

Nurses' Knowledge, Practice and Attitude regarding Nursing Informatics and its relation with Their Readiness for Change

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Abstract: Background: Nursing informatics has the potential to improve the health of individuals and the performance of providers, leading to improved quality, cost savings, and greater patient engagement in health care theirs. The implementation of nursing informatics has met with both acceptance and resistance. **Purpose:** determine nurses' knowledge, practice and attitude regarding nursing informatics and its relation with their readiness for change at Menoufia University Hospital. **Design:** A descriptive correlational research design was used. **Setting:** This study was conducted in in all pediatric units in hospital at Shebin El-Kom, Menoufia Governorate, Egypt, namely: Menoufia University Hospital. **Sample:** All staff nurses who worked in pediatric critical care units and departments (n=300). **Instruments:** four instruments of data collection were used as follows: Instrument I: nurses' knowledge scale: consisted of two parts: part 1 (personal characteristic), part 2 (Nurses' knowledge scale). Instrument II: (Nurses' practice scale) .Instrument III: (Nurses' attitude scale). Instrument IV: Readiness for change scale. **Results:** The majority of studied sample had poor knowledge level about nursing informatics while had good practice level about nursing informatics. Also, more than half of nurses had positive attitude regarding nursing informatics. More than half of study nurses had low level of readiness for change. **Conclusion:** There was highly statistical significant correlation between total knowledge level, total practice level , total attitude level and readiness for change **Recommendation:** Provide periodic training programs for nurses regarding nursing informatics.

Keywords: Knowledge, Attitude, Nursing Informatics, Readiness for Change

Introduction

Nursing Informatics integrates nursing science and arts , computer science and information science to facilitate the integration of data, information,

knowledge and wisdom to help patients, nurses and other healthcare providers in their decision-making during health care delivery to manage

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and communicate data, information, knowledge and wisdom in our patient care and informatics practice. This specialized nursing informatics operation is essential to the delivering high quality and cost-effective health care in a rapidly changing environment where technology is ubiquitous (Ademuyiwa et al., 2020)

Outcomes associated with the adoption of nursing informatics in healthcare organizations include higher levels of productivity among clinicians , better integrated care processes and improved patient safety and quality of care for patients (Adedeji ,et al .,2018). However, these systems often encounter strong opposition from the very communities that are supposed to benefit from their adoption and use. In some cases, resistance has manifested itself through boycotts of installed computer systems or threats of strikes by the medical staff to oppose the implementation of nursing informatics. Nurses also appear reluctant to use computers in areas closely related to patient care for a number of reasons, such as fear of distraction or keeping patients at a distance and perceived lack of links to nursing process/workflow. communicate data, information, knowledge and wisdom in nursing practice (Christian et al ., 2021).

Historical background of nursing informatics , Nurses have been working in the field of informatics for nearly four decades, the term “nursing informatics” has been considered a nursing resource specialty since 1984 (Mohamed et al ,2023). Many aspects such as data recovery, ethics, patient

care, decision support systems, human-computer interaction, information systems, imaging informatics, computer science, information science, security, electronic patient records, intelligent systems, e-learning and telenursing have been added to the field. Nursing informatics defined as the application of IT in the nursing duties including education, management & practice. Integration of information science, computer science and nursing science to support nursing practice and knowledge management is the definition proposed by Graves and Corcoran in 1989. The American Nurses Association (ANA) published its goals and standards in 1994-1995 and considered the Nursing Informatics as a specialty that integrates nursing science, computer and information science to provide data communication management, knowledge and nursing work in 2001 (Darvish et al ., 2014).

Health care organizations face increasing demands to demonstrate positive clinical outcomes and service outcomes from major payers and customers. This requires high-quality nursing practice to deliver effective nursing care with reduced hospital stays and savings in treatment costs for patients and hospitals. (Negm et al .,2021).

Nursing staff readiness toward nursing informatics helps to identify additional competencies and education that are required in order to achieve efficient nursing informatics implementation. The implementation of nursing informatics in hospitals is the result of the interaction between technical skills, hospital culture, and social acceptance.

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Therefore, head nurses need to change the way they think about new technology. Implementing new technologies can change practice. It is also important to ensure that nursing staff have the skills to work with these new technologies. (Sewell, 2016).

Change involves altering the current state of things to give a different position, course or direction and to make a shift from one to another (Yoder-Wise, 2015). Change, whether introduced proactively at the time of change or imposed by external sources, affects people. Responses to all or part of the change process by individuals and groups can vary from complete acceptance and willingness to participate to complete rejection or even revolution (Marquis & Huston, 2015). Additionally, there are three reactions to change, which are willingness, commitment, and resistance to change. Readiness to change is a cognitive antecedent to behavior that resists or supports a change effort, reflected in employees' beliefs, attitudes, intentions about the necessity of changes and the possibility of change and ability to organize and implement changes according to plan (Negm et al., 2021). Weiner's theory on readiness for change emphasizes the multilevel construct of the concept on the individual, unit and organizational level (Weiner et al., 2009). It is also important to know how health professionals comprehensively conceptualize readiness for change, Holt et al., (2010) highlight the readiness for change for healthcare professionals in three broad areas, that

is, psychological, structural and levels of analysis (individual or groups). Psychological factors consist of healthcare professionals individual characteristics (e.g., change motivation between nurses and physician might be different) and structural factors (e.g., circumstances of change might differ between hospitals and care homes).

