Nursing Students' Perception and Educational Needs regarding Nursing informatics

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Abstract: nursing informatics is a new specialty in Egypt. It is becoming an important and integral part of healthcare organizations, it affects nursing outcome and quality of health care. Therefore, involving informatics basic knowledge and skills within a nursing education program is recommended to meet the future challenging trends that globally affect nursing workforce. *Aim of the study:* To assess nursing students' perception and educational needs regarding nursing informatics . *Research Design:* Descriptive Cross-sectional design was used in this study. *Setting:* The study was conducted at the Faculty of Nursing, Beni Suef University. *Sample:* Convenient sample (n= 390) of nursing students from different academic levels, encountering in baccalaureate science of nursing program during academic year 2015-2016. *Tools of data collection:* 1- Self administered nursing informatics perception questionnaire, 2- Nursing informatics educational needs. *Results:* revealed that nursing students highly perceived importance of informatics application in education and health care mean % (90.73% and 86.86% respectively). Main educational needs of nursing informatics include: application of informatics in education, tele-medicine, ethics of informatics and hospital information system (98.2%, 97.4%, 96.9%, and 96.4% respectively). *Conclusion:* nursing students highly perceived importance of informatics application in healthcare and education. There was statistical significant difference between nursing students perception regarding nursing informatics by their academic year, students educational needs include application of informatics in education, tele-medicine, ethics of informatics and hospital information system. *Recommendations:* develop and integrate nursing informatics course specification design based on nursing students' educational needs, support the faculty of nursing with resources and fund to build appropriate infrastructure necessary to apply nursing informatics, provide faculty teachers with an opportunity to learn and develop skills about nursing informatics in order to prepare them to integrate this course within the curriculum and courses they teach.

Key words : Nursing Students, Information Technology, Nursing Informatics, Educational Needs

BACKGROUND

Integrating information technology within healthcare has gained a greater acceptance in the last two decades. Developed countries have successfully adapted it within healthcare organizations. Compared to developed, countries developing countries have limited application of it in thier healthcare institutions (Mohammed, Andargie, Meseret & Girma, 2013). Furthermore, Jeon et al. (2016) concluded that informatics in nursing education have increased during the last decade. Schools / faculties offering nursing informatics courses were not so much. A greater focus is needed on training faculty members and developing the appropriate nursing informatics course. Daimi & Grabowski, (2011) stressing increasing demand for informatics results, from governmental strategic vision, as well as spread its application within health care systems.

Information technology increasingly important aspect in healthcare organizations, therefore, its application in health professional education, research and clinical practice are critical issue (Koivunen et al., 2008; Oroviogoicoechea et al., 2010). Nursing-Informatics (NI) defined by Guenther and Peters (2006) as the involvement of information technology in different nursing practices, including clinical nursing, management, research or education. American Nurses Association (2008) defined it as "A specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, knowledge, and wisdom in nursing practice". Moreover, Canadian Association of Schools of Nursing (2012) defined it as "a science and practice that integrates nursing, its information and knowledge, and their management, with information and communication technologies to promote the health of people, families and communities worldwide".

Nurses spend most of their time providing direct patient care that may include: bedside monitoring, assisting and teaching patients, providing primary care (Benner et al., 2010). Informatics applied in variety of nurses' activities involve: vital signs (e.g. heart rate, respirations, temperature and blood pressure), collection of clinical data, nursing care plans, regulation of medication administration, communication from the nurses' station, decision support systems and medical diagnostic systems are associated with collecting patient information and for many other patient care operations (Ellis and Hartley, 2012 and Darvish et al., 2014). However, Nursing informatics (NI), has great benefits such as, record keeping, enhancing communication, perform simple calculations, support decision making, facilitates gaining competitive advantage, better management of chronic diseases, faster retrieval of record, improving process flow and productivity (Namakula and Mayoka, 2014). Also, it is promising in improving the efficiency, cost-effectiveness, quality, and safety of patient care, and reducing health care costs by integrating the best practices into patient care and developing evidence base nursing through transforming health care and nursing practice (Alquraini, Alhashem, Shah, & Chowdhury, 2007, Amarasingham et al., 2009, Ball et al., 2011, Spencer, 2012 and Darvish, Bahramnezhad, Keyhanian, & Navidhamidi, 2014). Leaders in nursing must play the role of advocates for nursing informatics by influencing people, policies, practices, structures and systems in order bring about change (Tomajan, 2012). Furthermore, Canadian Association of Schools of Nursing (2012) stressed that inadequate informatics education affects the skill of graduate nurses to recognize how to apply informatics to patient care and nursing practice. So, educational institutions have a responsibility to ensure that students acquire required knowledge of informatics.

