Nurses' Information Technology Competence and Their Attitude to Electronic Health Solutions at Mansoura University Children Hospital

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Abstract
Background: Information technology competence integration and its relation to providing electronic health facilities are main concerns in numerous countries around the world. The development and implementation of e-health strategies is regarded as a priority for the health care system. **Aim:** This study aimed to detect the relation between nurses' IT competence and their attitude to e- health solutions at Mansoura University Children Hospital. **Research design:** A descriptive correlational research design was utilized. **Subjects:** A convenient sample consisted of 123 staff nurses were enrolled in the study. **Tools:** Data were collected by using a self-administrated questionnaire in addition to a question concerned with assessing nurses' opinion of the impact of new technologies and the internet on lives of modern people as well health care. **Results**: The study findings revealed that majority of the staff nurses have high level of IT competence. As well, more than half of staff nurses agreed upon usefulness of the presence of new technologies in the lives of modern people. **Conclusion:** The relation between nurses' IT competence and assessment of the influence of the internet and new technologies on health care and lives of modern people was a highly significant. Also, there was a highly significant relation between nurses' IT competence and recommendation of e-health solutions. **Recommendation:** Promoting the concept of embedding electronic health solutions and tele-nursing through health care organizations and conducting continuous training programs for sustaining information technology competency levels.

Keywords: Electronic Health Solutions, IT Competence & Staff Nurses

Introduction

Nursing services in a hospital environment are one of the health sector services that have an imperative role in influencing the success of services delivered in hospitals. In the hospital setting, nurses spend at least 40% of their time gathering information, coordinating, and documenting. Nurses have many technical skills, and those skills are now being supported and supplemented by the addition of information technology (IT) to the workplace **(Salmond & Echevarria, 2017).**

IT is the use of computers, storage, networking, and other physical devices, infrastructure, and processes to create, process, store, secure, and exchange all forms of electronic data (**Garimella, 2018).** In healthcare, IT is utilized in routine health, electronic (e) health records, for example, web-based surveillance systems, vital registrations, consumer health informatics, self-management systems, telemedicine, virtual healthcare, and research about health **(Jeffree et al., 2020).**

A nurse can store all of the hospital information records on a computer and print out official medical documents. In the past, nurses put in a lot of time filling out paperwork for patient records. Compared to manually recording, this can help the nurse record more quickly, saving her time. Additionally, recorded data will be safer. There is very little chance that

recorded data will be lost. Via IT, nurses may fill up patient discharge and transfer charts and share that information with other hospital departments **(Amankwah-Amoah, et al., 2021).**

With IT, a nurse can easily check the patient's medical history. This aids in preventing the patient from receiving a medication that could induce an allergic response and cause the patient to pass away too soon. Also, the nurse can speak with the doctor using tools like webcams or phones to request the dosage that is needed for a patient. Technology in nursing is essential for significantly enhancing the patient care that nurses deliver as well as lowering critical errors that result in fatalities **(Kichloo et al., 2020).**

IT can boost autonomy in the quest for knowledge, help with material comprehension, support clinical judgment, and raise the standard of nursing care delivery **(Sharma & Sehrawat, 2020).** Since the advent of information and communication technology, the world has been reduced to the size of a small village. As these technologies become increasingly integrated into our daily lives, varieties of new electronic terms have emerged and are continually developing. Examples include electronic trading, email, commerce, government, business, journals, and health **(Beaunoyer, et al., 2020).**

E-health, which refers to health services and information supplied or improved through the internet and similar technologies, is a developing field at the interface of medical informatics, population health, and business. In a larger sense, the phrase describes not only a technological advancement but also a mindset, a style of thinking, an attitude, and a dedication to global thinking, networked, in order to use information and communication technology to enhance health care on a local, regional, and global level **(Loute, 2021).**

In many countries worldwide, integrating IT competence and understanding how it relates to offering e-health services is a top priority. To enable patients and healthcare professionals to use technology to preserve and enhance their health, the development and implementation of e-health strategies are prioritized in the healthcare system **(Wojturska, 2021).**