The change or reform in the healthcare system has required hospitals to adapt their processes and structures to the new environment, therefore increasing the overall interest in studying healthcare professionals including nurses on readiness for change. Today, as healthcare change is accelerating, competition increasing and access to information expands, many healthcare organizations are trying to accelerate adaptation and innovate through centralized planning and tight control of resources (Child, 2015).

Factors related to readiness for change, as an individual factor, readiness for change is related to people's characteristics, attitudes, and preferences regarding readiness for change (Nilsen et al., 2018). Contextual factors refer to the characteristics of the work environments that influence organizational readiness for change and to the professional nursing practice environment. As an organizational factor, readiness for change refers to job characteristics that equip employees with the necessary attitudes, skills, and opportunities to manage change. Additionally, it focuses on emotional climate and structural empowerment (El-Sayed et al., 2017). When resources are available and

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situational factors are properly aligned, employees will proactively change and demonstrate more collaborative behaviors, which can lead to effective and efficient implementation of change (Alharbi, 2018).

Because nurses make up the majority of direct care practitioners, they are in an ideal position to make an impact as specialized experts at the intersection of healthcare and technology. Registered nurses go beyond providing clinical care to take on roles in operations, education, leadership and technology in today's healthcare system. Nursing informatics allows nurses to deliver evidence-based and patient-centered care, improve human health and advance medical research. It also enhances clinical workflows so that nurses and other personnel can care for patients more efficiently and effectively. These nursing professionals play an important role in increasing efficiency, cutting costs and improving care by conducting research on topics affecting both caregivers and patients. Nursing informatics, with most respondents believing that nursing informatics will improve the maintenance of high standards of nursing care. (Adedeji, 2018).

Significance of the study:

Healthcare and nursing education have been affected by many changes within larger global and national social, economic, political, cultural, and environmental spheres. As a result, nursing informatics technology offers ways to cope with new life challenges, including increasing work load, increasing shortages of health

professionals and rising aged populations in many countries. Additionally, in intensive care units, response time and speed are critical for all patients (Cipriano, 2013). Nursing informatics utilization in nursing care environment stemmed from the rapid innovative technological revolution, especially in the field of telecommunication. Thus, this study purposes to determine nurses' knowledge, practice and attitude regarding nursing informatics and its relation with their readiness for change at Menoufia University Hospital.

Purpose

This study was conducted to determine nurses' knowledge, practice and attitude regarding nursing informatics and its relation with their readiness for change at Menoufia University Hospital.

Research Questions:

- What is the level of nurses' knowledge regarding nursing informatics at Menoufia University Hospital?
- What is the level of nurses' practice regarding nursing informatics at Menoufia University Hospital?
- What is the level of nurses' attitude regarding nursing informatics at Menoufia University Hospital?
- Is there a relationship between nurses' knowledge, practice and attitude regarding nursing informatics and their readiness for change at pediatric units in Menoufia University hospital?

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Methods:

Research design:

A descriptive correlational research design was used in conducting this study.

Study setting:

This study was conducted in all pediatric units at hospital at Shebin El-Kom, Menoufia Governorate, Egypt, namely: Menoufia University Hospital. Menoufia University Hospital was established in 1993. This hospital is divided into five buildings. Three of these buildings are interlinked and two separate building namely Oncology and Minshat Al Solutan. The first main building is the General Hospital which provides its services to the community through medical, urology, orthopedic, ophthalmology, ENT department and hemodialysis unit. The second building is the Emergency Hospital which provides its services to the community through the emergency, neurosurgery, surgical department, intensive care units, burn units and operating theaters. Additionally, the third newest building is the Specialized Hospital which provides its services to the community through the outpatient clinics, pediatric unit, pediatric intensive care unit, premature unit, pediatric dialysis unit, pediatric neurology, pediatric genetic and nutrition, obstetrics and gynecology departments and premature unit. The fourth building which is separate from the other hospital settings is the Oncology Institution which provides its services through outpatient clinics, male and female adult inpatients departments and

chemotherapy outpatient clinics. Finally the five building Minshat Al Solutan is department of pediatrics, pediatric outpatient clinics, pediatric unit, pediatric intensive care unit, pediatric dialysis unit, neonates units and other clinic such as Dental clinic and surgical

Sample:-

All staff nurses who work in pediatric critical care units and departments because the hospital administration will apply the nursing informatics in these sections first (n= 300) staff nurses.

