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## Factors Contributing to The Application of Information Technology System and Their Benefits

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### ABSTRACT

**Background:** An information technology system has developed rapidly in recent years and become an indispensable part of health care services as in the very field. **Aim:** This study was to examine factors contributing to the application of information technology system and their benefits. **Subjects and method: Design:** A descriptive correlational research design was used **Subjects:** Sample of staff nurses(180) were included. **Setting:** Oncology Center in El Mansoura University. **Tools:** Data were collected by four tools (1) personal and job characteristics, (2) organization factors that include (a) user involvement scale, (b) a management support scale, (3) information systems use a scale, and 4) benefits use the information systems scale. **Results** revealed that (55%,51.7% and 58.3%) of the study nurses had a moderate level toward user involvement, management support, and information systems use benefits respectively . Also, 53.4% of the study nurses had a high level related to information systems use. **Conclusion:** There was a highly significant positive correlation between total benefits use information systems of the studied nurses and their user involvement, management support and information systems use. Therefore, this study. **Recommendations:** Provide many chances for the continues training and awareness of healthcare professionals for promoting use electronic medical records efficiently and study nurses' attitudes and satisfaction with electronic medical records, medication administration records systems, and nearby paperless hospitals and measuring the quality of the Ibn Sina system for managing medical documents by applying the Six Sigma methodology.

**Key Words:** Benefits, Information technologies

## **INTRODUCTION**

In the course of recent many years, there have been critical advancements in information and communication technology and the degree of its utilization in nursing around the world (Kingma, 2018). Nearly four decades ago, nurses began working in information systems, and the term nursing informatics were known. Due to the frequent use of computers in various health care settings, there is great interest in the impact of modern technology on the care provided by nurses, so, researchers have studied the factors that affect the use of information technology and the health care provided (Faustorilla, 2020).

Information technology system (ITS) is used to integrate the science of computing, information, and nursing to assist in the management and processing of nursing data, information and knowledge to enhance the nursing services and provider of nursing care (Pope, 2018). ITS refers to both software and computer hardware to manage and process information, It includes software used a variety of activities such as word processing, spreadsheets, databases, e-mail, the Internet, and the World Wide Web to access information for research, education, and specific computerized educational programs. So, nurses use the multiple information technology in the work environment, due to its importance at work (Jovanović, 2016 ; Kingma, 2018).

Hospital information system refers to the most widely used information systems (IS) within health facilities. The integrated informatics system consists of outpatient, emergency service, inpatient, IS nursing, laboratory test and medical examination system, reports, material management. And the electronic health record is defined as a collective electronic record of patient health information that includes the medical history patient, patient medications, physical exams, medical reports, and healthcare professional notes that ensure complete, readable orders (Wager, Lee & Glaser, 2021).

Factors that affect the use of ITS, national policies towards health information technology, Information and Communication Technology ICT infrastructure, cost and time, social, cultural, educational, organizational and ethical barriers (Liang, Das, Kostyuk, & Hussain,2018).The Egyptian government seeks to provide an information technology infrastructure by a legal framework. It has also worked with the Ministry of Health and Population and the Ministry of Communications and Information Technology (MCIT) on e-health programs to provide integrated health care for Egyptians (Khedr and Alsheref,

2014). In this regard, Kipturgo, Kivuti-Bitok, Karani and Muiva (2014) mention that nurses have an uplifting outlook towards rehearsing IT, are having insight and abilities in the utilization of computers

Abdelgaber, Abdel-Fattah & Helal (2017) reported that the benefits of applying electronic health records (HER) in Egypt are to improve the quality of health care, reduce medication errors, facilitate coordination between health care professionals and places, and provide quick access to patient information. Must be established specialized EHR management, EHR training body, providing a source of funding, setting up security standards, accreditation procedures, and publicizing the benefits of EHR to the community

Ifinedo (2016) state those nurses' attitudes towards accepting the use of EHR have become more positive than before as a result of continuous training and awareness, which leads to the health team's success in using EHR efficiently and effectively. Moreover, healthcare organizations can gain the benefits of information systems if nurses adapt to change with a positive attitude towards the system.

The nursing profession lags behind other professions in the use of IS. Although nurses have adapted to new changes, the successful implementation of IS in nursing can only be achieved through full acceptance and integration of IS into professional practice (Wachter, 2016). New technologies are improving the delivery of health care by medical professionals; accurate information, time, location and specific services help overcome geographic boundaries. Remote diagnosis via interactive video conferencing, applications and remote consultation via consulting software can reduce the time patients spend in doctors' clinics (Farid, 2019).

