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Factors Influencing Nurses' Attitudes towards Information Technology in Nursing Practice

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Abstract

The use of towards computerized health information systems in developed countries and in some developing countries has already become a reality. However, nurses as a group of care providers have been found to resist computerization, seeing computerized health information systems as dehumanizing, confusing and uncaring. Nurses with more computer experience tend to have more positive views; education and training positively influence attitudes; and younger and less experienced nurses may have more positive attitudes. A structured questionnaire was used to measure the attitudes of nurses working towards computerization. A random sample of nurses working in public hospitals were sent a questionnaire. Respondents generally had positive attitudes toward computerized health information systems. Analysis of variance revealed statistically significant differences in attitudes in relation to nationality, level of education, previous experience in computer use, and computer skills ($P < 0.05$). Multiple regression analysis showed that gender, nationality, education levels, and duration of computer use were statistically

significant predictors of attitudes toward computerized health information systems (P < 0.05). With adequate computerized health information system training, the implementation of computerized health information systems could be effective for nurses in providing quality health care, as found in other studies.

Keywords: nurses practice, information technology

INTRODUCTION

Adapting to technological innovations represents a key process for improving and restructuring healthcare. Technological developments have, in addition to many existing assignments, exposed nursing personnel to new tasks and responsibilities in many areas of practice including homecare, clinic settings, schools, and hospitals (Harris, Roussel, & Thomas, 2016).

Although the introduction of computers, representing a significant facet of technologic developments, to both daily and professional lives of nurses has been rapid, the literature indicates a resistance by nurses to use of computers in healthcare (Galani, 2015).

Nurses argue that use of computers in healthcare is not in accordance with holistic and humanistic approaches, which represent the main philosophy of nursing, and that computers are complex devices to work with, to justify their resistance to use computers in healthcare (Crowell, 2015).

Because of the accelerated development of technology, hospitals have expanded the use of computers to many areas. Initially, areas such as human resources, financial, and logistics systems were computerize (Gonen, Sharon, Offir, & Lev-Ari, 2014).

The successful implementation of computer systems in nursing practice is likely to be directly related to users' attitudes toward computerization. Thus, the attitudes nurses have toward the use of computers are very important, and use of computers in healthcare requires that objective and comparative information on how nurses view the use of computers and the factors affecting these attitudes is available. The growth of hospital information systems has also had significant impacts on nursing practice (Yontz, Zinn, & Schumacher, 2015).

The successful implementation of computer systems in nursing practice is likely to be directly related to users' attitudes toward computerization. Thus, the attitudes nurses have toward the use of computers are very important, and use of computers in healthcare requires that objective and comparative information on how nurses view the use of computers and the factors affecting these attitudes is available (Strudwick, 2015).

If attitudes of nurses are adequately assessed, then implementation strategies can be developed to support nurses who are less willing to accept computerization (Ifinedo, 2016).

However, studies utilizing models and tools such as the Nurses' Attitudes toward Computerization questionnaire, the Information Technology Attitude Scales for Health, and the Technology, the worldwide expansion and growth of the technology has led to the formation of new markets in the majority of industries that are centered on IT functionality (Kaye, 2017).

The healthcare industry has exhibited a similar pattern, and services and applications that utilize IT are actively being developed in hospitals, organizations, and other groups (Rosa, Campbell, Miele, Brunner, & Winstanley, 2015)

Numerous studies have examined the importance of nurses' attitudes toward how successfully computers are introduced into a nursing unit. Study designs ranged from one-time descriptive studies examining demographic variables influencing computer acceptance, to studies comparing users with nonusers, and measurement of attitudes before and after computerization (Liaw et al., 2015).

Information and communication technologies (ICTs) embody all digital technologies that support the electronic capture, storage, processing, and exchange of information in order to promote health, prevent illness, treat disease, manage chronic illness, and so on In the health sector, ICTs refer to a set of projects or services that allow for remote care (telehealth), interdisciplinary clinical support, as well as knowledge transfer (Rouleau, Gagnon, & Côté, 2015).

The rapid advances in computer information technology have important implications for both nursing students and educators worldwide. These implications include but are not only limited to the teaching and learning technology but also must include the technology

that nursing graduates will be expected to work on a daily basis (McCutcheon, Lohan, Traynor, & Martin, 2015).

