowledge of the users.

Aim: This study assesses the ICT literacy of professionals at the Administration of Food and Nutrition, which works under the umbrella of the Kuwait Ministry of Health.

Method: A survey was conducted by distributing questionnaires to 115 dieticians and nutritionists. Results: The response rate was 90%. The educational level of the respondent proportionally influenced their general computer use and experience. Most of the respondents (84%) were willing to use ICT for patient care and education.

Discussion: The study findings are consistent with those of previous studies that have confirmed the need for healthcare professionals that are ICT literate to use such technology to improve communication, information retrieval, and decision support.

Conclusion: ICT illiteracy is considered a deficiency that could be an obstacle to the successful implementation of EHRs. Several recommendations were developed, including recommending training courses on ICT for the dieticians and nutritionists so that they can provide better nutritional care to patients.

Keywords: Assessment of ICT literacy in healthcare; Electronic health records; Individual perception; Nutrition informatics

Introduction

With the progress of technology over the last two decades and the diffusion of informatics into the healthcare field, including nutrition, the role of the healthcare professionals that adopt the technology has changed dramatically. In Europe, the adoption and use of ICT in healthcare have been encouraged. For example, in the United Kingdom, the National Health Service is striving towards providing high-quality healthcare services to patients through ICT use at low costs [1].

Prior research has shown that different domains in healthcare have adopted ICT for clinical use [2,3], including pharmacy, radiology, medical testing, health information, and nutrition. Recently, in the United States, nutrition as a profession has recognized the importance of informatics and its impact on clinical practice. Nutrition informatics is a new field that specializes in the use of computer and information systems to store, organize, retrieve, and use data and information effectively in solving problems related to food and nutrition, as well as in the use of such systems to make appropriate decisions [3]. Nutrition as a practical domain is rich with information that requires ICT support in order to manage it easily and effectively to provide high-quality nutritional services to patients and the public. Therefore, health professionals, including dieticians and nutritionists, should be aware of how to use ICT properly and efficiently and thus achieve their career objectives. One important application of ICT is electronic health records (EHRs).

The failure rate of IT projects has reached at least 40% in the American industrial sector [4]. There are many different reasons for suspending IT projects, most importantly those related to human and organizational factors [5]. The success of ICT implementation in healthcare organizations has been directly linked to the knowledge of the users, as well as to their readiness towards computer systems and internet use. Readiness has been defined in regard to e-health as "the preparedness of healthcare professionals for the changes produced by ICT use" [6]. Therefore, assessing the readiness of the individuals who will use ICT is very important in order to determine their ICT literacy to ensure that they will be able to use EHRs and the internet in their clinical practice [7]. This will help the health organization to work proactively towards making ICT projects successful.

A report issued in 2007 by the International ICT Literacy Panel defined ICT literacy as the ability to use "digital technology, communications tools, and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society" (p. 2). The internet is a world of information. However, knowledge and skills are required to surf the World Wide Web in order to find resources that are useful and credible [8]. Hence, it is important that healthcare professionals know how to use the internet very well, as there are numerous websites that offer suitable information that can be used to empower patients.

According to the extant literature, there are three stages for carrying out ICT projects: pre-implementation, implementation, and

post-implementation. In this research study, the focus will be on the pre-implementation stage of EHRs, and readiness assessment is an essential requirement in this stage [9,10].

In the next section, a brief overview of the research setting will be presented, including the research question, aim, and objectives.

Current situation in Kuwait

Research question: Are dieticians and nutritionists in the Kuwait Administration of Food and Nutrition sufficiently ICT literate?

The aim of this study is to assess the ICT literacy of all dieticians and nutritionists who work in the Administration of Food and Nutrition (AFN) in the Kuwait Ministry of Health (KMOH). The objectives of the study are as follows:

- To assess the existing knowledge and skills of the dieticians and nutritionists in regard to ICT use.

- To explore the perceptions of the dieticians and nutritionists towards ICT use and the effect of these perceptions on nutritional practice, including the difficulties.

The AFN is in the process of implementing fully integrated EHRs, including internet services. The competency of the professionals in using ICT is unclear, as the AFN expects a lot of accomplishments from them in regard to EHRs and internet use to empower patients. The lack of research on this interesting topic, particularly in the field of nutrition, was the reason behind carrying out this study.

The next section will talk about the methods of this research study, including the study design, the ethical considerations, and the statistical analysis.