In many nations, health care programs and policies place a high priority on the adoption and spread of e-services in the healthcare sector. The scarcity of staff nurses as well as the average age of practicing nurses, which is fifty to fifty-three years old, is a problem that many countries will have to deal with in the near future. This will directly decrease the availability of qualified professional care **(Alabdallat, 2020).**

Population shifts in societies, the continual rise in the number of elderly people, and the situation brought on by pandemics like COVID-19 are all global issues that have a significant effect on health policy and the healthcare system. There is a strong requirement for care and nursing services as the issue of long-term care becomes one of strategic importance **(Mohammadi, et al., 2021).**

One strategy for addressing the issue of a shortage of staff in the healthcare system is to leverage new technologies in patient care, as demonstrated by tele nursing, which involves nurses using information and communication technology to give nursing care to patients at a distance **(Hoover, 2017; Balenton & Chiappelli, 2017).** The COVID-19 pandemic has created a number of difficulties, including a rise in the number of patients and the possibility that the disease may spread throughout the world's health care delivery systems, particularly nursing. Technology competence has the potential to aid nursing in these situations **(Kord et al., 2021).**

Significance

Nurses should be open to new technologies and remember that telemedicine and tele-nursing have many advantages when dealing with a lack of staff that is made worse by the ongoing pandemic. The development of e-nursing has proven to be not only advantageous but also necessary, particularly during the ongoing pandemics **(Harris et al., 2021; Petrelli et al., 2020).** In many countries worldwide,

integrating IT competence and understanding how it relates to offering e-health services is a top priority. E-health solutions and information and communication technology competence can help the entire population by expanding access to and enhancing the quality of medical services **(Quaglio et al., 2016).**

From our perspectives, health care providers in Egypt, in the era of digitization and increased complexity of delivering care to patients, need to work on the readiness and IT competence of nurses. This IT competency is in turn initiating them to show an attitude of being professionally active to accept and implement more modern e-health solutions. Implementing these solutions will improve access to care, decrease the workload on nurses, and offer suitable solutions to nurse shortage problems. So, we need to detect the relation between nurses' IT competence and their attitude towards e-health solutions at Mansoura University Children Hospital.

Aim of the study:

Detect the relation between nurses' IT competence and their attitude to e-health solutions at Mansoura University Children Hospital.

Research questions:

Q1: What is the level of nurses' perception about IT competence?

Q2: What is nurses' attitude for the application of the e-health solutions at health care sector?

Q3: Is there a relation between nurses' IT competence and their attitude to e-health solutions?

Subjects and Methods

Research design: A descriptive correlational research design was used to carry out this study.

Setting : The present study was conducted at Mansoura University Children Hospital that delivers an extensive spectrum of health services at Delta Region. Mansoura University Children Hospital occupied with 365 beds and 18 departments and classified into two main building as below:

First building contains: three floors: **Ground Floor** that contains out patients, pharmacy, magnetic resonance imaging, blood bank and its laboratory. **First floor** contains dialysis department, laboratory department, radiology department. **Second floor** contains investigations related to different department. **Lastly third floor** contains: medical intensive care unit, surgical intensive care unit, surgical operation department

Second building contains eight floors. **The ground floor** which contains: emergency department. **First floor** contains: administrative offices. **Second floor** contains: cardiology department, endocrine and diabetic department, blood disorders department. **Third floor** contains: nutrition and infectious diseases department, pediatric surgery department.

Fourth floor contains:
GIT department, genetic department. Fifth floor contains: department (5) and (6), immunology department, bone marrow transplantation department respectively. **Sixth floor contains**: neonate intensive care unit, economic department. **Seventh floor contains**: nephrology department, neurology department, and cardiac surgery department. **Lastly eighth floor** contains: nursing and physicians residence.