Data collection instruments:

Four instruments of data collection were used as follows:

Instrument 1: Nurses' Knowledge

Scale: consists of two parts.

- **Part I:** - It covered the general characteristics of the subjects as demographic data, e.g., age, educational level, years of experience in work, residence, marital status, current job, using of computer, where ever you use computer, training in computer and timing for using computer.
- **Part II:** - Nurses' Knowledge Scale. It was developed by (Elewa & El Guindy 2017) Nurses' knowledge about nursing Informatics, it consisted of 19 questions, each staff members were asked to rank each item according to three Likert scale ranging from 1= disagree, 2= uncertain, 3= agree.

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Scoring System:

Total score ranged from (19-57) .The total score of nurses' knowledge will be calculated and classified as follow: (19-35) described as poor score, (36-43) described as fair score, and scores ranged from (44-57) described as good level. The total scores were graded as Poor <60%, fair 60 < 75 %, Good 75-100%.

Instrument II: Nurses' Practice Scale

developed by Elahi, et al., (2018) to assess the level of staff nurses 'about using computer in the selected hospital, it consisted of 15 questions seven items for informatics Device use and 8 items informatics application use , each staff members were asked to rank each item according to two Likert scale ranging from 2= done , 1= not done.

Scoring System:

Total score ranged from (15-30) where ranged from (15-18) described as poor nurses informatics practice, scored ranged from (19-23) described as fair and scores ranged from (24-30) described as good level of nurses informatics practice. The total scores were graded as Poor <60%, fair 60 < 75 %, Good 75-100%.

Instrument III: Nurses' Attitude Scale.

It was developed by research after review of Farzandipour et al., (2020).covered nurses attitude to assess the level of staff nurses 'attitude regarding nurses informatics in the selected hospital, it consisted of 12 items ,each staff members were asked to rank each item according to three

Likert scale ranging from 1= disagree , 2= uncertain, 3= agree.

Scoring System:

The total scores were graded as; negative attitude (<65%), while positive attitude (≥65%)

Instrument IV: Nurses' Readiness for Change scale:

It was developed by El- Beshlawy (2018) to assess readiness to change. It consisted of 41 items related to critical care nurses' readiness for hospital change. It is classified into four domains namely; appropriateness of change (5 items), managerial support (13 items), change efficacy (12 items) and personal valence (11 items). each staff members were asked to rank each item according to five points Likert Scale ranging from strongly agree (5), agree (4), neutral (3), disagree (2), strongly disagree (1) .

Scoring system:

The total score ranged from (41-205) where ranged from (41-133) are describes as low level of readiness for change, scored ranged from (134-153) are describes as moderate level and scores ranged from (154-205) are prescribes as high level. The total scores were converted to percentage score as following: low level (<65%), moderate level (65 - 75 %), high level (more than 75. %).

Validity and reliability:

The content and face validity of tools were tested through a jury 5 nursing experts in the field of pediatric nursing to assess completeness, cover all of the content and clarity of the items. The

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required modification was carried out accordingly. Moreover; the researchers translated the original tools into Arabic language, then through back translation, the Arabic tools were translated again into English and compared with original English tools to confirm of items after being translated and identify any confusion and ambiguities of tools. The study tools were check to reliability by measuring their internal consistency using Cranach's alpha coefficient method. This turned to be for Knowledge scale was ($\alpha=0.97.$), for practice scale was ($\alpha=0.81$), for attitude scale ($\alpha=0.84$) and readiness for change scale was ($\alpha=0.89$).

Pilot study:

A Pilot study was used to check the feasibility and applicability of the questionnaires and determine the time needed for data collection. It was test on 10% (30) of participants. Participants in the pilot study were included the final analysis.

Data collection procedure:

Official approval was taken from the medical and nursing directors of the selected hospitals, to be able to carry out data collection and conduct the study. The researchers collected data from the first of May 2023 to the end of July 2023. An interview was carried out by the researchers for the participants during the morning shift when most of the leaders of the teams were available to orient them about how they filled the tow tools of the study; it took about 20 to 30 minutes.

Reponses rate for staff nurses was 100%.

Ethical consideration:

In order to adhere to the ethical aspects of the research, the following steps were secured; written approval was obtained from Ethical and Research Committee at Faculty of Nursing Menoufia University. Additionally, the hospital administrator and the nursing authority in the study setting gave their written consent after being informed of the objectives and methods of the study. By requiring voluntary participation and obtaining oral informed consent after outlining the study's objectives, methods, and potential advantages, the rights of the respondents were protected. The respondents received guarantees that the information would be handled with strict confidentiality.

Statistical design:

Data was entered then analyzed by using SPSS (Statistical Package for Social Science) statistical package version 22. Graphics by using Excel program. Quantitative data were presented by mean (X) and standard deviation (SD). It was analyzed by using t- test for comparison between two means, and ANOVA (F) test for more than two means. Qualitative data were presented in the form of frequency distribution tables, number and percentage. It was analyzed by chi-square (χ^2) test. However, if an expected value of any cell in the table was less than 5, Fisher Exact test was used(if the table was 4 cells) , or Likelihood Ratio (LR) test (if the table

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was more than 4 cells). Level of significance was set as P value <0.05 for all significant tests.