Materials and Methods

In this study, a survey method was used to obtain more-accurate results that could be utilized for strategic planning and future training on ICT use within the KMOH. The instrument used for the research was a survey questionnaire. Ethical approval was received before conducting the study.

Study design

A review of previous relevant research was used to develop the initial draft of the questionnaire. The questions have been used and validated by other researchers [11,12]. However, due to the research procedures of the AFN, it was necessary to conduct a pilot study to comply with their rules and regulations. The questionnaire was piloted with five participants (who were then excluded from the main study). Accordingly, modifications were made to suit the research setting, including adding the phrase "as a dietetics/nutrition professional" to the item "Using ICT benefits your work" to become

"Using ICT benefits your work as a dietetics/nutrition professional", which is more expressive. The second modification was made regarding the respondents' speciality levels to suit the professionals of the AFN.

The questionnaire covered the following areas: (1) demographic data; (2) background information about computer use; (3) willingness towards technology use; and (4) reasons for not using technology.

Statistical analysis

The data was analyzed using the software Statistical Package for the Social Sciences (SPSS version 22.0). The descriptive statistics are presented in the next section. A chi-square test was used to examine any association between the demographic variables and other variables. The probability value ($p < 0.05$) was considered statistically significant.

The conditions for using the chi-square test are as follows: (1) cells must have no value or number and (2) the expected value in any cell must be no less than five iterations. Since these two conditions were achieved in the data of this study, a merging technique was performed on the following subsections of "Background information about computer use":

- For both of the subsections "Clinical databases and information retrieval" and "Computer experience", three categories were merged (unable, slightly able, and satisfactory) into one category (weak to satisfactory), while the remaining categories (able and skilled) were merged into one category (good to excellent).

- For the last subsection, "Anticipated future need for computer skills", two categories (no need and slight need) were merged into one category (skillful).

The third category was defined as "moderate skills"; the last two categories (need and significant need) were merged into one category (skill-less).

In the following section, the results of the survey questionnaire are presented.

Results

The questionnaires were distributed to 115 dieticians and nutritionists who were working in different settings under the umbrella of the AFN in the KMOH from February 2015 to April 2015. These settings are the Central Medical Nutrition Clinic and general and tertiary hospitals (five general hospitals and nine tertiary hospitals). The number of completed questionnaires was 103, giving a response rate of 90%. Table 1 shows a summary of the general demographics of the participants.

- **Background information about computer use**

The participants were asked about their experiences with computer systems, which encompassed (1) clinical databases and information retrieval (CDIR); (2) general computer use; (3) computer literacy; (4) access to computers; and (5) anticipated future need for computer skills.

- **Clinical databases and information retrieval**

The results show that 43% of the respondents were weak to satisfactory in their abilities to use clinical databases and retrieve medical information. Most of these respondents held diplomas. Furthermore, the results show that there is a statistically significant association between educational levels and the use of CDIR, where p-value < 0.001. Therefore, respondents with BSc or postgraduate degrees were more experienced in CDIR than those with diplomas were. Moreover, the results show that there is no association between the use of CDIR and the factor of years of experience (p-value=0.097) or if respondents had undertaken any computer training courses (p-value=0.062).

- **General computer use**

It was found that there are significant associations between computer experience and the variables of gender (p-value=0.017), educational level (p-value=0.005), and computer training programmes (p-value=0.006). In total, 10 (67%) of the 15 responding males were good to excellent in computer experience, while 58 (66%) of the

Demographic Factors		All
		(n=103)
	n	(Col%)
Age Groups (years)(mean ± sd)		33.1 ± 6.8
21 to 30	50	(48.5)
31 to 40	39	(37.9)
41 to 55	14	(13.6)
Gender		
Male	15	(14.6)
Female	88	(85.4)
Nationality		
Kuwaiti	89	(86.4)
Non-Kuwait	14	(13.6)
Educational Level		
Diploma	50	(48.5)
BSc	37	(35.9)
Post Graduate	16	(15.6)
Specialty		
Nutritionist	48	(46.3)
Dietician	52	(53.7)
Years of experience		
1 to 5	38	(37.7)
6 to 10	27	(26.7)
11 to 20	29	(28.7)
21 to 30	7	(6.9)
Computer training programs		
ICDL	30	(29.1)
Other	20	(19.4)
None	53	(51.5)

Table 1: Shows a summary of the demographic data of the participants

88 responding females had less computer experience. Regarding educational level, the trend association indicates that the respondents with diplomas had less computer experience than those with BSc or postgraduate degrees did. Regarding the computer training programs, it was found that 14 (70%) of the 20 respondents who had undertaken training programme other than the ICDL were more experienced in using computers.