Subjects:
Convenient sample from staff nurses (123) working at Mansoura University Children Hospital

Data collection tools:
Data were collected using a self-administrated questionnaire developed by **Bartosiewicz, et al., (2021)**, which aimed to self-assess nurses' IT competence and assess nurses' attitudes about recommending and using e-health solutions in their everyday work. It consisted of five parts in addition to one question concerned with assessing nurses' opinions of the influence of the internet and new technologies on health care and the lives of modern people.

Part I: It concerned the personal characteristics of the surveyed nurses (age, education, experience years, and attending training courses about IT).

Part II: Type of electronic device used (10 items) concerned the frequency of using electronic devices such as a computer, tablet, smartphone, e-mail address, and mobile applications by nurses. Their responses were scored on a 4-point Likert scale as the following: 4=Often, 3=Sometimes, 2=Never, 1=Not applicable.

Part III: Nurses' opinions on information technology competence and education in this field (4 items) concerned the assessment of one's ability to use electronic devices. Their responses were scored on a 5 point Likert scale as the following: 5=Yes, 4=Rather yes, 3=I don't have opinion, 2=Rather no, 1=No. The total scores on the scale ranged from (4-20). It was categorized into two levels as:
  - Low (≤75%)   - High (>75%)

Part IV: Recommendation e-health solutions (8 items) concerned nurses' recommendations of e-solutions for patients. Their responses were scored on a 3-point Likert scale as the following: 3= I recommend now, 2=I would recommend, 1= I don't recommend.

Part V: Types of e-health solutions used in the healthcare sector (11 items) concerned the benefits of using e-health solutions in everyday work. Their responses were scored on a 5 point Likert scale as the following: 5= Strongly relevant, 4= Relevant, 3=I don't have opinion, 2= Irrelevant, 1= Completely irrelevant.

In addition to one question **developed by Bartosiewicz, et al., (2021)** concerned with assessing nurses' opinions of the impact of the internet and new technologies on health care and the lives of modern people, It includes the nurses' statements regarding how they feel about how new technologies are used in modern people's daily lives, as follows:
It fascinates me=6, It interests me=5, It is helpful=4, I have no opinion=3, It worries me=2, It scares me=1.

Validity and reliability:
Tool of data collection was translated into Arabic, and face and content validity were verified via five experts in the field of nursing administration to evaluate the items validity as well as the entire tool as relevant, comprehensive, and appropriate. The study tool was tested to assess reliability through the pilot subjects, and Cronbach's alpha for study tool parts was (0.856-0.89–0.855–0.894) for type of electronic device used, IT competence, recommendation of e-health solutions, and assessment of types of e-health solutions used in the health care sector respectively.

Pilot study:
It was carried out on a randomly selected (10%) of staff nurses (14 nurses) to test the clarity and feasibility of the questionnaire. Based on the results of the pilot study, the necessary adjustment was made by rephrasing and clarifying.

Field work:
Gathering data from staff nurses by outlining the purpose of the study to each nurse and obtaining their consent, the questionnaire took 20 to 25 minutes to complete. The data gathered took a month to be completed.

Ethical consideration:
Ethical approval was obtained from the Research Ethics Committee of the Faculty of Nursing at Mansoura University. A formal permission to conduct the study was obtained from Mansoura University Children Hospital after an explanation of the aim of the study. A formal consent was obtained from the participants, subsequently giving them complete information about the study. Participants were informed that participation in research is voluntary, and they were able to withdraw from the study without responsibility at any stage. The confidentiality of the collected data was maintained, and the privacy of the study sample was guaranteed.

Statistical analysis:
Using SPSS software, the gathered data were arranged, tabulated, and statistically examined (Statistical Package for the Social Sciences, version 21, SPSS Inc. Chicago, IL, USA). The presumption of normality was acknowledged. As a result,
frequency and percentage were used to describe categorical data. The relation between two continuous variables was evaluated using the Pearson correlation coefficient test. A p-value of 0.05 or lower and a 0.01 were considered statistically significant.