It is important to use modern technologies in health care practice, for their benefit to patient and provider satisfaction, improving quality of life, directly involving patients in their care and health, reducing costs, ensuring effectiveness, enhancing the professional scope of nursing practice, and delivering care to the majority of the population (Baines et al., 2018). In order for health facilities to overcome obstacles and challenges, attention must be paid to enhancing the quality of health systems and encouraging innovations and new methods that benefit the patient (Howitt et al., 2012).

### **Significance of the Study**

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis made by Abdelgaber et al. (2017) showed the main barriers for EHR implementation in Egypt. Those included high cost, lack of a clear time plan, lack of IT infrastructure, technical ability and training, lack of standardization, privacy concerns, and resistance to new technology .

Information technology (IT) plays an important role in nursing practice. Hence, nurses' experiences and viewpoints about IT integration into healthcare help improve nurses' adoption of IT (Farokhzadian, Khajouei, Hasman, & Ahmadian, 2020). In today's world, the potential for information and communication technology application is increasing so that it can enhance the quality of nursing domains outcome (McNelis, Horton-Deutsch, & Friesth, 2012). Nurses have the most communication with patients and interact with technology more frequently. Using technology should create a positive attitude in nursing productivity. It is essential for nurses to be involved in the initial design of systems to improve the quality of health care and change their culture in this regard (Darvish & Salsali, 2010).

The advantages of applying information technology in all aspects of nursing, including clinical areas, management, education, research, and its influence on health care have been reviewed. Today, the subjects of clinical nursing information systems, decision support systems, and medical diagnostic systems are associated with collecting patient information. Regarding the technology-rich environment, health care, hospital information systems developers, and the quality of care is improving (Jang & Kim, 2020).

In addition, Kleib, Simpson & Rhodes (2016) mention that nurses need to be informed of the application of information technology and its advantages, through the integration of information technology into nursing education. Hopefully, the administrator can use the results to organize training courses to modify the system.

### **AIM OF STUDY:**

assess factors contributing to application of information technology system and their benefits among nurses

**Study objectives are to:-**

- 1- Assess factors contributing to application of information technology systems as perceived by nurses at Oncology Center in El Mansoura University.
- 2- Determine uses of information systems as perceived by nurses in their work.
- 3- Asses benefits of application of information technology systems as perceived by nurses at Oncology Center in El Mansoura University.
- 4- Find out the relationships among personal and job characteristics, organizational factors, nurses' information system used and information system benefits.

**SUBJECTS AND METHOD**

**(I) Technical Design:**

**Research design:**

A descriptive research design was used to conduct the current study.

**Study setting:**

The study was carried out in all inpatient units (8) in the oncology center that affiliated to in El Mansoura University. This unit includes: medical units (2), surgical units (2), intensive care units (2), and pediatric units (2). It contains eleven floors with a capacity of 282- bed. The building management system is an electronic monitoring system for all devices and units of the center, which reveal the presence of any malfunction in any part of the center automatically through the computer, and then immediately fixing all specialized and mechanical work.

Center used program Ibn Sina e-Hospital Management System, This system is powered by Mansoura University e-business engine, The Ibn Sina Hospital Management System is one of the strongest and most important systems produced by the Communications and Information Technology Center, as this system currently manages all Mansoura University hospitals, and it contains the complete data of more than 2 million patients, and the first version of it was issued in 1998.

**Subjects:**

The study subjects included all staff nurses (180) out of 200 nurses who work in all departments in the aforementioned setting during the time of data collection. The remaining 20 staff nurses were selected randomly for the pilot study.

**Type of sample:** Purposive sampling

### **Tools for Data Collection**

To achieve the aim of this study, data were collected through using 4 tools, namely, (1) personal and job characteristics, (2) organization factors that include (a) user involvement scale, (b) a management support scale, (3) information systems uses a scale and 4) benefits use the information systems scale as the following:

**First tool: Personal and job characteristics** of the study sample. It consisted of nine questions as (age, gender, qualifications, years of experience, department, job title, number years of using the computer at work, level of computer experience at work, and in-service training programs). It was developed by researcher.

**Second tool: Organizational factors** that include (a) User involvement scale, (b)

A management support scale.

**(a) User Involvement Scale:** This tool was used to describe the amount of time that nurses actually spent participating in development activities for IS in general. It was developed by Doll and Torkzadch (1990). It consisted of 8-items as initiating the project, determining system objectives, determining the nurses' information needs,...

### **Scoring system:**

Participants' responses were measured on the five-point Likert scale ranging as follows: not at all (1) to a great deal (5). These scores were summed up and the total was divided by the number of items, giving a mean score, these scores were converted into a percentage score. The total score of nurses' user involvement was 40 grades. It was classified into 3 categories: - High if score  $\geq 70\%$ , moderate if score  $50 < 70\%$ , and low if score  $< 50\%$ .