- **Computer literacy**

The results show that there is a significant association between computer literacy and educational level (p-value=0.016): the higher the educational level of the respondent, the more likely they are to be computer literate. In total, 10% of the respondents were computer illiterate, while the majority of the respondents were computer literate and ranged in their knowledge levels: 11% were literate, 28% were beginners, 36% had intermediate knowledge, and 14% had advanced knowledge. According to the results, there is no significant association between computer literacy and the variables of age, gender, nationality, years of experience, and computer training programs. Furthermore, more than half of the respondents (65%) stated that their computer knowledge needed improvement to reach the desired level.

- **Access to computers**

According to the results, 59% of the respondents had easy access to computers, whereas 18% of the respondents found accessing computers difficult. Only 8% of the respondents found accessing computers impossible.

- **Anticipated future need for computer skills**

The results show that there is only one significant association for anticipated future need: speciality (p-value=0.011), as most of the nutritionists (73%) and dieticians (44%) had moderate skills in ICT use, wherein computer skills are needed in the future.

- **Willingness towards technology use**

Most of the respondents (85%) were willing (50% strongly agreed; 35% agreed) to use ICT for the purposes of patient care and education, in addition to using it to store, retrieve, and communicate patient information with other health institutions. According to the results of the chi-square test, there is no significant association between willingness and demographics, where p>0.05.

- **Reasons for not using technology**

According to the results, 58% of the respondents said that a lack of suitable training in the use of equipment was the reason they did not use certain technologies. Others (51%) considered that a lack of communication between IT experts and clinicians was the reason behind them not using technology in their work, while 40% of the respondents chose "Lack of user-friendly software" and "Negative attitudes of staff involved" as the reasons for them not using technology.

Some respondents left additional reasons. These reasons were analysed using the thematic content technique. The comments were: (1) the current available computer systems are old and not effective (6%) and (2) our profession needs high-speed internet access (5%).

At the end of the questionnaire, a box was left for the participants to add any other comments. In total, 8% of the respondents said that there was a need for fully computerized electronic medical records integrated with suitable diet software, requiring suitable training and continuous technical maintenance. Furthermore, 4% said that the use of ICT in the nutrition department was very important and had a positive impact on the work but that, to make it successful, technical support should be available 24 hours a day, seven days a week.

In the next section, the results of the survey questionnaire will be discussed, and the findings will be presented.

Discussion

The impact of ICT use in healthcare organizations has become obvious. Many advantages of ICT have been utilized by clinicians in providing patient care, including for the following important uses: communication, information retrieval, and decision support [13]. However, utilizing informatics relies on the user's competency in using ICT properly. The benefits of carrying out assessments of ICT literacy have been proven by many studies in the context of informatics in healthcare organizations [14]. Therefore, in this study, ICT literacy assessment was performed for dieticians and nutritionists that will use EHRs and the internet in their regular work in the future.

The nature of nutrition practice requires specialists to have up-to-date information about nutrition and nutritional studies, and this requires certain skills in using the World Wide Web. Different online databases can be used to help nutrition professionals to practice evidence-based medicine and nutrition. However, the findings of this study reveal that approximately half of the respondents (43%) were rated as weak to satisfactory in using clinical databases and retrieving medical information, and most of these respondents held diplomas. As a result, it seems that the respondents were not knowledgeable about using electronic libraries or databases. This finding is consistent with the results of a study conducted in Nottingham and Rotherham,

UK, where it was found that under half of the primary care staff surveyed (44%; mostly physicians) were using electronic resources and databases [15]. The study found that the higher the professional's level of education, the better their skills in using clinical databases (such as PubMed and OVID) are, but age and work experience do not have a strong influence. These findings are not consistent with those of other studies that have found that the age of the individual and their work experience are significant factors that have an influence on computer knowledge [16-18]. In respect to the professionals' experience in using computers, the study found that 35% of the respondents who held diplomas were not experienced in computer use, especially compared to those who held BSc degrees or higher. This revealed that in their bachelor or higher studies, the professionals had been more exposed to computer use. Furthermore, the findings show that even if the nutritionists or dieticians had undertaken computer training programs, their computer experience was still not being utilized. A possible explanation could be that the training programme they had undertaken were not suitable in respect to numerous factors, including learner needs, learning content, and the timing of the training [19]. Alternatively, they may not have been exposed to computers at work.