Results:

Table (1): Personal characteristics of the studied staff nurses (No=123)

Characteristics	No	%
Age years:		
▪ 20-30	88	71.5
▪ > 30	35	28.5
Education		
▪ Diploma degree	8	6.5
▪ Technical degree	72	58.5
▪ Bachelor degree	43	35.0
Experience years:		
▪ 1-5	70	56.9
▪ 6-10	28	22.8
▪ > 10	25	20.3
Attending training courses related information technology		
▪ No	107	87.0
▪ Yes	16	13.0

Table (2): Frequency of using electronic devices by staff nurses in private life and at work (No=123)

	Not applicable		Never		Sometimes		Often	
	No	%	No	%	No	%	No	%
A. Type of electronic device utilized in private life								
1. Computer	13	10.6	7	5.7	68	55.3	35	28.5
2. Tablet	20	16.3	19	15.4	57	46.3	27	22.0
3. Smartphone	7	5.7	7	5.7	45	36.6	64	52.0
4. E-mail	13	10.6	16	13.0	63	51.2	31	25.5
5. Mobile applications	14	11.4	5	4.1	25	20.3	79	64.2
B. Type of electronic device utilized at work								
1. Computer	16	13.0	11	8.9	49	39.8	47	38.2
2. Tablet	39	31.7	14	11.4	42	34.1	28	22.8
3. Smartphone	10	8.1	8	6.5	52	42.3	53	43.1
4. E-mail	18	14.6	12	9.8	45	36.6	48	39.0
5. Mobile applications	10	8.1	13	10.6	43	35.0	57	46.3

Table (3): Information technology competence as reported by the studied staff nurses (No=123)

| Items	No		Rather no		I do not have opinion		Rather yes		Yes	
	No	%	No	%	No	%	No	%	No	%
▪ I feel prepared to use e-health solutions in my work	0	0.0	4	3.3	2	1.6	32	26.0	85	69.1
▪ I would use training courses to improve my IT competence	1	0.8	1	0.8	0	0.0	15	12.2	106	86.2
▪ Current nursing education keeps pace with the challenges of the 21st century.	4	3.3	5	4.1	3	2.4	33	26.8	78	63.4
▪ The nursing training program should better prepare for acquiring IT competence	3	2.4	2	1.6	15	12.2	16	13.0	87	70.7
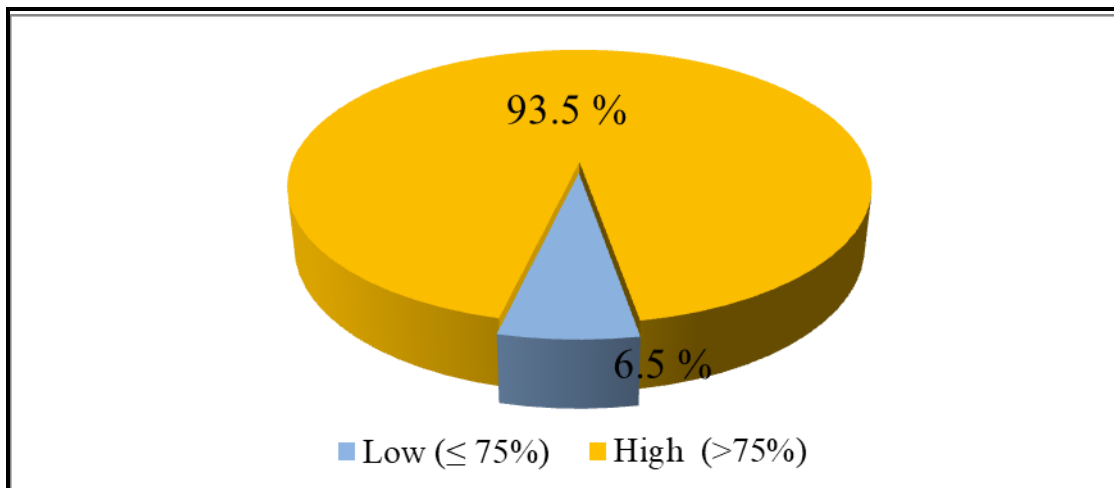
Figure (1): Levels of competence toward information technology among the studied nurses (No=123)

