

Information And Communication Technology: Nurses' Empowerment At Alahrar Teaching Hospital

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Abstract

Background: Information and communication technology (ICT) have been become vital tool in providing nursing care to patient in the hospital and after patient discharge. ICT empower nurses with information and different needs to improve quality of nursing care. **Aim of the study:** Assess the relation between information and communication technologies (ICT), and empowerment of nurses at Alahrar Teaching Hospital. **Subjects and method: Research Design:** An exploratory, descriptive research design was utilized at this study. **Setting:** This study was carried out at Alahrar Teaching Hospital which affiliated to the general organization for Teaching Hospitals and institutes. **Subjects:** Random sample from nurses(236) was concluded from previous mentioned setting. **Tool of data collection:** Adapted information and communication technologies (ICTs) questionnaire, Psychological empowerment scale& Adapted Conditions for Work Effectiveness Questionnaire (CWEQ). **Results:** More than two thirds 67.8% of the studied nurses had moderate level regarding perception of ICT, majority 94.1% &89.4% of them had moderate level regarding to staff nurses' structured and psychologically empowerment respectively. **Conclusion:** There was a strong role for information and communication technologies (ICT), in improving structured empowerment and psychological empowerment among studied nurses in the working setting. **Recommendation:** Establish training program for staff nurses about using information and communication technology devices, also provide different supplies, equipment and work information for staff nurses that improve their structural empowerment.

Keywords: Information and communication technology, Empowerment& Nurses

INTRODUCTION

Nurses, the largest healthcare workforce who also have a long working hour, are expected to have the adequate knowledge, skill and technical know- how of utilizing ICT to enhance their health care services. ICT covers a wide range of scientific and technological innovations which have transformed virtually all aspects of human life including healthcare system ⁽¹⁾. Information communication technologies (ICT) are all instrument through which information are conveyed and shared between places and among people. Since the development of the internet, information technology (ICT) has had a positive impact on health care delivery system worldwide, particularly in the areas of disease control, diagnosis, and patient management and teaching.⁽²⁾

ICT is useful in healthcare services, artificial intelligence, retrieval of up-to- date information on different aspects of diseases, video-conferencing, to guide practice and manage patients for better outcome. ICT also provides free access to journals, textbooks, and current breakthroughs in medicine thereby improving learning and research. In addition, the use of ICT in health services ensures that doctors, nurses and other healthcare practitioners get the most useful information to guide them in making appropriate decisions about a patient's illness and treatment⁽³⁾.

Many nursing care themes are influenced by the use of ICTs, including time management, time spent on patient care, documentation time, information quality and access, quality of documentation, knowledge updating and utilization, nurse autonomy, intra and inter-professional collaboration, nurses' competencies and skills, nurse patient relationships as well as assessment, care planning, and evaluation. Unfortunately, despite the increasing advances in modern information technology, the utilization of ICT in healthcare services is still very low. ICT also provides important tools that contribute to E-Health⁽⁴⁾.

The E-Health is a concept of utilizing ICT tools and services, such as social media and collaboration technologies, to offer innovative solutions that enhance health care service delivery. They provide more effective means of accessing, communicating

and storing information in the nursing sector. Databases and other applications can help improve health system efficiencies and avoid errors. However, understanding how technology innovations can be effectively introduced in health systems and how these innovations will influence nursing outcomes through empowerment of nurses staffs⁽⁵⁾.

Empowerment in nursing means" to authorize nurses to have the freedom to act, think, respond, initiate and make decisions affecting their area of given responsibility "this empowerment done through education, resourcing, evaluating, and guiding. Empowerment in nursing facilitating hospital commitment, learning and innovation, in order to achieve empowerment, manager must provide the necessary means, such as, delegating more formal authority to nurses to make specified decisions, offering increased training opportunities to develop expertise and self -confidence, providing more resources and access to information to be able to implement effective decisions, in addition to that avoiding the sudden withdrawal of shared power at the first sign of trouble⁽⁶⁾

Staff nurses could be structurally empowered based on four conditions at the workplace which identified by including; having the opportunity for advancement activities beyond one"s job description; access to information about all facets of the organization; support for one"s job responsibilities and decision- making; and access to resources as needed by the nurses to complete their tasks⁽⁷⁾.