**(b): Management Support Scale.**

This tool was used to to indicate nurses' level of agreement or disagreement with management's encouragement and allocation of resources. It was developed by Igbaria

(1990) and adopted from Henry & Stone (1995). It consisted of 6-items as nursing management is aware of the benefits that can be achieved with the use of information systems, nursing management always supports and encourages the use of information systems for job-related work.

**Scoring system:**

Participants' responses were measured on the five-point Likert scale ranging as follows: strongly disagree (1) to strongly agree (5). These scores were summed up and the total was divided by the number of items, giving a mean score, these scores were converted into a percentage score. The total score of management support was 30 grades. It was classified into 3 categories: - High if score  $\geq 70\%$ , moderate if score  $50 < 70\%$ , and low if score  $< 50\%$ .

**Third tool: Information Systems Use scale.** This tool was used to assess the extent to which the information systems available to nurses were used to perform and support their work task activities. It was developed by Abdrbo, Hudak, Anthony, Douglas, & Dowling (2007). It consisted of 7-items as assessment and nursing diagnosis, such as obtaining data about patient condition and history, searching for patient related information, such as laboratory results...

**Scoring system:**

Participants' responses were measured on the five-point Likert scale ranging as follows: use never/almost never (0) to always /almost always (4). These scores were summed up and the total was divided by the number of items, giving a mean score, these scores were converted into a percentage score. The total score of Information Systems Use was 28 grades. It was classified into 3 categories: - High if score  $\geq 70\%$ , moderate if score  $50 < 70\%$ , and low if score  $< 50\%$ .

**Fourth tool: Benefits use information systems scale.**

This tool was used to assess benefits use the information systems. It was developed by Abdrbo et al. (2007). It consists of 56 questions divide to 4 dimensions: 1. Quality of

care dimension (items 1-8) 2. Communication and documentation dimension (items 9-26); 3. Saving time and efficiency dimension (items 27-46); 4. Other benefits related to professional practice (items 47-56) as Improves quality and administration of nursing care overall, Improves access to patient information, Provides more accurate and complete patient information,.....

**Scoring system:**

Participants' responses were measured on the five-point Likert scale ranging as follows: strongly disagree (1) to strongly agree (5). These scores of each dimension were summed up and the total was divided by the number of items, giving a mean score of the each dimension, these scores were converted into a percentage score. The total score of information systems use benefits was ranged from 280 grades. It was classified into 3 categories:- High if score  $\geq 70\%$ , moderate if score  $50 < 70\%$ , and low if score  $< 50\%$ .

**II. Operational Design:**

The operational design covers the preparatory phase, content validity, reliability, pilot study, and fieldwork.

**Preparatory phase:**

Review of current national and international related literature, articles, periodicals, magazines, and internet of the various aspects concerning the various aspects concerning information technology systems. Getting the preliminary approval of the medical & nursing directors of the Oncology Center in El Mansoura University.

**Tools Validation:**

The tool was translated into Arabic language by the researcher and then retranslated into English again. The content validity was examined by a panel of five experts three from nursing administration department, two from the faculty of technology, management and information systems in port said university. They were requested to express their opinions on relevant field to assure that the content was assessing what the researcher want to measure and comments on the translated tools. Also, they reviewed the tools for clarity, relevance, and comprehensiveness.

**Reliability:**

The tools of the study were tested by using cronbach's alpha coefficient. Test reliability for the user involvement scale was 0.76, a management support scale was 0.78, information systems use scale was 0.81 and benefits use information systems scale was 0.79.

**Pilot study:**

A pilot study was carried out after the development of the study tools, and before the data collection phase. A pilot study was carried out on 20 nurses who represent 10% of the nurses to test applicability, feasibility, and clarity of the language and to estimate the needed time to fill the data collection sheets, and then necessary modification was done according to the result of the pilot study. Subjects of the pilot study were excluded from the study sample. Completion of the study sheets took 25-30 minutes.

**Field work:**

This study was carried out in the period of five months, started from the beginning of June 2019 to end of October 2019. The researcher met the respondents at three days per week in three shifts to distribute the questionnaire. Data were collected from nurses in their work area. The questionnaire sheets were filled in by the study subjects after explaining the aim and purpose of the study. They were assured that the information given would be utilized confidentially and used for the research purpose only, and the researcher explained to them how to fill in the sheets. The respondents filled the questionnaire sheets individually by themselves. The researcher remained with the nurses until questionnaires were completed to ensure objectivity of the responses and to check that all items were answered.

**III. Administrative Design:**

Before the conduct of the study, an official letter from the dean of the faculty of nursing and vice dean for post-graduate studies and researches were sent to the selected area of the study. The director of the aforementioned setting were contacted and informed in order to obtain permission to include the nurses on the present research.

**Ethical Considerations:**

An informed consent was obtained from nurses to participate in the study after explaining the purpose and the nature of the study. The studied nurses were informed that their participation is voluntary and they have the right of withdrawing from the study at any time. The studied nurses were ensured about the confidentiality of the information collected and that it was used only for the purpose of the study, and the anonymity is guaranteed.