Table (4): Types of e-health solutions recommended by the studied staff nurses (No=123)

Items	I do not recommend		I would recommend		I recommend now	
	No	%	No	%	No	%
▪ Remote monitoring of basic parameters (pressure, heart rate, temperature, glucose level).	16	13.0	11	8.9	96	78.0
▪ Laboratory test results via the Internet	8	6.5	29	23.6	86	69.9
▪ Arranging medical appointments via the Internet	8	6.5	51	41.5	64	52.0
▪ Using a mobile application that facilitates research analysis	2	1.6	53	34.1	68	55.3
▪ Using a mobile application that is a knowledge base on health-related topics	7	5.7	46	37.4	70	56.9
▪ Using a mobile application that is a mobile drug database	3	2.4	40	32.5	80	65.0
▪ Using a mobile application that reminds to take medication	10	8.1	34	27.6	79	64.2
▪ Using video-consultation with a doctor/nurse to support the treatment process	36	29.3	43	35.0	44	35.8

Table (5): Nurses' attitude toward the use of types e-health solutions in the health care sector (No=123)

| Types of e-Health Solutions	Completely irrelevant		Irrelevant		I have no opinion		Relevant		Strongly relevant	
	No	%	No	%	No	%	No	%	No	%
▪ Easy and quick access to patients' medical records	3	2.4	5	4.1	9	7.3	70	56.9	36	29.3
▪ Possibility to write electronic prescriptions	4	3.3	9	7.6	17	13.8	76	61.8	17	13.8
▪ Possibility to write out electronic sick leaves	5	4.1	18	14.6	11	8.9	63	51.2	26	21.1
▪ Possibility to write electronic referrals	7	5.7	14	11.4	14	11.4	61	49.6	27	22.2
▪ Using the electronic database of drugs	2	1.6	2	1.6	6	4.9	67	54.5	46	37.4
▪ Ability to remotely route patients to other specialists or hospitals	5	4.1	7	5.7	12	9.8	47	38.2	52	42.3
▪ Solutions to streamline the sending/sharing of clinical results	3	2.4	6	4.9	40	8.1	70	56.9	34	27.6
▪ Solutions enabling remote (not requiring direct contact) patient care	7	5.7	11	8.9	10	8.1	64	52.0	31	25.2
▪ Increasing the share of digital solutions supporting the treatment and self-monitoring of the patient's health	6	4.9	22	17.9	0	0.0	70	56.9	25	20.0
▪ The ability to exercise comprehensive control over the facility and track generated costs, staff management (schedules)	5	4.1	16	13.0	13	10.6	62	50.4	27	22.0
▪ Possibility to conduct scientific research	3	2.4	4	3.3	11	8.9	68	55.3	37	30.1
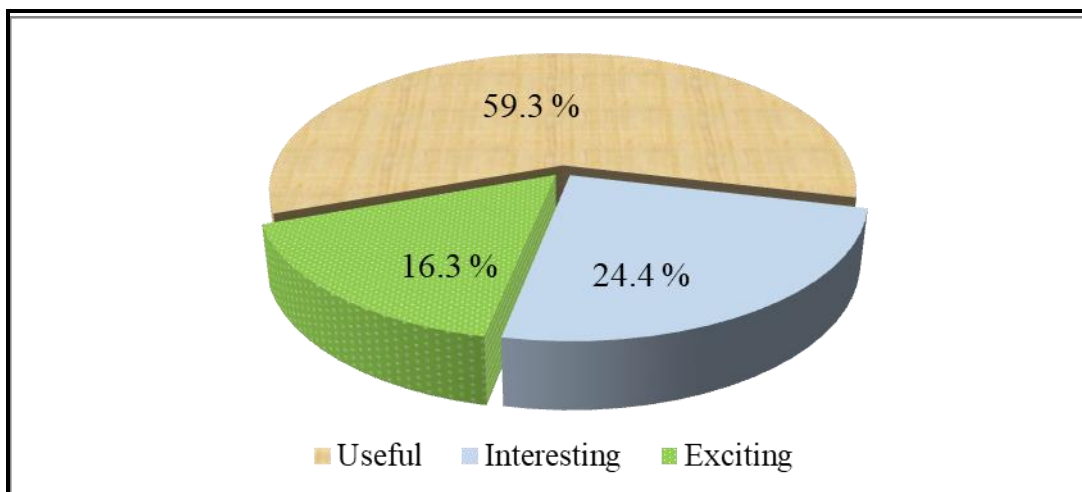
Figure (2): Nurses' opinions on the presence of new technologies in the lives of modern people (No=123)