Psychological empowerment of staff nurses has four dimensions namely: meaning, competence, self-determination, and impact. Meaning mirrors congruence between staff nurse"s beliefs, values, behaviors, and job requirements. Competence: refers to having the necessary knowledge, skills, and abilities to perform the job. Self-determination illustrates feelings of control that are exerted over one"s work and individuals" sense of having choices of initiating and controlling regulating actions. Impact indicates a sense of being able to influence the strategic, administrative, and operating outcome of the organization. Therefore, a positive effect among nurses toward their organizations positively affects job satisfaction and performance, increases the meaning and fulfillment of work, promotes the ability to self-determination, and builds competence⁽⁸⁾.

Significance of the study:

World without ICT means you do not have any information and you don't know about the events that are occurring. The people are now engaging in ICT like it's a part of life. Uses of ICT are increasing day by day. ICT considered one of the challenges facing health care organizations. So studying the relationship between information and communication technology and empowerment of nurses is an important issue to be studied for its great effect and results: ICT plays an active role in supporting communication among all members of the hospitals especially nurses. For nurses, using ICT can contribute to the development of knowledge in the discipline of nursing, facilitate the communication of that knowledge to new generations of nurses, enhance the use of knowledge in nursing practice, improve nursing care plans, increase the ability of nurses to face challenges, improve nursing practice, quality of patient care and clinical decision making⁽²⁾.

Although, the importance of the use of information and communication technology in the nursing field, there are limited studies internationally and no studies nationally were done to assess the use of ICT among nurses and patients and its relation with empowerment. This study is an interesting starting point from which to highlight the use of ICT between nurses. Perceptions and barriers to the effective use of ICT by nurses was also be highlighted. Thus, the current study was conducted to assess the use of ICT and assess the relationship between ICT and empowerment for nurses.

Aim of the study

The aim of this study was to assess the relation between information and communication technologies (ICT), and empowerment of nurses at Alahrar Teaching Hospital.

The aim of the study was fulfilled through the following objectives:

- Assess the nurses' use of ICT at Alahrar Teaching Hospital.
- Determine the nurses 'empowerment level at Alahrar Teaching Hospital.

Research questions:

- Are the nurses at Alahrar Teaching Hospital using ICT?
- To what extent do the nurses use ICTat Alahrar Teaching Hospital?
- What is the level of nurses' empowerment at Alahrar Teaching Hospital?

Subjects and method

Research Design:

An exploratory, descriptive research design was used to achieve the objective of the present study.

Subjects:

The study sample was random sample from nurses working at Alahrar Teaching Hospital according to the following **inclusion criteria :**

- The available two categories of nurses were included(bachelor & technicians)
- Both sexes
- Had at least one year of experience.

- Agree to participate in the study.
- Had at least one device of ICT (mobile phone, laptop, computer or personal digital assistant (PDA)).

Sample size:

Assuming that frequency of using technology by individuals in Egypt between 2018 and 2019 is 53% Statista,⁽⁹⁾ and the total numbers of nurses is 612, So sample size is calculated by openepi program to be 236 nurses with confidence level of 95%

Setting:

This study was carried out at Alahrar Teaching Hospital which affiliated to the general organization for Teaching Hospitals and institutes. The hospital capacity is 418 beds. It includes two buildings, one is called office building and the other is the hospital building, which consists of six floors

Tools of data collection:

Three tools were utilized to collect data for the present study:

Tool I- Adapted information and communication technologies (ICTs) questionnaire guided (developed) by (Lupianez-Villanueva)⁽¹⁰⁾. It aims to assess use, access and barriers of ICT

It organized into three sections:

I: Socio-demographic and practice details, this section aims to identify personal and professional characteristics as: gender, date of birth, years of experience and department.

II : Access and use of ICTs, this section aims to identify practice and experience of ICTs among nurses at Alahrar Teaching Hospital and consisted of 11 items with **Scoring system:** scoring system was 1= Yes and 2= No (Tukayo et al.)⁽²⁾

- High perception $\geq 75\%$
- Average perception 60- < 75%
- Low perception < 60

III: Perceptions and barriers of ICTs utilization, this section aims to boost perceptions, opportunities, and challenges of ICTs among nurses at Alahrar Teaching Hospital, Example: How do you consider the Internet in your work? & Do you believe individuals' quality of life would improve if they go online searching for health information?⁽²⁾.