To achieve the effective use of ICT in nutrition care, dieticians and nutritionists need to be computer literate [14,20]. The findings of this study demonstrate that the educational level of nutritionists and dieticians has an impact on their computer literacy; the majority of the respondents who were well educated in computer use had completed postgraduate studies. Consequently, these findings concur with other studies that have confirmed the relationship between educational level and computer literacy [21].

Even though the majority of the respondents were knowledgeable about computers, 65% of the respondents stated that their computer knowledge needed improvement to reach the desired level. This result confirms the notion that training is important and needs to be continuous in order for users to maintain the optimum level of computer use. This finding is consistent with the findings of a study conducted in Makah, Saudi Arabia, in 2013, which found that the physicians studied needed to be trained in computer skills to improve their clinical practice and patient care [22].

In healthcare organizations, easy access to computers makes the healthcare professionals use computers in a uniform manner. The study shows that not all of the professionals in the AFN had access to computers (26%). This will affect the usage level of EHRs in the future [5].

This study found that the majority of the respondents were willing to use technology (84%), regardless of their age, gender, educational level, or nationality. This contradicts the findings of a previous study that found that gender and type of practice (e.g. physicians who receive high volumes of patients, such as Medicaid cases) both have a dominant effect on professionals' willingness to use EHRs [23]. The willingness of dieticians and nutritionists to adopt ICT in their clinical practice could determine their knowledge of the advantages of EHRs. This positive acceptance among respondents in utilizing EHRs is attributed to the benefits they expect EHRs to provide in their work.

On the other hand, the findings of this study show that the lack of both (1) suitable training courses (58%) and (2) communication with IT experts (51%) were the most common reasons hindering the use of ICT in the AFN. These findings confirm those found in previous studies [24,25]. Apparently, proper exposure to ICT by undertaking more-detailed training courses makes individuals more prone to developing positive attitudes towards using ICT. A lack of communication between healthcare professionals and IT experts will affect the coordination between the various medical departments in the healthcare organization. This problem could be solved by involving specialists from health informatics backgrounds who speak dual 'languages': health and ICT.

Limitations

This study had the following limitations:

- The assessment of ICT literacy was limited to dieticians and nutritionists in the AFN, so the results are not generalizable to other healthcare professionals in the KMOH.

- This study was restricted to dieticians and nutritionists in the governmental sector and excluded the private sector.

- The conducted assessment in this study was restricted to the pre-implementation stage of EHRs and solely focused on the individual level, not on the technical or organizational levels.

Conclusion

It can be concluded that the educational level of dieticians/nutritionists and ICT literacy has a proportional relationship. ICT illiteracy is considered a deficiency that could be an obstacle to the successful implementation of EHRs. The effective use of ICT in healthcare relies on the competency of the users. Therefore, assessing the ICT literacy of dieticians and nutritionists is strategically important in order to identify and respond to their individual needs to ensure the proper use of ICT and to avoid wasting time and money in the future. As a result, in the professional domain, training is necessary to improve users' ICT literacy. Additionally, within academia, an educational module needs to be considered to equip a new generation with knowledge of nutrition informatics.

Recommendations

To obtain the optimal advantages of EHR use in nutrition care at the AFN, the following recommendations could be considered prior to the implementation of EHRs:

- Provide training courses for nutritionists and dieticians at different levels, paying extra attention to professionals who hold lower levels of education. Furthermore, it is important to take into account the type, timing, and content of the learning materials of the training course.

- Offer training courses in certain topics to encourage dieticians and nutritionists to become more ICT literate [25] in regard to the following: (1) electronic databases and clinical information retrieval skills; (2) information management, including all kinds of data, information, and knowledge in healthcare; and (3) basic computer competence, including hardware, software, and networks.

- Provide effective computer networks integrated with EHRs, giving easy access to all authorized professionals.

- Hire health informatics specialists to work as a point of liaison between ICT experts and professionals in the AFN in order to improve the communication among them and to achieve the intended objectives.

- Provide user-friendly software to make the users happy and willing to use the technology, especially those who have negative

attitudes towards technology.

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