Results:

Table (1):- displays): Percentage distribution of the studied staff nurses according to their personal characteristics. This table showed that more than half of the studied sample (61%) had age 20 -<30 years old , also more than half of staff nurses (55%) had 5-10 year of experience and of staff nurses were male and married (56% -53.6%) respectively. Moreover, 73% of studied sample were nursing technical institute and half of the staff nurses (50.7%) not take a course training in nursing informatics technology. Finally near to half (48.6%) were really use the computer. Also this table declares frequency distribution of studied staff nurses' knowledge about computer use. This table displayed that the most (85%) of nurses not currently used computer, two third (66.6%) of studied sample had Period of computer course from 1: 5 hours. Majority of studied sample (82%) never used the computer both at home and work. While more than half (53.6%) use the computer for less than 5 years.

Table 2: shows frequency distribution of studied staff nurses' knowledge about nursing informatics. More than two third of staff nurses (72%) had knowledge about nursing informatics regarding "Leads to reducing the time used in patient procedures " and "Leads to strengthening patient safety Leads to streamlined workflow procedures and increased work

conclusion" . While, (17%) of studied sample don't know about " Nursing Informatics play a vital role in the implementation of clinical applications including clinical and nursing documentation"

Table 3: illustrates frequency distribution of studied staff nurses' practice about computer. This table pointed that the majority of studied sample (83.6%) didn't can solve common errors on the computer and more than two third of staff nurses (70%) can have basic computer skills like turning on and off.

Table 4: shows frequency distribution of studied staff nurses' attitude of nurses about nursing informatics. This table illustrated that most of nurses agree about all statement except statement that anxious informatics technology lose my jobs are negative attitude .Also, more than half of nurses (54.6%) were positive attitude.

Figure 1: mentioned that the majority of studied sample (83.60 %) had poor level regarding total knowledge. While near to half (40.40%) of staff nurses had good level of total practice about nursing informatics.

Figure2: mentioned that the more of studied sample (54.60 %) had positive attitude regard nursing informatics.

Table 5: displays frequency distribution of studied staff nurses' readiness for change. The high M±SD 38.7267±10.47558 among dimensions of readiness for change was " Managerial support." While low M±SD 15.3467±4.29667was " appropriateness to change".

Figure 3: Displayed that more than half of studied sample (57.40 %) were

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low level of readiness for change while, 30.40% moderate level and 12.20% high level.

Table 6: Revealed that there was highly statistical significant correlation

between total knowledge level , total practice level , total attitude level and readiness for change where P value = .000.

Table (1): Percentage distribution of the studied staff nurses according to their personal characteristics (n = 300).

Personal characteristics items	No.	%
Age		
<20	3	1.0
20 -<30	183	61.0
more than 30	114	38.0
Mean &SD	25.6±5.7	
years of experience		
<5 year	23	7.6
5-10 Year	165	55.0
>10 year	112	37.4
Gender		
Female	132	44.0
Male	168	56.0
Educational level		
Nursing 2ry schools	61	20.3
Nursing Technical Institute	219	73.0
Bachelor of nursing	20	6.7
Marital status		
Married	161	53.6
Unmarried	139	46.4
Do you using a computer		
• Never	95	31.2
• Really	146	48.6
• Sometimes	56	18.6
• Often	2	0.6
• Always	1	0.3
Do you take a course training in nursing informatics technology		
• Yes	148	49.3
• No	152	50.7
For how long period you use the computer		
• < 5 years	161	53.6
• 5-10 years	96	32.0
• >10 years	43	14.4
Where you use the computer		
• At home	20	6.6
• Never used	248	82.8
• At faculty	32	10.6
Period of computer course		
• zero hours	36	12.1
• 1-5 hours	200	66.6
• 6-15 hours	20	6.6
• 16-25 hours	43	14.4
• 26-36 hours	1	0.3
Do you currently use a computer		
• Yes	45	15.0
• No	255	85.0

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**Table (2): Frequency Distribution of Studied Staff Nurses' Knowledge about
Nursing Informatics (n = 300).**