#### IV. Statistical Design:

Data analysis was performed using IBM SPSS statistical software version 22. The data were explored. Qualitative data were descriptive using numbers and percentage. Quantitative data were described used mean, standard deviation, chi square test ( $\chi^2$ ) used to examine the relation between personal & job characteristics, and different variables, Person coefficient (r) test was used to correlate between studied variables and linear regression model was used to identify the strength of the effect that the independent variables have on a dependent variable. ANOVA test used to determine the influence that independent variables have on the dependent variable in a regression study. A significant level value was considered when the p-value  $\leq 0.05$  and a highly significant level value was considered when the p-value  $\leq 0.001$ .

## RESULTS

**Table (1):** showed that, 56.7% of the studied nurses their age were 20-<30 years, the Mean SD age was  $29.25 \pm 5.89$  years. As regards to gender and qualification, 88.3% and 42.8% of the studied nurses were female and had technical institute, respectively. Moreover, 55% of the nurses under study their years of experience were  $\geq 10$  years with mean SD  $9.44 \pm 3.92$ . Also, 32.2% of the nurses working in pediatric units. Likewise, 73.3% and 83.3% of the studied nurses didn't work in private hospitals and didn't work in any Arab country before, respectively. Moreover, 86.7% and 50% of the studied nurses working full time and working the morning shift, respectively.

Moreover, 41.7% of the studied nurses used the computer at work from  $\geq 5$  with mean SD  $5.33 \pm 3.60$  year. Also, 56.7% of the studied nurses were expert in computer. Likewise, 63.3% and 60% of the studied nurses didn't attend training courses in the use of information systems for nursing education and work, respectively.

**Table (2):** presented that, 55% of studied nurses had moderate level toward user involvement. While, 25% of them had low levels. In addition, the Mean SD score of studied nurses regarding total user involvement was  $23.41 \pm 6.88$ . Moreover, showed that, 51.7% of studied nurses had moderate level management support. While, 23.3% of them had low level. Additionally, the Mean SD score of studied nurses regarding management support was  $18.33 \pm 5.76$ .

**Table (3):** indicated that, 53.4% of studied nurses had high level related to information systems use. While, 13.3% of them had low level. In addition, the Mean SD score of studied nurses regarding information systems use was  $20.21 \pm 6.33$ .

**Table (4):** indicated that, 58.3% of studied nurses had moderate level toward benefits use information systems. While, 6.7% of them had low level. Additionally, the Mean SD score of studied nurses regarding benefits use information systems was  $191.38 \pm 34.8$ .

**Figure (1):** indicated that, 51.7% and 48.7% of studied nurses had high level related to quality of care and communication, documentation, respectively. Also, 55% and 61.7% of them had moderate level related to saving time, efficiency and professional practice respectively.

**Table (5):** validated that, there was highly statistically significant relation between benefits use information systems of studied nurses and their age, years of experience, years of using the computer at work, level of computer experience and attendance of training courses on information systems in their nursing education and work at ( $P < 0.01$ ). While, there was no statistically significant relation to their gender, qualification and working unit at ( $p > 0.05$ ).

**Table (6):** showed that, there was highly significant positive correlation between benefits use information systems of the studied nurses and their user involvement, management support and information systems use. Also, there was a significant positive correlation between the information systems use of the studied nurses and their user involvement and management support.

**Table (7):** showed that, there was a highly significant positive effect from qualification, level of computer experience, information systems use nurses' and benefits uses information systems ( $p < 0.01$ ). Also, there was a significant statistical positive effect of age, years of using the computer at work and management support nurses' and benefits use information systems ( $p < 0.05$ ).

**Table (1):** Number and percentage distribution of the studied nurses, according to their personal and job characteristics (N=180).

Items	N	%
<b>Age (year)</b>		
20 - < 30	102	56.7
30 - < 40	63	35
≥ 40	15	8.3
<b>Mean SD</b>	<b>29.25 ± 5.89</b>	
<b>Gender</b>		
Female	159	88.3
Male	21	11.7
<b>Qualification</b>		
Nursing school diploma	43	23.9
Technical Institute	77	42.8
Bachelor	51	28.3
Master	6	3.3
Doctorate	3	1.7
<b>Years of experience</b>		
< 5	21	11.7
5-< 10	60	33.3
≥ 10	99	55
<b>Mean SD</b>	<b>9.44 ± 3.92</b>	
<b>Department</b>		
Medical units	45	25
Surgical units	45	25
Intensive Care Units	32	17.8
Pediatric units	58	32.2
<b>Working in private hospitals before</b>		
Yes	48	26.7
No	132	73.3
<b>Working in any Arab country before</b>		
Yes	30	16.7
No	150	83.3
<b>Working time</b>		
Full time	156	86.7
Part time	24	13.3
<b>Working Shift</b>		
Morning	90	50
Afternoon	78	43.3
Night	12	6.7
<b>Years of using the computer at work</b>		
< 3	66	36.7
3-< 5	39	21.6
≥ 5	75	41.7
<b>Mean SD</b>	<b>5.33 ± 3.60</b>	
<b>Level of computer experience at work</b>		
Novice	24	13.3
Moderate	54	30.0
Expert	102	56.7
<b>Training courses in the use of information systems for your nursing education</b>		
Yes	66	36.7
No	114	63.3
<b>Training courses on information systems in your work</b>		
Yes	72	40
No	108	60