Table (6): Nurses' information technology competence relation to their attitude to recommendation of e-health solutions, assessment using of e-health solutions, and assessment of the influence of the internet and new technologies on health care and lives of modern people (No=123)

Variables	Nurses' information technology competence	
	r	P
Recommendation of e-health solutions	0.26	0.003**
Assessment of types e-health solutions used in health care sector	0.14	0.12
Assessment of the influence of the internet and new technologies on health care and lives of modern people	0.25	0.005**

*** Highly statistically significant (p<0.01)*

Table (1): Illustrates that the total number of staff nurses was 123, and more than half of them (71.5%) were aged 20–30 years. More than half of them (58.5%) have technical degrees. Concerning experience years, a percentage of them (56.9%) have experience of 1–5 years, while 20.3% of them have (>10) years. Also, the majority of them (87.0%) didn't attend training courses related to IT**.**

Table (2): Illustrates that more than half of the staff nurses (64.2%) often use mobile applications, followed by a percentage of (52.0%) who often use smart phones in private life. On the other hand, less than half of them (46.3%) often use mobile applications, followed by a percentage of (43.1%) often use smart phones at work.

Table (3): Demonstrates that the majority of the staff nurses (86.2%) reported that they would use training courses to improve their IT competence, while (70.7%) of them agreed that the nursing training program should better prepare them for acquiring IT competence.

Figure (1): Illustrates that the majority of the staff nurses (93.5%) have a high level of IT competence.

Table (4): Shows that most of the staff nurses (78.0%) recommended remote monitoring of basic parameters, followed by laboratory test results via the internet (69.9%), then using a mobile application that is a mobile drug database (65.0%), and using a mobile application that reminds patients to take medication (64.2%).

Table (5): Clarifies that staff nurses have the opinion that the most useful e-health solution is the possibility of writing electronic prescriptions (61.8%), followed by easy and quick access to patients' medical records, solutions to streamline the sending and sharing of clinical results, and increasing the share of digital solutions supporting the treatment and self-monitoring of the patient's health (56.9%).

Figure (2): Shows that more than half of staff nurses (59.3%) agreed upon the usefulness of the presence of new technologies in the lives of modern people, followed by a percentage of (24.4%) who agreed that it is interesting.

Table (6): Demonstrates that there is a highly significant relation between nurses' IT competence and their assessment of the influence of the internet and new technologies on health care and the lives of

modern people. As well, there was a highly significant relation between nurses' IT competence and the recommendation of e-health solutions.

Discussion
The work of nurses around the world is being impacted more and more by the advancement of digital technologies. The rising use of various electronic devices and the internet, the reliance on various tele-care models, robotic systems, and the use of artificial intelligence in nursing are all excellent examples of this (**Kraus, et al., 2021**). Professional nurses have become increasingly active online, participating in training, conferences, and online forums in addition to using electronic equipment and serving their patients. By doing this, nurses enhance their reputation, gain knowledge, share experiences, and encourage one another (**Fontanini, et al., 2021**).