Hebda & Calderone (2010) and Gardner & Jones (2012) emphasized that emerging information technology considered one of driving forces for curriculum change. Nursing educator develop nursing curriculum guided by competencies. Establishing informatics competencies baseline for nursing students is critical issue in planning an informatics curriculum and preparing

adequately students to use information technologies to maintain and promote safe and quality nursing care. Nurses' informatics competencies subdivided into four levels of nursing practice: beginner; experienced; informatics specialist; and informatics innovator.

Jetté, Tribble, Gagnon, & Mathieu, (2010), Edwards & O'Connor, (2011) and Gardner & Jones (2012) stated that nursing students should have NI competences to provide them with the ability to solve computer problems, report to the specialized technical support services, communicate through technology, understand the use of Windows applications and have the ability to search databases they can get competencies due to internal and external factors. Internal factors such as knowledge about informatics, personal attitude toward informatics and personal motivation and interest about the use of electronic data and using technology. While, external factors involve, availability of computers, use of suitable software for the profession, electronic scientific database and attending informatics course .Therefore, involvement of informatics competency within a nursing curriculum is important to ensure success throughout the education and career of contemporary nursing students.

Keser & Özcan (2011) admitted that educational technology is used to increase the efficiency of education in educational settings. Computers and related technology are viewed as the future of teaching and learning and also as a powerful technological machine to promote development of learning. They are able to create a more attractive and effective learning environment. The technology has many different effects on education, specifically in enhancing students learning. When technology and appropriate teaching methods are integrated in teaching and learning, a positive impact may be observed in both the cognitive and affective domains.

Ball et al.(2011) and Dionne (2014) declared that the main constraints to informatics application include, a lack of nursing knowledge and skills ,limited resources, personnel, time and budgetary constraints. Electronic health record software access within nursing educational institutions is limited due to its high costs that include the requirement of specialized personnel who develop and maintain software and lack of database regarding competences of NI. Thompson & Skiba (2008), Fetter (2009), Curry (2010) Flood, Gasiewicz, & Delpier (2010) ,Edwards & O'Connor (2011) and Hasa, Shamsuddin & Aziati (2013) mentioned that failure of developing countries to integrate NI involve nurse skills deficiency for the computer usage, resistance to change, inadequacy of necessary information technology infrastructure, high cost of information systems infrastructure. Adding, faculty's limited knowledge and skills about its appropriate integration into the curriculum, overcoming faculty resistance and receiving academic support, lack of motivation to integrate informatics competencies into curriculum, misperception of the nurses' role and limited funding and high costs of informatics education.

However, El-Nemer & Marzouk (2014) reported that the Egyptian Education Initiative was launched in 2006 to enhance the use of information technology aiming to improve the quality of education. Egyptian higher education is experiencing many challenges; including increasing the number of enrolled students each year, high turnover and high loading staff, lack of financial support, outdated governance and legislation and the absence of quality assurance system. Fetter (2009) stated that educational preparation of baccalaureate nurses should meet information technology (IT) competency requirements for employment and future professional development. Adding that, courses and content may include, hardware, software, and strategies such as distance learning and simulation have been recommended to improve competency development. Ragneskog & Gerdner(2006) concluded that the nursing students should be familiar with the following informatics skills as: E-mail, word-processing and various databases on the World Wide Web, which stress the need for integrating informatics into nursing curriculum.