The ability to use computers is an important prerequisite for nurses and nurse candidates, who can benefit in clinical practice from acquiring health and nursing information via computer, Acceptance Model suggest that nurses' attitudes toward healthcare technologies may vary significantly (Lee & Clarke, 2015).

More than 11 studies about the attitudes and anxiety of nurses toward hospital computer systems and, based on these studies, reported that nurses expressed fears that computerization may contribute to loss of jobs and/or loss of data and that nurses also expressed fears that more time would be spent with computers and less time with patients (Weeger & Gewald, 2015).

If we better understand the effects of these Information Technologies, we could organize strategies to facilitate their implementation and their integration in nursing care. Consequently, we could overcome their negative effects and optimize the positive ones, in order to use them to their full potential, as a tool to support nursing care and, ultimately, improve patient outcomes

Health sector is faced with constant changes as new approaches to tackle illnesses are unveiled through research. Information, communication and technology have greatly transformed healthcare practice the world over. Nursing is continually exposed to a variety of changes. Variables including age, educational level, years worked in nursing, computer knowledge and experience have been found to influence the attitudes of nurses towards computerization and Information Technologies (Wager, Lee, & Glaser, 2017).

A positive attitude could see a rapid adoption with accompanying realization of the benefits of computerization, less positive attitude or rejection is likely to retard attempts to modernize service delivery (Warren, 2017)

LITERATURE REVIEW

Many studies reviewed more than 11 studies about the attitudes and anxiety of nurses toward hospital computer systems and, based on these studies, reported that nurses expressed fears that computerization may contribute to loss of jobs and/or loss of data and that nurses also expressed fears that more time would be spent with

computers and less time with patients On the other hand, there are many studies in the literature emphasizing the importance of health informatics (Weeger & Gewald, 2015).

The exponential increase in information and communication technologies has advanced the information presently available, not only quantitatively but also qualitatively.

Dramatic advances in Information and Communication Technology (ICT) have transformed the way in which health care professionals deliver patient care and health administrators manage health institutions

The Australian health care sector, as in many parts of the world, is facing significant changes in service and delivery, with health information technology and electronic health records viewed as tools for improving quality and safe health care (Sheikh, Sood, & Bates, 2015).

Nurses still manage information through a combination of methods, including paper and pencil, computer-based records, remote monitoring devices and the use of the Internet (Campbell, Ali, Finlay, & Salek, 2015).

Research indicates that, although nurses might be willing to learn new technologies, such as complex monitoring equipment or complicated life-saving procedures, the mastery of information technology, to date, has been of low priority (Christe, 2017). In 2014, Porter-O'Grady lamented that many nurses at that time were from the last generation of the industrial age, and they should have moved into an intensifying technological age because the traditional practices and functions of nursing were no longer relevant and sustainable (Suppiah Dall, 2014).

Nurses' ambivalence and lack of knowledge have been hailed as significant encumbrances to optimal information technology integration in the workplace (Bagheri, Hamidizadeh, & Sabbagh, 2015). Nurses need to be informed of the application of information technology and its advantages, through the integration of information technology into nursing education (Kahouei, Zadeh, & Roghani, 2015).

Bickford (2015) asserts that, while every nurse need not be an informatics specialist, every nurse must be information, computer and information technology literate because, as knowledge workers, nurses require accurate and up-to-date information, as information

technology continues to expand, it will undoubtedly impact on how health care is conceptualized and delivered(Bickford, 2015).The findings of past research have indicated that nurses were, generally, supportive of computerization in the workplace (Tubaishat,, 2016) and that there is a generally positive attitude towards their use (Tubaishat, Al-Rawajfah, Habiballah, & Akhu-Zaheya, 2016)

In contrast, the results of other studies have suggested that nurses' age is a significant predictor of attitudes, with younger and often less-experienced nurses having more positive attitudes towards computers than their older colleagues (Conley & You, 2017). Jilka, Callahan et al had reported that "nurses who used computerized documentation were able to decrease time spent in documentation activities, and they were able to increase time spent in direct patient care (Jilka, Callahan, Sevdalis, Mayer, & Darzi, 2015).

Westbrook et al investigated the differences in three areas (nursing time distribution, nurse attitudes toward computerization, and compliance with charting standards) before and after implementation of computerized charting. They found that implementation of computerized charting made up positive changes in these areas (Westbrook et al., 2016).