According to the study findings, more than half of the staff nurses often use mobile applications in private life. On the other hand, at work, less than half of them often use mobile applications. This may be due to nurses use mobile applications in private life for many reasons, such as texting and messaging family and friends, monitoring or sharing information on their own personal social media pages, making phone calls or looking up missed calls, and engaging in recreational activities like gaming or shopping. Mobile nursing applications help nurses with clinical nursing work locate information regarding prescriptions, diagnoses, procedures, and laboratory testing.

This agreed with **Correia et al., (2019),** who claimed that nurses could provide patients with affordable rehabilitation advice by using a mobile nursing application. In addition, **de Jong, Donelle, & Kerr, (2020)** found that nurses reported improved communication among health team members and used their personal devices to communicate patient information via text messaging, calling, picture, and video functions. Furthermore, **Wosik et al., (2020)** reported that nurses see mobile applications as an effective way to connect with the medical staff and other health care providers and acquire information about the care needed for patients.

In contrast, **Gill, Kamath & Gill, (2012)** found that the use of modern technology like mobile application may be a contributing factor to nurse interruptions or distractions while caring for patients. As well, **Fiorinelli et al., (2021)** mentioned that use of mobile application lead to distraction among nurses which affect care given to patient.

Concerning IT competence as reported by the studied staff nurses, the findings revealed that the majority of them reported that they would utilize training courses to improve their IT competence, while more than two-thirds of them agreed that the nursing education programs have to do a better job of preparing students for computer proficiency. This may be due to the fact that through training and education programs, nurses can learn basic computer skills and enhance their proficiency in managing and utilizing health data.

This was supported by **Buchanan, et al., (2021)** who reported that there is a need for training nurses in IT and stressed the importance of consistency in such training, as well as encouragement and supporting for nurses to become IT-competent. As well, **Nikolopoulou & Gialamas, (2015)** reported that absence of support and training prevented nurses from utilizing technology.

This agreed with **Oregon, McCoy & Carmon-Johnson, (2018)** who stated that to increase nurses' IT competency, nursing faculty must be able to use technology effectively and become familiar with new technical tools. Additionally, **Raman (2015)** called for incorporating IT into nursing courses to educate nursing students for the contemporary practice environment, which demands having access to a great deal of information to offer evidence-based patient care.

In contrast, **Geist, (2011)** reported that faculty had a negative view of using IT devices such as iPads throughout lecture time and saw it as a distraction. According to **Rahman & Hameed, (2018),** the main hazards connected with using IT for educational purposes were found to be student distraction, loss of control over the classroom, and time waste. **Alzubi, (2019)** also identified distraction as a concern for educators when using new technology in education.

According to the results, the majority of the staff nurses have a high level of IT. This may be due to nurses' good knowledge-seeking behavior, as they need to know and learn about IT to use computers in recording patient data and locating information about procedures, diagnoses, medications, and laboratory tests. **Bartosiewicz, et al., (2021)** found that more than half of participants believed that their computer skills were below average. According to the Korean study done by **Hwang & Park, (2011),** more than two-thirds of nurses said that they have below-average general computer skills.

When it came to the types of e-health solutions recommended by the staff nurses, the results revealed that more than two-thirds of them recommended remote monitoring of basic parameters followed by laboratory test results via the Internet. This may be due to the fact that these types of e-health solutions are easy to use and enhance efficiency through improved connectivity and knowledge exchange. In this context, many countries have undertaken innovative projects in the realm of digital health. In

Germany, mobile applications can be used for both therapy and diagnosis (**Gerke, et al., 2020**).

As well, **Metsallik, et al., (2018)** declared that electronic prescription data in Estonia, which is likewise at the forefront of the digitization movement, is used to determine whether a patient needs regular checkups or hospitalization. Also, in Sweden, **Kasper et al., (2017)** reported that centers for medical innovations have been operating for a while. Moreover, **Hussey, et al., (2015)** stated that the different e-health solution examples can serve as inspiration and a convincing argument that investing in healthcare digitization is likely to result in significant benefits for patients and medical professionals.