SIGNIFICANCE

Edwards & O'Connor (2011) and Institute of Medicine (2011) emphasized that informatics should be applied to nursing academic curriculum as it is progressively evolved and incorporate within health care organizations. Adding that, providing hospitals with competent nurses who had adequate informatics skills that already taught at the academic level could ensure the practice of quality and safe patient care, stressing the importance of informatics in advancing nursing career development. Kleib, Zimka, & Olson, (2013) reported that there is inconsistent integration of informatics content and lack of research studies on the process and outcomes of informatics education. Suggested, further research to specify the core informatics content needed in baccalaureate nursing program.

Abdrbo (2015) recommended integration of informatics competencies in the baccalaureate nursing program and including nursing informatics course as one of the main course, not as an elective course, in the curriculum. Kleib, Zimka, & Olson (2013) stated that deficient informatics education during undergraduate levels affects the aptitude of the graduate nurses to accept informatics and relates it to patient care and nursing practice. In Egypt, study done by Ebrahem (2014) at Children Cancer Hospital (57357) recommended integration of nursing informatics within healthcare system including clinical practices, administration, research and nursing education

However, previous research in Egypt , carried out at Faculty of Nursing of Ain Shams University , by Abdelaziz, Kamel, Karam, Abdelrahman (2011) found that lack of computer skills of students affected their abilities to communicate effectively with the instructor and failed to participate in a variety of online communication methods. Additionally, a study done at Faculty of Nursing, Mansoura University, Egypt by, Kandeel and Ibrahim (2012) found that student expression of their desire to access information technology at the faculty, and their need for additional preparation on using information technology in education. From researchers' point views, increasing implementation of information technology in healthcare settings it will promote safety and evidence-based nursing care and a growing emphasis on the importance of nursing informatics competencies has emerged. Also, we found that little researches were done to assess students' perception regarding nursing informatics, especially in many new emerging/ regional nursing faculties. Additionally, the results of the present study will provide a guide for nurse educators regard the need for nursing informatics as perceived by nursing students. Results also will provide data for the educational needs of nursing students, which can be used as a guide for nursing informatics course development. Therefore, this study aims to assess nursing students' perception and educational needs regarding nursing informatics.

SUBJECTS AND METHODS

Aim of the study:

To assess nursing students' perception and educational needs regarding nursing informatics

Research Questions:

- What are the nursing students' perception regarding nursing informatics ?
- What are the nursing students' educational needs regarding nursing informatics?
- Is there a difference among nursing students' perceptions regarding nursing informatics by their academic year?

Research Design:

The descriptive, cross-sectional design was used in this study.

Setting:

The study was conducted at the Faculty of Nursing, Beni Suef University.

Sample:

Convenient sample of nursing students from different academic levels,

encountering in baccalaureate science of nursing program during academic year 2015-2016. Composed of (n= 390) students , include 25.4% from the first year (n=99), 24.9% second year (n= 97), 24.6% third year (n= 96) and 25.1% fourth year (n= 98). Around half of them (53.8%) were female.

Tools of data collection:

1- ***Self administered nursing informatics perception questionnaire,*** developed by the researcher based on the related literature review Kennedy (1998); Özdamli, Hürsen, & Özçinar (2009) ; Kivuti Wanjuki & Chepchirchir (2011) and Woreta, Kebede, & Zegeye (2013) it consists of four parts :

A- Personal characteristics data sheet : it includes, (nursing student's academic year, gender, age and marital status).

B- Descriptive nursing students' knowledge regarding computer use (9 items)

C- Nursing students' perception regarding application of informatics in healthcare (10 items)

D- Nursing students' perception regarding application of informatics in nursing education (9 items).

2- *Nursing informatics educational needs questionnaire:* developed by the researcher, guided by the literature (Kennedy, 1998; Kleib & Olson, 2015 and Rahman, 2015). Composed of (22 items) that includes three subscales: right definition of nursing informatics (three items); objective of the nursing informatics course (three items) and educational needs (16 items).