**Table (2):** Distribution level of organizational factors (user involvement and management support) among studied nurses (N=180).

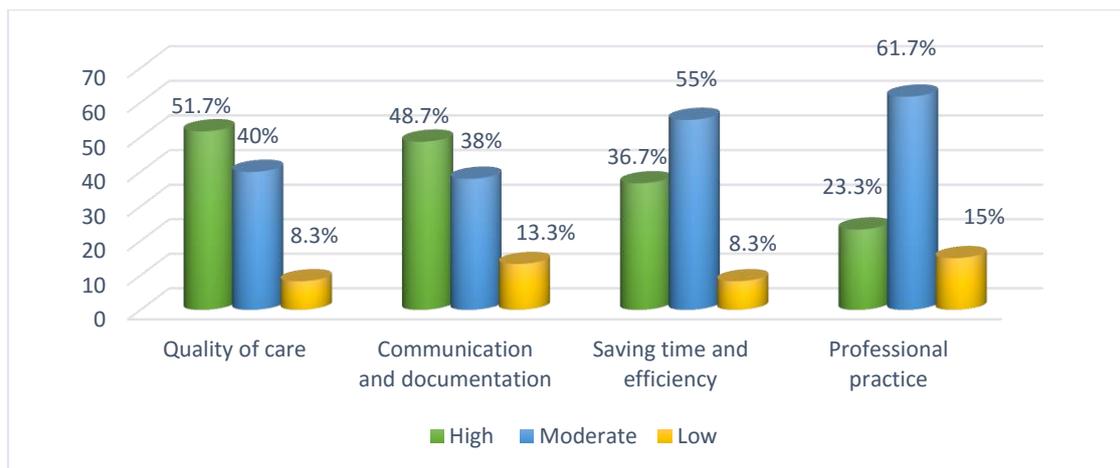
Distribution	Level of organizational factors			
	user involvement		management support	
	N	%	N	%
High $\geq 70\%$ .	36	20	45	25
Moderate 50-<70%.	99	55	93	51.7
Low < 50%.	45	25	42	23.3
Mean $\pm$ SD	23. 41 $\pm$ 6. 88		18. 33 $\pm$ 5. 76	

**Table (3):** Distribution level of information systems use among studied nurses (N=180).

The level of information systems uses	N	%
High $\geq 70\%$ .	96	53.4
Moderate 50-<70%.	60	33.3
Low < 50%.	24	13.3
Mean $\pm$ SD	20. 21 $\pm$ 6. 33	

**Table (4):** distribution levels of benefits use information systems among studied nurses (N=180).

Levels of benefits use information systems	N	%
High $\geq 70\%$ .	63	35
Moderate 50-<70%.	105	58.3
Low < 50%.	12	6.7
Mean $\pm$ SD	191. 38 $\pm$ 34. 8	



**Figure (1):** Percentage distribution level of dimensions benefits use information systems among studied nurses (N=180).

**Table (5):** Relation between personal and job characteristics of the studied nurses and their benefits use information systems (N=180).