Items	Agree		Uncertain		Disagree	
	N	%	N	%	N	%
Nursing Informatics is the integration of Nursing science, computer science and Information science.	201	67.0	59	19.7	40	13.3
Nursing Informatics play a vital role in the implementation of clinical applications including clinical and nursing documentation	210	70.0	39	13.0	51	17.0
Nursing informatics improves ability to give the patient the right treatment in the right way and it is a violation of patient privacy.	210	70.0	63	21.0	27	10.0
Nursing informatics improving abilities of develop nursing care	205	68.3	72	24.0	23	7.7
Increased nurses' workloads.	195	65.0	79	26.3	26	8.7
Nursing informatics leads to good communication between the health care staff in the hospital	180	60.0	79	26.3	41	13.7
Nursing informatics improves ability to take care of the sick with the right person and improve care for patients	209	69.7	59	19.7	32	10.3
Nursing informatics improves your ability to access patient information	197	65.7	71	23.7	32	10.7
Nursing informatics leads to good decisions in patient care	191	63.7	74	24.7	35	11.7
Nursing informatics leads to the ease of transferring patients from one unit to another	213	71.0	45	15.0	42	14.0
Nursing informatics leads to what is for the smell and the family in the treatment plan	195	65.0	61	20.4	44	14.6
Nursing informatics leads to less giving verbal orders in the hospital	212	70.7	53	17.7	35	11.6
Nursing informatics leads to reducing the time used in patient procedures	216	72.0	46	15.3	38	12.7
Nursing informatics matches data that is recorded for patient care	309	69.7	50	16.7	40	13.6
Nursing informatics leads to improving the accuracy of the patient's medical orders	202	67.3	56	18.7	42	14.0
Nursing informatics leads to the ease of medical follow-up of patients inside the outpatient clinics or re-admission	210	70.0	61	20.3	29	9.6
Nursing informatics leads to the employment of highly qualified nurses Leads to facilitate the application of research to improve the care , applied skills of the patient due to the availability of information accuracy of delivery and receipt at the end of the shift	213	71.0	45	15.0	42	14.0
Nursing informatics leads to accurate and correct recording of treatment plan data	205	68.3	45	15.0	50	16.7
Nursing informatics leads to strengthening patient safety Leads to streamlined workflow procedures and increased work conclusion	216	72.0	46	15.3	38	12.7

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Table (3): Frequency Distribution of Studied Staff Nurses' Practice about Nursing Informatics (n = 300)

Items	Not done		done	
	N	%	N	%
Informatics' Device Use				
I have basic computer skills like turning on ,turning off and windows	90	30.0	210	70.0
I have the ability to use antivirus software	238	79.3	62	20.7
I solve common errors on the computer	251	83.6	49	16.4
I have the ability to back up your computer files and scanners and printers	101	33.7	199	66.3
I have the ability to use Excel application	133	44.3	167	55.7
I have the ability to use a power point application	128	42.7	172	57.3
I have the ability to use Word application	126	42.7	172	57.3
Informatics Application Use				
Have the ability to use external storage devices such as CD and ROM	142	47.3	158	52.7
I use electronic communication (e.g., email to create, send, respond, attach and receive attachments).	103	34.3	197	65.7
Familiar with the use of multimedia presentations (e.g., videos, podcasts, blogs, YouTube, etc.).	129	43.0	171	57.5
Uses spreadsheets and presentation graphics (e.g., document, spread- sheet, slideshow creation, etc.).	188	62.7	112	37.3
Navigates primary operating systems (e.g., Windows to manage files, determine active	164	54.7	136	45.3
Use technology for self-directed learning.	178	59.3	122	40.7
Familiar with social networking applications (e.g.,Twitter, Facebook, LinkedIn, etc	179	59.7	121	40.3
I have the skills to informatics –learning for other staff	190	63,3	110	36.7

Table (4): Frequency Distribution of Studied Staff Nurses' Attitude about Nursing Informatics (n = 300)

Items	Agree		Uncertain		Disagree	
	N	%	N	%	N	%
I am sure computer is the best for saving file in the patient care system	195	65.0	75	25.0	30	10.0
I believe that good health care need to informatics technology	190	63,3	74	24.7	36	12.0
I feel that easy identified time appropriate to access electronic information	217	72.3	38	12.71	45	15.0
I am sure activities done by computer are effective	216	72.0	43	14.3	41	13.7
I aware packets in the computer and medical records are important	190	63,3	74	24.7	36	12.0
I feel I have ability to apply the principle of data integrity	195	65.0	75	25.0	30	10.0
I feel saving professional ethics and legal requirements for confidentiality and security in informatics technology	190	63.3	82	27.3	28	9.3
I am anxious that informatics technology make me lose my jobs	48	16.0	38	12.7	214	71.3
I am aware to continuous learning of informatics skills, applications and knowledge	210	70.0	49	16.3	41	13.7
I believe the importance of using data to improve practice, patient care improve quality, save cost and reduce patient stay in the hospital.	184	61.3	76	25.3	40	13.3
I am sure the laws related to the protection of personal information found on the computer	201	67.0	69	23.0	30	10.0
I am sure information and communication is needed in informatics skills	184	61.3	80	26.7	36	12.0

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Total mean &SD of attitude	30.4833± 5.75908	
	N	%
Positive attitude	164	54.6
Negative attitude	136	45.4

Figure (1): Nurses' Knowledge and Practice level about Nursing Informatics (n =300).