Researches on nursing attitudes has consistently demonstrated that education is related to attitude-s about computers. Most studies agree that the more education a healthcare worker has, the more receptive they are to computers(Irizarry et al., 2017).

A study conducted by Gonen & Lev-Ari, who found that those who had worked longer in nursing had a more positive attitude toward computers(Gonen & Lev-Ari, 2016).

Ball et al surveyed that nurses as to their attitudes toward hospital computers and found that attitudes toward or reactions to computers can be changed with information, a study described the knowledge of and attitudes toward computers of graduate nursing students before and after an elective course of Computers in Nursing (Shin, Cummings, & Ford, 2018).

A study reported that nurses who worked in hospitals without computers had higher mean scores, indicating a more favorable attitude toward computers and I T(Chong et al., 2016).

A study discovered that the level of education, type of nursing and years of experience in nursing were associated with a positive

attitude toward computers. The attitudes of nurses in a non-computerized hospital, also found that previous experience with computers was an important contributor to a positive attitude, the attitudes of nurses in a non-computerized hospital, also found that previous experience with computers was an important contributor to a positive attitude(Chong et al., 2016).

Similarly, Widman et al. established that computer education and experience were significant factors that contributed to the development of nurses' positive attitudes towards computers, found that computer experience was by far the most influential factor to nurses' positive attitudes(Widman, 2015).

Nurses' computer attitudes reflected their complex internal states that affect their choice or behavior towards computer use, Sultana reported no major relationship between attitudes and computer experience or any demographic variables(Ibrahim, 2018)

Van Deursen & Helsper compared the attitudes of users and non-users and found the non-users with previous computer experience to be of a more positive attitude(Van Deursen & Helsper, 2015). Ding, et. al purports that education and training are critical factors in encouraging nurses' use of information technology systems in their daily practice. Ding also identified other factors, such as experience in computer use and educational preparation in information technology, that were predictors of nurses' attitudes(Ding, Ottenbreit-Leftwich, Lu, & Glazewski, 2019).

PROBLEM STATEMENT

Graduate nurses, the largest group of new nurses, are often expected to have computer skills but this might not always be the case. Two Australian studies found that the majority of nurses considered their level of computer competence to be less than proficient (Darbyshire, 2015; Smedley, 2016). Some graduate nurses have limited or no computer skills relating to the applications in use in their work environment (McCannon & O'Neal, 2015).Computer proliferation is not synonymous with computer literacy, which is essential to facilitate the learning of information technology by nurses. For that reason to selected this topic to determine the factor which effect on nursing attitude towards informational technology.

OBJECTIVE

1. To assess nurses' attitudes towards the use of information technology in hospitals.
2. To investigate whether the attitudes of registered nurses towards information technology in the workplace are related to their personal skill rating.

OPERATIONAL DEFINITIONS

Information technology:
The technology involving the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data in nursing.

HYPOTHESIS

Null Hypothesis:
Information technology has no effect on nursing attitude.
Alternate Hypothesis:
Information technology has an effect on nursing attitude.

MATERIAL AND METHODS

Study Design: A quantitative descriptive cross-sectional study design was used to assess Depression and Its Contributing Factors among Undergraduate Nursing Students
Settings: Study was conducted in the Private sector of Faisalabad, Pakistan.
Duration of Study: 4 Month
Target population: Students of Private sector of Faisalabad, Pakistan.
Sample Size: The data was collected from 150 students of Private sector of Faisalabad, Pakistan.
Sampling Technique: A non-probability convenient sampling technique was utilized to select the proposed sample of undergraduate nursing students.
Sample Selection:
Inclusion Criteria:

- All the male and female students of the school of Nursing.
- Undergraduate BS Nursing and Post RN Nursing.

- All the students who are willing and available at the time of data collection included.

Exclusion Criteria: The students who are not willing and not available at the time of data collection excluded.

Equipment: Questionnaire adopted from (Suppiah Dall, 2014) will be used to collect data from the nurses.

DATA COLLECTION PROCEDURE

Questionnaire adopted from (Suppiah Dall, 2014) was used to collect data from the nurses, Questionnaires consist of two section, (Section A) composed of demographic data Name (Optional), Age, Sex, Education & marital status about the participants. (Section B) composed of questions regarding the assessment of Factors Influencing Nurses' Attitudes towards Information Technology in Nursing Practice 21 questions, the participants can answer these questions by providing five options (Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree). After floating Questionnaire among the participants the data was analyzed through SPSS version 21 for Descriptive statistics and finding mean, frequencies, validity and reliability. Consent was taken from all the participants and free hand were given to the participants to take part in the study or refused to participate.