SCORING SYSTEM

- **First questionnaire: nursing informatics perception questionnaire**
- Nursing students' perception regarding informatics application in health care part: measured against three points Likert scale agree= 3, uncertain= 2 and disagree = 1 , but question 2, 7 and 9 had inverse cod.
- Nursing students' perception regarding informatics application in education , measured against three points Likert scale agree= 3, uncertain= 2 and disagree 1
- **Second questionnaire nursing informatics educational needs:** Measured against three scales agree= 3, uncertain =2 and disagree = 1

VALIDITY AND RELIABILITY

After the translation of the questionnaires to Arabic, content validity of the questionnaires was confirmed by three academic experts in nursing administration. Based on their recommendation little modifications were made. Reliability test was calculated for nursing informatics perception questionnaire using Cronbach's alpha , the result showed that (alpha == 0.75) which indicating fair reliability.

PILOT STUDY

A pilot study was carried out after development of questionnaires and it was applied to (10%) of the total number of nursing students' represent different academic years, to test the clarity and applicability of questionnaires and determine the needed time to fill it. The average time consumed to fill the questionnaires ranged from 15-25 minutes.

ETHICAL CONSIDERATION

The nature and aim of the study were explained to all department head and nurse educators over all the faculty of nursing. Nursing students were fully aware of the nature of the research, and all students participated voluntarily in this study. A number of measures were taken in order to protect the participants' anonymity and confidentiality of students' responses.

PROCEDURE

An official permission to conduct the proposed study were obtained from the dean of the faculty and head of the departments Full disclosure of the nature of the study and its objectives was given to all respondents prior their participation in the present study by the researcher, oral consent was obtained from each student to be included in the present study. Nursing students took the questionnaires at the end of nursing lectures and collected from them next time for the same lecture. Data were collected over two months in (March and April) during the academic year 2015-2016.

Statistical design:

The collected data were organized, categorized, tabulated and analyzed using Statistical Packages for Social Science (SPSS, 21). The results were estimated using numbers, percentage, mean and standard deviation. Analytical statistics were done using independent samples t-test and one-way analysis of variance (ANOVA). The selected level of significance was at p≤ 05.

RESULTS

Table (1) Frequency Distribution of Nursing Students Personal Characteristics (N=390)

Personal Characteristic		No	%
Age	<20	104	26.7
	20-<25	274	70.3
	>25	12	3.0
Academic year	First year	99	25.4
	Second year	97	24.9
	Third year	96	24.6
	Fourth year	98	25.1
Gender	Male	180	46.2
	Female	210	53.8
Marital status	Single	371	95.1
	Married	19	4.9

Table (1) displays that the majority of nursing students age (70.3%) ranged between (20-25) years old. Around half of them Were female (53.8%). And the majority of them were single (95.1%).

Table (2) Frequency Distribution of Nursing Students Knowledge About Computer Use (n=390)

Items		No	%
For how long period you use the computer?	1-<5 years	388	99.5
	≥5	2	0.5
Where you use the computer?	At nursing faculty	43	11.0
	At home	3	0.8
	Never used	1	0.3
	At home and faculty	343	87.9
Student computer use hours /week	1- <5	58	14.9
	5-<10	80	20.5
	>10	252	64.6
Do you take a course in information technology?	Yes	99	25.4
	No	291	74.6
Period of computer course	zero hours	281	72.1
	1-5 hours	10	2.6
	6-15 hours	37	9.5
	16-25 hours	8	2.1
	26-36 hours	54	13.8
Do you currently use a computer?	Yes	383	98.2
	No	7	1.8