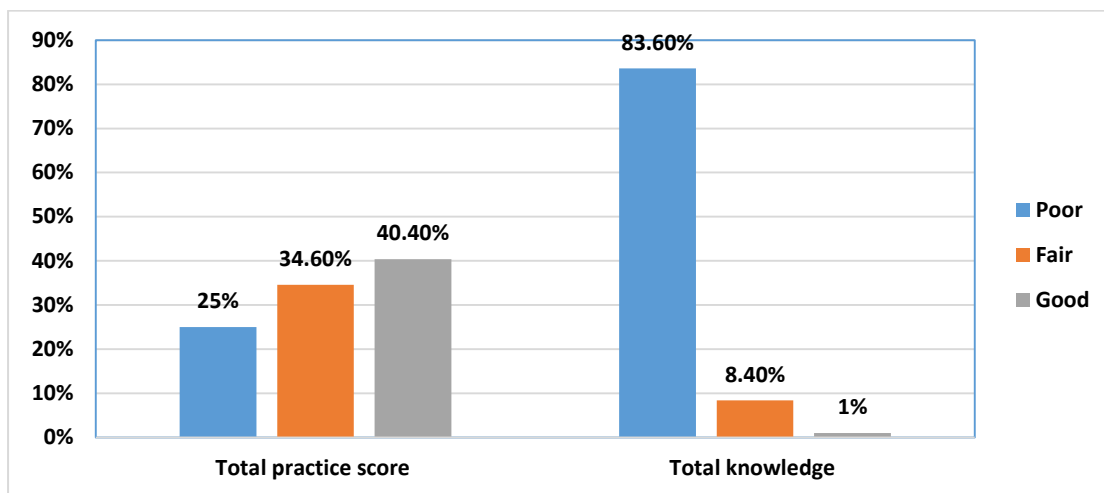


Figure (2): Nurses' Attitude level about Nursing Informatics (n =300).

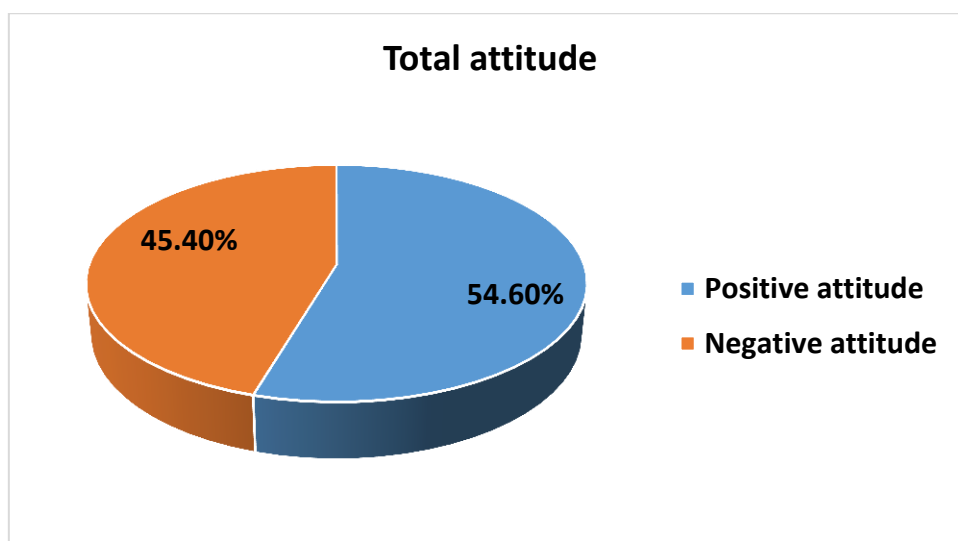


Table (5): Frequency Distribution of Studied Staff Nurses' Readiness for Change (n = 300)

Readiness for change items	Total Mean &SD
Change Efficacy	36.4600±9.95819
Appropriateness to change	15.3467±4.29667
Managerial support change.	38.7267±10.47558
Personal valence with change	31.4433±8.8

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Figure (3): Nurses' Readiness for Change Level (n =300).