DATA ANALYSIS PROCEDURE

The questionnaire consists of two parts of analysis No 1 Demographic data of analysis which include 4 questions that include Age, Gender, education & marital status and No 2 Factors Influencing Nurses' Attitudes towards Information Technology in Nursing Practice, the data is collected through questionnaire, distributed in 150 students. The collected data is analyze and computed using frequency, table and charts through SPSS version 21.

RESULTS & DISCUSSION

There were 135 respondents in the study. 48.1 %(n=65) participants were from 18-25 age group 43.7% (n=59) participants were from 26-34 age group and 8.1% (n=11) participants were from 35-45 age group. Both male and female were involve in the study 48.9 (n=66) participants were male and 51.1 (n=69) participants were female. In

this study nursing diploma holder 4 years BS nursing and Master in nursing nurses were involved in which 87.4 (n=118) participants were from nursing diploma, 9.6% (n=13) participants were from 4 years BS nursing degree holder and other 3.0 %(n=4) participants were Master in nursing nurses. Both married and unmarried participants were involve in which 31.9% (n=43) participants were Married and 68.1% (n= (92) participants were unmarried.

Variable		N	Percentage %
Age		135	100
	18-25	65	48.1
	26-34	59	43.7
	35-45	11	8.1
Gender	Male	66	48.9
	Female	69	51.1
Education	Nursing Diploma	118	87.4
	4 years BS Nursing	13	9.6
	Master in nursing	4	3.0
Marital Status	Married	43	31.9
	Unmarried	92	68.1

Relationships between Nurses' Personal IT Skill Ratings and Attitudes.

Given that the competency of nurses in computer science is fast becoming important for healthcare, it was deliberated important to examine whether there are any relations between the qualification of special computer skills of nurses (or self-assessments). Their skill with information technology / computer nursing) and the aspects that influence their arrogances towards information technology in place of work. Data was collected from 135 nurses, simple correlations were used to describe the relationships between the factors of nursing attitudes and their personal ability score. Results reported in Table no 4.4 shows that the qualification of nurses' individual skills was statistically important ($p < 0.05$) interrelated to all attitude scales. For two of the scales, the welfares of computer technology in medical care and the need for information technology and associated skills in medical care, these associations were confident. For the third scale, the association was negative. These results shows that the superior the degree of competence of nurses with information technology, they fell more positive regarding the importance of computer technology for

care of patient and the essential for information technology and related skills in nursing care. Moreover, the results showed that nurses with lesser computer literacy scores were more expected to highlight potential pitfalls related with the usage of information technology in nursing.

Table 4.4 Correlations between Nurses' Attitudes towards Information Technology and Personal Skill Ratings

Scale	Personal IT Skill Rating (r)
Benefits of IT to Health Care	0.18*
Pitfalls of IT to Health Care	-0.26**
Need for IT and Associated Skills in Health Care	0.23**

*p<0.05 **p<0.01

Understanding Nurses' Attitudes towards IT

The nurses answered each of the items in the recently established survey by a five-point Likert scale. Figure 4.6 indicated the frequency through which nurses elected every of the five reacted and the average respond for every element. While elements were presented at random in the review, the declarations presented in the following tables (Figure no 4.6, 4.7 & 4.8) are grouped according to their scale. The three gauges and their elements are the following

(i) Standing of information technology for wellbeing care
(ii) Information technology setups for health care
(iii) Needs of information technologies and related skills in nursing care

Significant constituent of the present revision was the attachment of qualitative information, obtained through questionnaire, to better understand the attitude of nurses towards information knowledge in the workplace. Data were collected from listed nurses who agreed to participate, with hospital staff, clinical instructors, & clinical trainers. Of the 135 listed nurses (n = 33) who stated that they were willing to participate in data collection and provided their contact information. The data was integrated with the free text information entered in the comments section of the questionnaire to provide a large amount of information sources. I observed the contributions that information

technology taken complete to help nurses in their practice and how information technology was used to educate nurses.