Nurses' use e-health solutions in their daily work ranges from very simple measuring devices to more sophisticated ones. According to the results, the ability to write electronic prescriptions, easy and quick access to patient medical records, solutions to streamline sending and sharing of clinical results, and an increase in the percentage of digital solutions supporting patient treatment and self-monitoring of their health are all rated as the most useful e-health solutions by nurses. This may be due to the fact that using these solutions improves connectivity and knowledge sharing; these technologies promote efficiency and are simple for nurses to utilize.

In this context, **Wang, et al., (2019)** reported that the majority of Chinese nurses said that e-health solutions had a favorable impact on their clinical practice and professional growth. As well, **Nejadshafiee, et al., (2020)** indicated that implementing e-health solutions is important for management of care in emergencies and disasters.

Moreover, **Edirippulige, (2009)** asserted that one of the first health professionals to utilize e-health technologies for patient care is a nurse. According to the **Canadian Nurses Association (CNA), (2017)** tele-health nursing practice as an integral aspect of healthcare boosts the effectiveness, efficiency, and accessibility of current services.

On the other side, **Nisar & Shafiq, (2019)** reported that inadequate or unreliable online health information has been determined to be a significant drawback of e-health solutions in the healthcare industry. Violating patient privacy and confidentiality is another central drawback of electronic-health solutions in the healthcare industry. Also, **Osorio-Molina et al., (2021)** viewed distractions and interruptions during work hours as a negative impact of e-health solutions on health care practice. A nurse who is interrupted by social networking messages may make mistakes when calculating and administering medication, endangering patients' lives.

According to the result, more than half of the staff nurses agreed upon the usefulness of the existence of new technologies in modern people's lives, followed by agreeing that it is interesting. This may be due to nurses becoming aware of the importance of using new technology in their lives, especially during the coronavirus pandemic.

This was supported by **Archibald & Barnard, (2018)** who mentioned that in order to go beyond a reactive response to technological advancements, nursing as a profession must foresee the impact of technology on care. Understanding current technological breakthroughs and carefully examining how these developments affect nursing fundamentals are prerequisites for having the ability to anticipate change.

According to the result, there was a highly significant relation between nurses' IT competence and assessment of the impact of the internet and new technologies on health care and lives of modern people. As well, there was a highly significant relation between nurses' IT competence and recommendation of e-health solutions. This may be due to the demand for nurses with strong IT skills in healthcare organizations has increased due to the e-health industry's quick expansion, necessitating the organization of courses and trainings to improve nurses' IT skills and enhance their attitude towards recommending e-health solutions.

This was supported by **Wojturska, (2021),** who asserted that in many nations around the world, integrating IT expertise and understanding how it relates to attitudes towards using e-health services is a top priority. As well, **Sharma & Bhaskar, (2020)** asserted the essentiality of new technologies for seeking and receiving reliable medical guidance and care through a tele-health system, especially during pandemics such as coronavirus, which is the greatest crisis in recent times.

Conclusion

The findings of the present study concluded that the majority of the staff nurses have a high level of IT competence. As well, the ability to write electronic prescriptions, easy and quick access to patient medical records, solutions to streamline sending and sharing of clinical results, and an increase in the percentage of digital solutions supporting patient treatment and self-monitoring of their health are all rated as the most useful e-health solutions by nurses. Also, there was a highly significant relation between nurses' IT competence and nurses' attitudes towards the recommendation of e-health solutions.

Recommendation:
- Promoting the concept of embedding e-health solutions and IT through health care organizations by managers to raise nurses' awareness about the benefits of e-health solutions and gain their acceptance for continually using e-health solutions in health.
- Put into action policies and procedures promoting the use of e-health solutions and tele-nursing such as ensuring that enough resources are available and put in place to ensure that e-health solutions are used effectively.
- Conducting continuous training programs for nurses about different types and the possible advantages of e-health solutions to sustain nurses' IT competency level.

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