Items		Level of benefits use information systems						X <sup>2</sup>	P-Value
		High		Moderate		Low			
		N	%	N	%	N	%		
Age (year)	20-<30 (n=102)	36	35.3	66	64.4	0	0.0	37.23	.000**
	30-<40 (n=63)	21	33.3	36	57.1	6	9.5		
	≥ 40 (n=15)	6	40	3	20	6	40		
Gender	Female (n=159)	60	37.7	90	56.6	9	5.7	5.683	.053
	Male (n=21)	3	14.3	15	71.4	3	14.3		
Qualification	Diplom (n=43)	14	32.6	25	58.1	4	9.3	13.98	.082
	Technical (n=77)	31	40.3	38	49.3	8	10.4		
	Bachelor (n=51)	18	35.3	33	64.7	0	0.0		
	Master (n=6)	0	0.0	6	100	0	0.0		
	Doctorate (n=3)	0	0.0	3	100	0	0.0		
Years of experience	< 5 (n=21)	9	42.9	12	57.1	0	0.0	16.95	.002**
	5-<10 (n=60)	15	25	45	75	0	0.0		
	≥ 10 (n=99)	39	39.4	48	48.5	12	12.1		
Working unit	Medical (n=45)	23	51.1	20	44.5	2	4.4	10.36	.112
	Surgical (n=45)	20	44.5	25	55.5	0	0.0		
	intensive care units (n=32)	5	15.6	21	65.6	6	18.8		
	pediatric units (n=58)	15	25.9	39	67.2	4	6.9		
Years of using the computer at work	< 3 (n=66)	9	13.6	54	81.8	3	4.5	46.38	.000**
	3-<5 (n=39)	15	38.5	15	38.5	9	23.1		
	≥ 5 (n=75)	39	52	36	48	0	0.0		
Level of computer experience	Novice (n=24)	0	0.0	18	75	6	25	32.68	.000**
	Moderate (n=54)	18	33.3	30	55.6	6	11.1		
	Expert (n=102)	45	44.1	57	55.9	0	0.0		
Training courses on information systems in nursing education	Yes (n=66)	24	36.4	30	45.5	12	18.1	23.46	.000**
	No (n=114)	39	34.2	75	65.8	0	0.0		
Training courses on information systems in your work	Yes (n=72)	27	37.5	33	45.8	12	16.7	21.42	.000**
	No (n=108)	36	33.3	72	66.7	0	0.0		

\*Significant at p &lt;0.05. \*\*Highly significant at p &lt;0.01. Not significant at p&gt;0.05.

**Table (6):** Correlation between user involvement, management support, information systems use, benefits use information systems.

Variables		User involvement	Management support	Information systems use	Benefits use information systems
User involvement	r		.566**	.182*	.234**
	P		.000	.034	.002
Management support	r	.566**		.196*	.312**
	P	.000		.026	.000
Information systems use	r	.182*	.196*		.766**
	P	.034	.026		.000

(\*) Statistically significant at  $p < 0.05$  -- (\*\*) highly significant at  $p < 0.01$

**Table (7):** Best fitting multiple linear regression models for the score of benefits use information systems among studied nurses.

Variables	Unstandardized Coefficients	standardized Coefficients	T	P. value
	B	$\beta$		
Age	-.102	-.114	-1.844	.047
Qualification	-.146	-.223	-4.005	.000
Years of using the computer at work	.142	.216	2.611	.010
Level of computer experience	.225	.277	4.296	.000
User involvement	-.018	-.020	-.315	.753
Management support	.028	.033	1.499	.032
Information systems use	.504	.619	10.726	.000
ANOVA				
Model	Df.	F	P. value	
Regression	6	27.09	.000	

a. Dependent Variable: Benefits use information systems.

## DISCUSSION

All the world is increasing potential to use information system at all fields and also nursing nursing, so that it can improve the quality of nursing services. Nurses are the most persons close to the patients and usually using information technology systems at work. As a result of involvement of informatics, quality of patient care has been increased In the hospitals. So, Nurses must be a part of the initiation of ITS, to enhance quality of care and change their perception about ITS (Wilson, Elias & Moss, 2020).

The results revealed that, more than half of the studied nurses their age were 20-<30 years, As regards to gender and qualification, the majority of the studied nurses were female and less than half had technical institute. Moreover, more than half had of the nurses under study their years of experience were  $\geq 10$  years. Also, one third of the nurses working in pediatric units. Likewise, most of the studied nurses didn't work in private hospitals and didn't work in any Arab country before. Moreover, the majority of the studied nurses working full time and half of them working the morning shift.

Regarding to their computer experience, our study revealed that slightly more than one third of the studied nurses used the computer at work for more than five years. Also, more than half of the studied nurses were expert in computer. Likewise, more than half of the studied nurses didn't attend training courses in the use of information systems for nursing education and work. These results explained as new hires and nursing graduates have yet to receive technology training. These results in cohort with the study Zaman, Goldberg, Kelly, Russell, & Drye (2021) found that the majority of the study nurses attended training courses related using electronic documentation.

According to user involvement, the present results demonstrated that more than half of the study nurses had moderate level toward user involvement. These results attributed to because not all nurses, participate in setting goals, policies and practices of the system, but only supervisors and the most experienced are involved, and more than half of the nurses did not receive any training for the electronic system. These results supported by Ta'an, Al-Hammouri, Aldalaykeh, Suliman & Almutti (2021) stated that only one third of studied nurses considered a highly user contribution. While, inconsistent with the study conducted by Walker et al. (2020) reported that about two thirds of studied nurses dependent on electronic health record and had no individual or organizational problem.

Regarding Management support, the current study detected that slightly more than half of the study nurses had moderate level management support. While, one quarter of them had high level. Nursing supervisors are often accustomed to using computers in their own work, which positively affects their support for nurses to use computers at work and had a moderate mean score related nursing management always supports and encourages the use of information systems for job-related work.