Table (2) declares that the majority (99.5%) of nursing students used computer from 1- <5 years ago. Most of them (87.9%) used the computer both at home and faculty. While, (74.6%) of nursing students admitted that they don't take a course in information technology and the majority of them (98.2%) currently uses a computer.
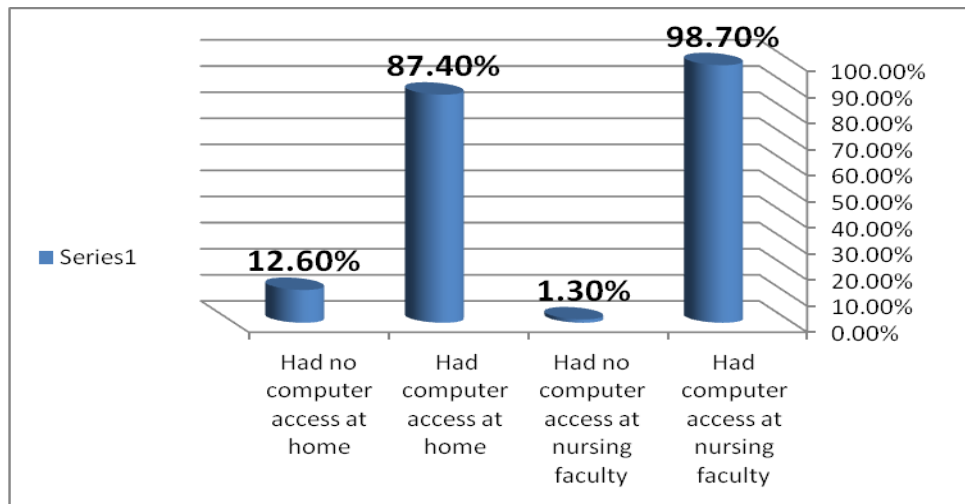
Figure (1) Frequency Distribution of Nursing Students Computer Access (n=390)

Figure (1) demonstrates that (98.70%) of nursing students' access the computer at their faculty and (87.4%) had computer access at their home.
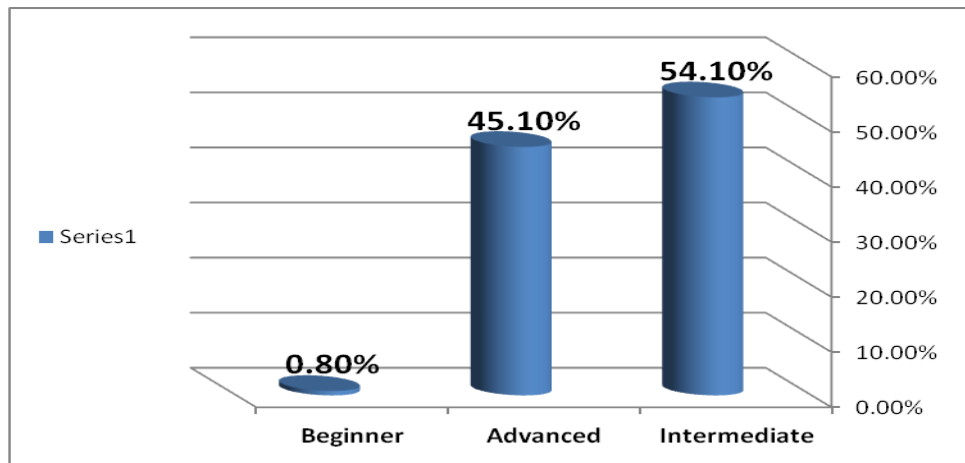

Figure (2) Nursing Students Level of Experience in Computer Use (n=390)

Figure (2) reveals that more than half of the nursing students rate themselves at an intermediate and advanced level of experience in computer use (54.10 % and 45.10% respectively). While, the least percentage (0.80%) rated themselves at beginner level.

Table (3) Mean and SD of Nursing Students Perceptions' Regarding Application of Informatics Healthcare (n=390)

Application of Informatics in health care	X	±SD
1- Will lower the cost of health care	2.9	0.2
2- Attributed to job loss in health care	1.1	0.41
3- Improves the quality of patient care.	2.9	0.1
4- Play an important role in health care	3.0	0.0
5- Improve the exchange of information in health care	2.9	0.1
6- Save time.	2.9	0.2
7- Represents a violation of patient privacy.	1.3	0.6
8- Nurses need to have a role in the designing of patient / hospital information systems.	2.7	0.6
9- Increases nurse workloads.	1.4	0.7
10- Improve nursing, occupational satisfaction	2.8	0.5
Total	**26.0**	**1.07**

Table (3) showed that nursing students highly perceived informatics play an important role in healthcare (3.0 ± 0.0). Also, they perceived that it lower health care cost, improves quality of patient care and improves information exchange (2.9 ± 0.2, 2.9 ± 0.2 and 2.9 ± 0.1) respectively. Furthermore, the lowest mean (1.3 ± 0.6) as perceived by nursing students that informatics use in health care violates patient privacy and it increases nurse workloads (1.4 ± 0.7).