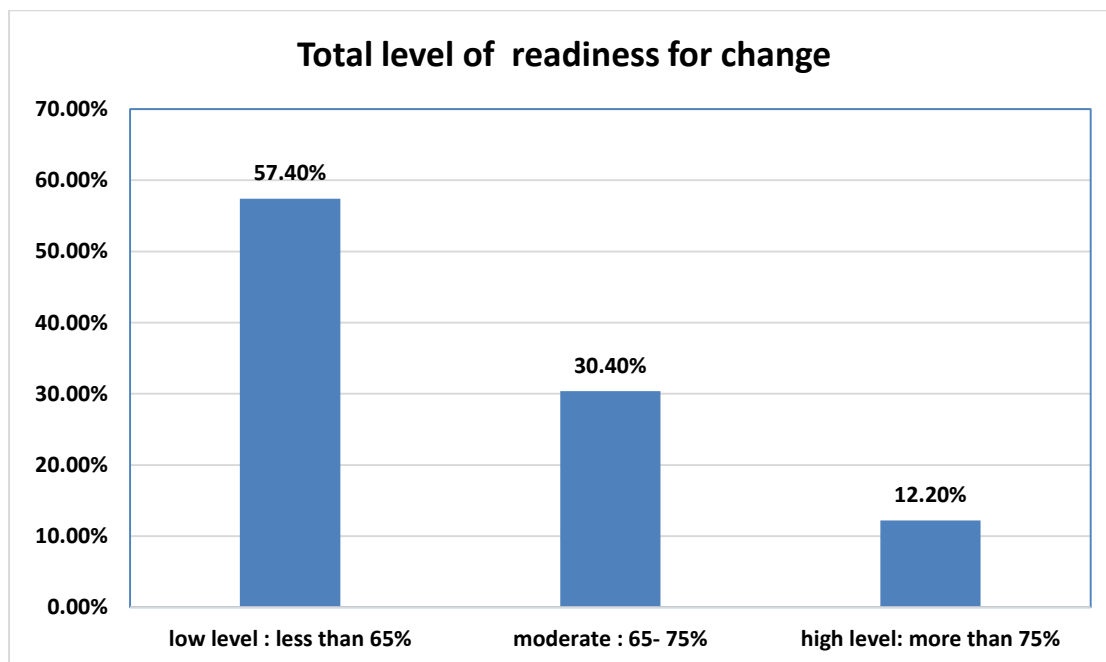


Table (6): Correlation between Nurse ' Knowledge Level, Practice Level, Attitude level about Nursing Informatics and their Readiness for Change (n=300).

Items	Readiness for Change	
	X2	Sig
Knowledge Level	85.979*	.000
Practice Level	132.197*	.000
Attitude Level	1785.452*	.000

Discussion

Nursing informatics has the potential to improve the health of individuals and the performance of providers, yielding improved quality, cost savings, and greater engagement by patients in their own healthcare. Nursing informatics has had a significant impact in all aspects of the society in the 21st century (Chan,2019). The implementation of nursing informatics has generated both acceptance and resistance (Ilie & Turel,2020). Al-Rayes et al., (2019) point out that nurses' resistance also

plays an important role in the implementation of new nursing information systems. According to Barzekar et al .,(2019),user resistance to nursing informatics has proven to be the biggest challenge in implementing large-scale systems. Nursing Informatics integrates nursing science, computer science and information science to facilitate the integration of data, information, knowledge and wisdom to support patients. Nurse's role in client care delivery have a pivotal role in this

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technology deployment, maintenance and evolution, although nurses are involved in technology in health-care the specific roles are diverse and nursing informatics system has become one of those key roles. Technologies that have evolved due to health care/nursing informatics include: Computerized Provider Order Entry (CPOE), Electronic Medical Records (EMRs), Test results, Progress notes, Nursing notes, Medication records and Nursing informatics .Nurses are engaged with information systems and different digital tools used for their clinical practice as a foundation for evidence-based care decision-support, and electronic health record (Adedeji , 2018)

Therefore, the present study was conducted to determine the relationship between nurses' perception of nursing informatics and their readiness for change at Menoufia University Hospital.

Before discussing the results related to the research questions, the light should be directed to personal characteristics of the studied sample. The result of the present study showed that more than half of studied sample age ranged between 20- <30 years old, mean of age (25.6±5.7) and 5 -10 years of experience and were male while level of education was nursing technical institute and really using of computer. Moreover , the majority of studied sample using computer for period ranged between 1-5 hours and no taking training courses about nursing informatics and don't currently use a computer.

The present study findings revealed that the majority of studied sample had poor knowledge level, while having good practice level about nursing informatics. Also, more than studied sample had positive attitude regarding nursing informatics. These findings may be due to the studied sample who don't currently use a computer, rarely use it at home and don't attend any training course about nursing informatics.

The current study finding was consistent with Mohammed et al.,(2020) who stated that most of the studied nurses had low knowledge level regarding nursing informatics , this result due to nearly two thirds of studied sample don't use computer at work and more than half of nurses didn't have courses about basic components of computer .Also, the current study findings in the same line with Christiansen et al .,(2017) who reported that majority of the studied group had positive level regarding practice and attitude about nursing informatics.

This result was contradicted with Fajarini et al., (2020) who mentioned that nurses had negative attitude. Also, Rosy (2018) who stated that more than half of the participants had an average knowledge of nursing informatics. Moreover, Ademuyiwa et al., (2020) who found most of (75%) of nurses have good knowledge score of nursing informatics .Additionally, Christian et al.,(2021) who report that level of nursing informatics knowledge above average (61.7%). This result is similar to Ademuyiwa et al.,(2020) who mentioned that the overall nursing

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informatics knowledge among respondents and their practice were high .