These results irrelevant to the study by Shin, Cummings & Ford (2018) stated that the majority of nurses reported that inefficient hospital systems and poor management

support were the main barrier of nursing informatics. Also, disagreement with the study by Wei-Lan, Li-Qun & Hong-Yu (2013) revealed that hospital information system instability as an obstacle to implementation and more than half had low management support related nursing informatics.

According to the information systems used among studied nurses, the present study reported that more than half of the study nurses had high level related to information systems use. While, less than one fifth of them had low levels. These results explained as with the spread of social media and the availability of smart phones with most people, which helped them to rely on technology greatly. These results disagreement with the study by Olajubu, Irinoye , Ogunfowokan & Olowokere (2015) stated that half of respondents in primary, three quarters in secondary & about two thirds in tertiary facilities do not utilize nursing informatics in providing services. Also, inconsistent with the study by Hwang & Park (2011) found more than two thirds of respondents considered their overall informatics competency below average so avoid using nursing informatics.

According to information systems use benefits about quality of care among studied nurses, the present results demonstrated that more than half of the study nurses had high level benefits and more than one third had moderate level related quality of care. These results explained as nursing informatics focus on the best ways to achieve good patient outcomes, it is about applying the overall process and best practice to maximize patient care wherever possible. These results cohort with the study performed by Dowding, Turley & Garrido (2015) reported that studied nurses reported that electronic health record improve communication, ease of access to information and safety of medication administration processes. Also, consistent with the study performed by Faustorilla (2020) detected positive effect of nursing informatics on quality nursing care at the majority of studied nurses.

According to benefits use information systems about documentation and communication between studied nurses, our results reported that half of nurses had higher level and more than one third had moderate level. These results attributed as It helps in speeding up communication between the medical team at any time and from anywhere, and facilitates obtaining information about the patient, and it is also difficult to lose information recorded in the electronic system. These results supported by Siokal (2021)

found that about two thirds reported high benefits from using computer-based nursing documentation.

While, the study conducted by Walker et al. (2020) found that while the move from paper-based patient records to an integrated electronic health record did not significantly change the amount of nurse time at the bedside, or for the preparation and administration of ordered medications, there was a clear and consistent trend of increased documentation time and activities following implementation of the electronic health record.

Related to saving time and efficiency, the present results mentioned that more than one third of them had higher level and more than half had moderate level. These results explained as the electronic system has provided us the ability to track and trend patient outcomes data in a more efficient manner so saving many times. These results similar to the study by Ta'an et al. (2021) found that computer using at nursing essential to increase nurses' work efficiency.

Also, an agreement with the study performed by Chérrez-Ojeda et al. (2020) stated that more than two thirds of participants agreed that information and communication technologies nurses can be useful to promote professional services, help in the search for new job opportunities and/or professional development, foster health promotion, and improve the workflow with colleagues. Meanwhile, more than three quarters of nurses had privacy or security concerns about personal and/or patient information.

Related to professional practice, the current study demonstrated that less than one quarter had higher level and more than half had moderate level. These results agreement with the study by Holden, Asan, Wozniak, Flynn, & Scanlon (2016) perceived usefulness for care delivery and patient/family social influence was associated with intention to use the system.

According to the level of benefits use information systems, the current study revealed that more than half of the study nurses had moderate level toward benefits use information systems. Also, more than one third of them had high level. These results explained as in general, the community's outlook towards smartphones and computer use at work improved, so the nurses had a positive perception toward benefits of using nursing informatics in their work. These results supported by De Leeuw, Woltjer & Kool (2020) reported that the majority of studied nurses had a positive perception toward

benefits of using a health information system at critical units. Also, an agreement with the study by Mobasheri et al. (2015) reported that much higher smartphone ownership among doctors and nurses, who perceive these devices to be useful when performing their clinical duties.

Regarding to, relation between personal and job characteristics of the studied nurses and their benefits use information systems, the present study demonstrated that there was highly statistically significant relation between total information systems use benefits of studied nurses and their age, years of experience, years of using the computer at work, level of computer experience and attendance of training courses on information systems in their nursing education and work. While, there was no statistically significant relation to their gender, qualification and working unit.

These results in the same line of the study conducted by Kleib & Nagle (2018) reported that, however, overall informatics competency means scores varied significantly in relation to age, educational qualification, years of experience, and work setting. The quality of informatics training and support offered by employers contributed the most the variance in mean scores of total and subdomains of informatics competency. Other factors, such as age, educational qualification, work setting, previous informatics education, access to the internet, use of health technology. Also, Adedeji, Irinoye, Ikono & Komolafe (2018) revealed that, statistically, there was a significant relationship between use of the electronic health records and age, years of working experience, availability of computer system, and training of users .While, These results disagreement with the study by Khezri & Abdekhoda (2019) stated that informatics competency was positively correlated with self-efficacy, evidence-based practice and time spent on hospital information systems.