Table (4) Mean and SD of Nursing Students Perceptions' Regarding the Application of Informatics in Education (n=390)

Application of informatics in education	X	± SD
1- Is a requirement for lifelong learning.	2.9	0.3
2- Using of Informatics by faculty improves the delivery of the nursing education process.	2.9	0.4
3- The cost of implementing Informatics in nursing education too expensive for nursing	2.1	0.8
4- Meets the learning styles of students.	2.9	0.4
5- The majority of nursing students entering nursing programs is computer literate	2.9	0.2
6- Improves faculty productivity	2.9	0.3
7- Improves graduate's marketability for employment	2.8	0.6
8- Provide benefit to students	2.6	0.8
9- Competency of nursing students should be evaluated clinically.	2.7	0.8
Total	**23.59**	**1.29**

Table (4) reveals that study sample perception highest mean is regarded informatics in education as it is required for lifelong learning, improves the delivery of nursing education process nursing students entering nursing programs are computer literate, improves educational process and meat student learning styles (2.9 ±0.3, 2.9 ±0.4, 2.9 ±0.4 and 2.9 ±0.4) respectively. Well, they less perceived that its application in education is expensive (2.1 ±0.8).

Table (5) Mean and Mean Percent of Nursing Students' Perception Regarding Nursing Informatics (n=390)

Nursing Informatics perception	Mini	Maxi	Mean ±SD	Mean %
Nursing students Knowledge about computer	12	24	19.52±2.85	81.33
Perception of nursing students regarding informatics application in healthcare	23	30	26.06±1.07	86.86
Perception of nursing students regarding informatics application in education	18	26	23.59±1.29	90.73

Table (5) displays that nursing students had the highest mean percent (90.73%) in the application of informatics in education. Also, the mean percent of their perception concerning knowledge about computer was (81.33%).

Table (6): Frequency Distribution of Nursing Students' Educational Needs of Nursing Informatics (n=390):

Items	Agree No	Agree %	Unsure No	Unsure No	Disagree %	Disagree No
1- Computer component	64	16.4	113	29.0	213	54.6
2- Computer program	64	16.4	151	38.7	175	44.9
3- Word processing	79	20.3	134	34.4	177	45.4
4- Computer Assisted Instruction	340	87.2	24	6.2	26	6.7
5- Literature search	367	94.1	19	4.9	4	1.0
6- Internet resources	346	88.7	31	7.9	13	3.3
7- Spreadsheets	166	42.6	150	38.5	74	19.0
8- Staffing	77	19.7	202	51.8	111	28.5
9- Flowcharts	53	13.6	177	45.4	160	41.0
10- Social network	39	10.0	60	15.4	291	74.6
11- Decision support	90	23.1	87	22.3	213	54.6
12- Electronic communications	319	81.8	33	8.5	38	9.7
13- Hospital information systems	376	96.4	10	2.6	4	1.0
14- Application of informatics in education	383	98.2	5	1.3	2	5
15- Tele-medicine	380	97.4	8	2.1	2	5
16- Ethical applications of nursing informatics	378	96.9	3	8	3	8

Table (6) shows that the main nursing students educational needs include: application of informatics in education, tele-medicine, ethics in informatics and hospital information system (98.2%, 97.4%, 96.9% and 96.4%) respectively. While, social network, flowchart, and computer component (10.0%, 13.6% and 16.4%) had the least percentage.

Table (7) Difference Among Nursing Students Personal Characteristics and Their Perception Regarding Nursing Informatics (n=390)

Personal characteristics	Perception of nursing students' regarding nursing informatics	
	Test	P
Age	F= 8.100	0.00
Academic year	F=4.9	0.00
Gender	t=1.13	0.26
Marital status	t=3.78	0.00

Table (7) reveals that there was a significant statistical difference between nursing student's age and academic year (F= 8.100, p= 0.00 and F= 4.9 , p= 0.00 respectively) and marital status (t= 3.78, p= 0.00) with their perception regarding nursing informatics. Also, there is no statistical difference between gender and perception of nursing students (t= 1.13 , p =0.26).