Table 4.6 Descriptive information on the opinions of registered nurses on the benefits of Information Technology in Healthcare

Item	Statement	% Response					Mean	SD
		SD	D	N	A	SA		
3.	The use of Information Technology in Healthcare improves the quality of patient care.	3.0	17.2	14.9	54.5	10.4	3.52	0.99
4.	Information Technology in healthcare improves communication in health care, thus benefiting patients.	0.7	9.0	13.4	61.2	15.7	3.82	0.83
5.	Information Technology saves time when seeking information regarding patients (for example medical records, pathology results).	0.7	3.0	7.5	63.4	25.4	4.10	0.71
11.	The use of Information Technology in healthcare allows nurses more time to improve patient care.	3.7	17.2	32.1	38.1	9.0	3.31	0.98

Table 4.7 Registered Nurses' Attitudes towards Pitfalls of Information Technology in Healthcare

Item	Statements	% Response					Mean	SD
		SD	D	N	A	SA		
9.	The use of Information Technology in healthcare for the depersonalises nursing care.	3.7	10.4	20.1	46.3	13.4	3.49	1.04
10.	The use of Information Technology in healthcare increases nurse's workload.	6	24	26.1	37.3	6.0	3.13	1.04
11.	The use of IT has contributed to nursing job losses within health care organization.	0.7	4.5	23.9	52.2	18.7	3.84	0.81
12.	The use of Information Technology in healthcare violates patient privacy and confidentiality.	5.20	14.9	20.1	50.7	14.2	3.64	0.90

Table 4.8 Nurses' Levels of Computer Literacy Skills

Computer Skills	Frequency (*n*)	Percent (%)
Beginner	35	26
Intermediate	79	59
Advanced	21	16

N=135

The results shown in Table 4.6 indicate that 64.9% of responding nurses agreed or agreed that information technology improved the

quality of patient care and gave nurses more time to practice care nursing. In contrast, 14.9% of nurses were ambivalent, neither in agreement nor in disagreement, and 20.2% of nurses disagreed or disagreed (average = 3.52, DS = 0.99).

CONCLUSION

The overarching aim of the present study was to gain an understanding of the factors that influence nurses' attitudes towards information technology and nursing informatics. The effective use of information and communications technology requires nurses to be computer literate, but past research has indicated that nurses' attitudes towards information and communications technology could be influenced by their perceived skill levels.

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PROFORMA/QUESTIONNAIRE
Questionnaire

Demographic Data

1) Age: 18–25 years □ 26–34 years □ 35–45 years □

2) Gender: F □ M □

3) Highest Educational qualification levels attained?

Nursing Diploma □Bachelor of Nursing Master in Nursing

Master in Education □ Post-Grad Diploma □ Sometimes□

4) Marital Status: Single □ Married □

Factors Influencing Nurses' Attitudes towards Information Technology in Nursing Practice

S. No	Questionnaires	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
1.	The use of Information Technology will lower the cost of health care.					
2.	The use of Information Technology has contributed to nursing job losses within health care organization.					
3.	The use of Information Technology in health care improves the quality of patient care.					
4.	Information Technology in health care has improved communication in health care thus benefiting patients and staff.					
5.	Information Technology saves time when seeking information regarding patients (for example medical records, pathology results).					
6.	The use of Information Technology in health care violates patient privacy and confidentiality					

7.	The use of Information Technology in health care increases nursing costs as it increases nurse's workload.					
8.	The use of Information Technology in health care will de-personalises nursing care					
9.	The use of Information Technology in health care can reduce paper work completed by nurses.					
10.	The use of Information Technology in health care increases nurse's job satisfaction.					
11.	The use of Information Technology in health care allows nurses more time to improve patient care.					
12.	The use of Information Technology by nurses increases the professional status of nursing.					
13.	Information Technology skills are essential for nurses in the 21st century.					
14.	Information Technology in health care is needed to improve nursing					
15.	The use of Information Technology in nurse education delivery meets student nurses' learning styles.					
16.	The use of Information Technology in nurse education improves the quality of teaching methods and student nurses' learning.					
17.	The use of Information Technology in nurse education improves the					

	marketability of graduate nurses.					
18.	Nurse educators require more formal education to use and teach the application of Information technology in nursing.					
19.	Nursing students' computer competency should be evaluated clinically.					
20.	Technology Skills are a requirement for lifelong learning.					
21.	There is a need for Information Technology within nursing and nursing practice.					