Related to the correlation between studying variables, our results showed that there was highly significant positive correlation between information systems use benefits of the studied nursing and their user involvement, management support and information systems use. Also, there was a significant positive correlation between the information systems, use of the studied nursing and their user involvement and management support. These results relevant to the study conducted by Kwak, Kim, Lee & Kim (2017) reported that nurses with highly using health informatics had a high perceived informatics benefit.

Also, cohort with the study performed by Lin, Chiou, Chen & Yang (2016) stated that the coalignment of nurses' perception of nursing information system performability and the technological capability of a nursing information system achieving success has a positive impact on nurses' satisfaction with nursing information system usage. Consequently, nurses' satisfaction will increase with the improved performance of nursing care.

According to linear regression with dependent variable: information systems use benefits, the study mentioned that there was a highly significant positive effect from qualification, level of computer experience and information systems, use of total nurses' information systems uses the benefits. Also, there was a significant statistical positive effect of age, years of using the computer at work and management support and on total nurses' information systems use the benefits. These results relevant to the study performed by Bashir & Bastola (2018) found that computer experience and user involvement had a positive effect on using telehealth. While, these results disagreement with the study by Özer, Özkan & Budak (2020) detected that gender, age and educational level had no significant with using electronic health record, while working time had slight significance and computer training had a significant effect.

## **CONCLUSION**

### **Depending on the results of this current study; it was concluded that:**

It was clear that revealed that more than half of studied nurses had moderate level toward user involvement, management support and information systems use benefits. Also, more than half of the study nurses had high level related to information systems use. This result demonstrated that, there was highly significant positive correlation between information systems use benefits of the studied nurses and their user involvement, management support and information systems use. There was highly statistically significant relation between user involvement, management support, information systems use and information systems use benefits of studied nurses and their personal and job characteristics.

## **RECOMMENDATIONS**

- Provide many chances for the continues training and awareness of healthcare professionals for promoting use electronic health records efficiently.

- Encouraging nurses become active participants to learn new emerging techniques and integrate information technology into professional practice.
- Integrating information technology in nursing education curricula to make nurses aware of the application and benefits of information technology.
- Encouraging administrative support to provide resources when nurses adoption of computer use.

#### **Further research is needed for:**

- Study nurses' attitudes and satisfaction with electronic medical records, medication administration records systems, and nearby paperless hospitals.
- Measuring the quality of the Ibn Sina system for managing health documents by applying the Six Sigma methodology.

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### العوامل المساهمة في تطبيق نظام تكنولوجيا المعلومات وفوائدها

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### الخلاصة

تطورت تكنولوجيا المعلومات بسرعة في السنوات الأخيرة وأصبحت جزءًا لا غنى عنه من خدمات الرعاية الصحية كما هو الحال في هذا المجال. الهدف من هذه الدراسة هو دراسة العوامل المساهمة في تطبيق نظام تكنولوجيا المعلومات وفوائدها. التصميم: تم استخدام تصميم بحث وصفي ، العينة: 180 من طاقم التمريض العاملين ، المكان: مركز الأورام بجامعة المنصورة. الأدوات: تم جمع البيانات من خلال أربع أدوات: (1) الخصائص الشخصية والوظيفية ، (2) العوامل التنظيمية التي تشمل (أ) مقياس مشاركة المستخدم ، (ب) مقياس دعم الإدارة ، (3) مقياس استخدام نظم المعلومات ، و (4) ومقياس فائدة الاستخدام. . أظهرت النتائج أن (55٪ ، 51.7٪ و 58.3٪) من المرضى الخاضعين للدراسة كان لديهم مستوى متوسط تجاه مشاركة المستخدمين ، دعم الإدارة وفوائد استخدام نظم المعلومات. كما أن (53.4٪) من المرضى لديهم مستوى مرتفع من استخدام نظم المعلومات على التوالي . الخلاصة ، كانت هناك علاقة إيجابية ذات دلالة إحصائية بين فوائد استخدام نظم المعلومات الإجمالية للمرضيين ومشاركة المستخدمين ، ودعم الإدارة واستخدام نظم المعلومات. لذلك ، أوصت هذه الدراسة الى توفير العديد من الفرص للتدريب المستمر وتوعية المتخصصين في الرعاية الصحية لتعزيز استخدام السجلات الطبية الإلكترونية بكفاءة و دراسته مواقف المرضى ورضاهم عن السجلات الطبية الإلكترونية وأنظمة سجلات إدارة الأدوية والمستشفيات الإلكترونية .

الكلمات المرشدة : الفوائد ، تكنولوجيا المعلومات