DISCUSSION

In the 21st century, computer and information technology has been rapidly integrated into the education and healthcare fields, computers are more powerful than ever, and are used in all aspects of nursing, including education, practice, policy, and research. Consequently, student nurses will need to utilize computer technology effectively to promote their educational advancement, support their professional practice, provide a higher quality of nursing care, and engage in the science and policy that are associated with nursing and improved health outcomes (Niyomkar, 2012). The present study finding revealed that nursing students didn't take a course in information technology. This result may be explained by the researcher as most of them have a computer basic knowledge during primary and secondary schools. In the same line with the present study, Hegney et al. (2007), Al Barrak, Al Yami & Bamajboor (2011), Haefeli et al.(2014) and Irinoye, Ayamolowo, & Tijnai (2016) as they declared that the majority of respondents had no previous computer training. Opposite to present study, Kivuti-Bitok (2009) and Mohammed , Andargie , Meseret & Girma (2013) as they emphasized that the majority of the study sample had computer training.

The results of the study indicated that the majority of nursing students had access to the computer at faculty and home. In the same line, Deltsidou et al.(2010), Shahi (2012) and Taher & Ahmed (2014) as they found that most of the nursing students had access computer at homes. Moreover, a study in Malaysia by Chong et al. (2016) admitted that most of the nurses had a computer at home and at work. In disagreement with the present study, Kivuti-Bitok (2009) who admitted that respondents don't have access to a computer. Additionally, Irinoye et al. (2016) who emphasized that nurse do not possess personal computers,

Regarding the level of experience in the computer using around half of nursing students rated themselves at an intermediate and advanced level of experience in computer use. From a research point of view, this may be explained as that most of them have a smart phone which considered a type of computer, used it in entertainment and for social communication. In the same line with the present study, Shahi (2012) and Taher & Ahmed (2014) as they emphasized that most of the study subjects admitted that they had advanced skills in using computers. Contradict present study, Mohammed, Andargie , Meseret and Girma (2013) who declared that respondents rated themselves as using computers inadequately. Also, Sukums et al.,(2014) reported that most of the study sample was computer illiterate or beginner users.

The present study revealed that most of nursing students highly perceived that informatics plays an important role in health care. Also, the majority admitted that it improves quality of patient care and improve information exchange. This could be explained by the researcher as it saves time, improve

accuracy of information and communication between health care team which reflected in the improvement of patient care. In alignment with the study results, Turisco & Rhoads (2008) who mentioned that information technology provide healthy and maintain work environment, used in different nursing activities and increase job satisfaction by improving efficiency, safety, ease, faster and quality of care. Furthermore, Eley et al. (2009), Menachemi and Collum (2011), Takhti et al. (2012) , Saddik, Barakh & Aldosari (2012) , Ajibade (2013), Chand and Sarin,(2014)and Kohlhof et al. (2015) as they mentioned that informatics improves quality of patient care, improve nursing care practice and support the appropriate and effective use of resources to improve the health service performance. Also, Raja, Mahal and Masih (2014) who reported that the majority of the sample reported that they had good communication knowledge through nursing informatics system.

Nursing students less perceived that informatics violates patient privacy. This result could be explained by the researcher as it is more difficult for unauthorized persons to gain access or share any information about the patient through information systems. This in agreement with, Kleib & Olson (2015) who showed that the lowest percentage of studied subjects reported threats to patient privacy by using technology. Regarding the effect of information technology on nurses' workload the most of student nurses less perceived that it increases nurse workloads. This result could be explained as the main goal of informatics in general is to improve quality within healthcare setting and decrease effort, time, i.e. decrease the work load but it will require time for training. In agreement with the present study result, Han et al. (2005) and Kipturgo, Kivuti-Bitok, Karani, & Muiva (2014) as they reported that respondents admitted that computerization could decrease nursing workload .