In this study concerning items of knowledge scale about nursing informatics, more than half of nurses agreed that the understanding of the concept of nursing informatics would make nurses perform better on the job and nursing informatics play a vital role in the implementation of clinical applications including clinical and nursing documentation. The current study agreement with (Ademuyiwa et al ., 2020) who reported that Three quarter of the nurses agreed that the understanding of the concept of nursing informatics would make nurses perform better on the job and Nursing Informatics play a vital role.

Regarding the staff nurses' practice level about nursing informatics, the present study stated that majority of studied nurses didn't have a basic computer skills like turning on and off .This result may be due to the studied sample didn't have training courses about using computer and rarely use the computer at work and home. Also, the current study revealed that there was statistical significance between all items of nurses' practice scale.

The current study in the same line with, Ghonem et al., (2023) who showed that the participants' skill level was not good enough. Also, Liston (2019) stated that nurses lacked informatics competency. As well as Al-Humran & Malakeh (2022) reported that nurses lacked informatics competency. Additionally, Elsayed et al., (2017) & Kinnunen et al. (2022), who found that staff nurses had few

knowledge about how to use computers such as turning on and off.

In this study majority of studied nurses had positive attitude toward nursing informatics .This result due to the nurses had good practice level regarding nursing informatics.

This result agreement with Al-Rawajfah. (2016), who found that nurses generally supported workplace computerization and had positive attitude regarding applying nursing informatics in workplace.

This finding contradicted with Ghonem et al (2023) who report that most of studied nurse had negative attitudes toward nursing informatics. The nurses were also worried that they would spend more time with computers and less time with patients. The present study in the same direction with Seboka et al., (2021) and Singh & Masango (2020), who found that nurses didn't like computerization in the workplace.

Regarding studied nurses' level of readiness for change the present study findings revealed that more than half of study nurses had low level of readiness for change. From the researcher point of view , the findings may be due to the staff nurses had a resistance to change because hadn't training course about nursing informatics and rarely use the computer this mean the staff nurses had low knowledge level about nursing informatics .The present study congruent with Sharmawt et al ., (2018) found low level of readiness for organizational change.

On the other hand, the results of Negm et al ., (2021) who revealed that there was high level of readiness to change

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as perceived by the majority of the studied sample. Also, the present study finding disagreement with Mashhady (2021) who stated that the studied nurses had satisfactory level regarding readiness for change this result due to well-trained staff with adequate resources. Moreover, Ashour (2016) who found that studied sample had high readiness to change.

This study result revealed that the highest mean score was for management support the lowest mean score was for appropriateness of change. These findings may be due to the nurse manager clearly communicate purpose for change to staff members and provide feedback and involved their staff in decision making. The current study result agreement with Clark (2016) who found that participants demonstrated low score toward how legitimate and appropriate the change initiatives were for organization to meet its objective (appropriateness) and high level concerning the management support.

In the opposite side, the current study finding disagreement with Negm et al ., (2021) revealed that the highest mean score was for appropriateness of change and the lowest mean score was for managerial support. It might be attributed to lack of encouragement from the senior leaders in the form of insufficient resources and information. Also, Visage & Steyn (2015) stated that studied subject displayed high favorable levels of appropriateness of change and moderate levels of management support.

The present study stated that there was highly statistical significant correlation

between nurses' knowledge level, practice level, attitude level about nursing informatics and their readiness for change. This result may be due to when employees received timely, informative, and useful information about an organizational change, they presented a more positive evaluation of the change and demonstrated willingness to cooperate with the change agent and low employees' resistance to change. Also, when the staff nurses had knowledge about basics of using computer and uses of nursing informatics and benefits of applying nursing informatics in organization their had high level of readiness for change.

The current study in the same line with Parlakkilic & Saribas (2021) who reported that there was statistical significance between nurses' knowledge level about nursing informatics and their readiness for change .Also , Takak (2019) who stated that there was highly significant correlation between nurses' practice level , attitude level about nursing informatics and their readiness for change.

On the other hand, Takak (2019) who stated that there was no significant correlation between readiness for change and total practice. Moreover, Bayrak & Hirca (2016) stated in their study that there was no significant relationship between readiness for change and total practice.

Conclusion:

In the light of the present study; it could be concluded that the majority of studied sample using computer for

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period ranged between 1-5 hours and no taking a training courses about nursing informatics and no currently used a computer. The majority of studied sample had poor knowledge level ,while had good practice level about nursing informatics. Additionally, the studied sample had positive attitude regarding nursing informatics . More than half of study nurses had low level of readiness for change. There was highly statistical significant correlation between nurses' knowledge level, practice level, attitude level about nursing informatics and their readiness for change.

Recommendation:

- Provide periodic training programs for nurses regarding nursing informatics.
- Availability of computer for all nurses and nursing informatics team.
- Successful leaders help employees to manage change effectively and support their innovative ideas.
- Supportive leadership and nursing foundation for quality of care, enhance readiness for change.
- Future studies should explore other variables that can influence organizational readiness for change, such as organizational culture and climate.

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