The present study results declared that the majority of nursing students entering nursing programs is computer literate. From the researcher point of view this because students enjoy using technology, that become common use such as smart phones / having computer at homes, that they can perform many functions such as internet / E- mail use, social media and also, they may use the computer in doing requested assignments, also, they take an introduction about informatics in elementary school. In accordance, in Egypt a study done by Taher & Ahmed (2014), Sukums et al.(2014) and Buabbas, Al-Shawaf, & Almajran (2016) who found that the majority of the sample were computer literate.

Furthermore, nursing students less perceived that informatics application in education is expensive. From the researcher point of view this may be due to accessibility of personal computers for the majority of students and lack of students experience regarding financial issues that it may cost a lot which include costs of educator preparation/training, confront their resistance to change, preparation of the faculty infrastructure and support of administrators. In contrast to the present study, result Fetter, 2009, Boonstra, & Broekhuis, (2010) and Cheeseman (2011) as they found that limited funding and tremendous costs of nursing informatics considered a major barriers for its application.

The results of the present study declared that nursing students had high knowledge and perception regarding nursing informatics. In alignment with the present study, Kivuti Wanjuki & Chepchirchir (2011) Osborne (2011) as they mentioned that information literacy is perceived as a major part of a nurse's professional role . Kandeel & Ibrahim(2010), Kivuti Wanjuki & Chepchirchir (2011), Kipturgo et al. (2014) as they reported that nursing students had a positive perception of the impact of using information technology education and health care, which indicate student readiness for nursing informatics education. Furthermore, study results declared that nursing students educational needs of nursing informatics include: application of informatics in education, telemedicine, ethical application in nursing ……etc. This may explained by the researcher, as students reported what they actually need to help them in their nursing career, as they will tought it only through integrated course within their educational program.

The study results reveal that there was a significant statistical diffrence between nursing students' age and marital status with their perception regarding nursing informatics. In accordance with the present study, Hsu et al., (2009); Lin et al., (2007) Niyomkar (2012) and Haefeli et al. (2014) as they emphasized that respondent age correlates positively with their computer competency. The present study showed that there was a significant difference between nursing students' perception regarding nursing informatics by their academic year. This could be attributed to lack of standardized curriculum and different background knowledge about information technology between students. Also, may due to difference in personal preference, interests and previous background. In congruence with the present study, Borycki & Foster (2014) who emphasized that there was a difference between nursing students with knowledge and, skill level and on how information technology influence clinical practice. Furthermore, Yang et al . (2014) found that education level had a significant impact on informatics competencies

Regarding gender, study results showed that there is no statistical difference between gender and perception of nursing students regarding nursing informatics. This could be interpreted by the researchers as nowadays both male and female have the access to smart phones and computers and they have a similarity of previous teaching background. In agreement, with the present study Maag (2006) indicated that there is no difference between male and female and their perception of informatics. Contrast to this study done in Kuwait by Alquraini, Alhashem, Shah, & Chowdhury (2007), Meelissen and Drent (2008) and Teo (2008) as they stated that the female group showed a statistically significant positive attitude towards computer use. Additionally, study done in Egypt, at medical students in faculty of medicine-Cairo University by, Taher & Ahmed, (2014) who found that males had better knowledge and skills about computer than their female peers.

CONCLUSION

The present study concluded that nursing students had access to a computer at home and faculty, they rate themselves between moderate and advanced skill level in computer use. Nursing students highly perceive informatics and its application in healthcare and education. There was a significant statistical difference among nursing students' perception regarding academic level, age and marital status.

RECOMMENDATIONS

Based on the results of the present study the following recommendation was made:

1- Develop and integrate nursing informatics course specification design based on nursing students' educational needs .

2- Support faculty of nursing with resources and funding to build infrastructure necessary to promote student knowledge in nursing informatics.

3- Provide faculty teachers with an opportunity to learn and develop skills about NI in order to prepare them to integrate this course within the curriculum and courses they teach.

4- Establish a nursing informatics leader who can support curriculum and course development efforts aimed at the area of nursing informatics.

5- Stress importance of security and confidentiality of nursing informatics

6- Future research should be done to assess:

- Computer skills and competences of faculties, staff members.

- The barriers of nursing informatics application within the health care settings and educational sectors

- Compare between graduate nursing who study informatics and who not study it

- The impact of informatics application within healthcare setting and educational faculties.

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