Scoring system

It used 5 points Likert scale in which 5 refers to 'very much' and 1 refers to 'I don't know' (Lupianez-Villanueva)⁽¹⁰⁾

- High perception $\geq 75\%$
- Average perception 60- < 75%
- Low perception < 60

Tool II- Psychological empowerment scale developed by Spreitzers⁽¹¹⁾. This scale designed to measure psychological empowerment levels and consists of 16 statements with four dimensions: meaning, competence, self-determination, and impact.

Scoring system

The measurement was directed utilizing a 5-point Likert scale in which 5 refers to "strongly agree" and 1 refers to "strongly disagree"⁽⁴⁾

- High psychological empowerment $\geq 75\%$
- Average psychological empowerment 60- < 75%
- Low psychological empowerment < 60

Tool III- Adapted Conditions for Work Effectiveness questionnaire (CWEQ) developed by Laschinger et al (2000), which designed to measure the four empowerment dimensions: perceived access to opportunity, support, information and resources in an individual's work setting - based on Kanter's theory of structural empowerment (Kanter⁽¹²⁾; Laschinger⁽¹³⁾) (12&13). The four dimensions comprised 31 items.

Scoring system

5-point Likert scale response in which 5 refers to "always" and 1 refers to "almost never". (Kanter et al)⁽¹²⁾

- High structural empowerment $\geq 75\%$
- Average structural empowerment 60- < 75%
- Low structural empowerment < 60

Field work:

Preparatory phase included reviewing of the literature regarding the study variables using electronic and printed sources. Then started modifying and developing the tools of data collection to fit the study purpose. Fieldwork of this study was executed in four months, from December 2019 to May 2020. The questionnaire sheets distributed among the study subjects during the three shifts , Researcher explained the purpose of the study and how to fill the questionnaires ,and assured the respondents of the anonymity of their answers ,that the information would be used for scientific research only, and would be kept entirely confidential. The respondents filled out the questionnaire. sheets individually and took 20–30 minutes to complete it, then the questionnaire sheets collected.

Validity and reliability:

After modification of the tools to fit the study purpose, the questionnaire sheets tested for clarity, relevance, applicability, comprehensiveness, understanding, and ease for implementation by 5 experts from Nursing Administration and Community Nursing Departments at the Faculty of Nursing, Zagazig university. They were requested to express their opinions and comments on the tool and provide any suggestion for any addition on or omission on the tools. Recommended modifications were done. It included content and face validity. For the research purpose, the reliability tested by cronbach's alpha test. Tool(I) Information and communication technology of nurses (**0.963**), **Tool(II)** Adapted conditions for work effectiveness questionnaire (**0.96**) and **tool(III)** Psychological empowerment for Nurses (**.799**)

A pilot study:

The pilot study was carried out to test the questionnaire feasibility, clarity and to estimate the time consumed for filling in the forms. It was carried on 10% of nurses’ sample(24), which excluded from the main sample.

Administrative design and Ethical consideration:

Official approvals for data collection were obtained through an official letter containing the aim of the study was issued from Faculty of Nursing to hospital manager of Alahrar Teaching Hospital. Before data collection, the content of this study was approved by the ethics committee, dean of Faculty of Nursing, Zagazig University and Alahrar Teaching Hospital administration. Informed oral consent obtained from nurses after verbal clarification of the nature and aim of the study. The subjects were told about their rights to refuse participation or withdrawal at any time without giving any reasons. The study procedure couldn't pursue any negative consequences for the subjects. They were reassured that any information collected will be used exclusively for research purpose and will be confidentially treated. The questionnaires forms were anonymous.

Statistical design:

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median and. Significance of the obtained results was judged at the 5% level. The used tests were: Chi-square test For categorical variables, to compare between different categories, Fisher’s Exact or Monte Carlo correction for chi-square when more than 20% of the cells have expected count less than 5, Pearson coefficient To correlate between two normally distributed quantitative variables, Cronbach's Alpha Reliability Statistics was assessed using Cronbach's Alpha test.

Results

Table (1): displayed that the highest percent 73.3% of studied nurses aged between 20-30 years old. In addition, most of them 76.7% were females. As well, about half (50.8%) of them had Bachelor of nursing degree, regarding position more than two thirds 69.5% of them were nurses and mean while slightly half 47.5% of them had 6-10 years of experience.

Fig (1) demonstrated that more than two thirds 63.6% of studied nurses had moderate level regarding access and use of ICT, more than one fifth 21.1% of them had low level, while 15.3% of them had high level of access and use of ICT.

Figure (2) indicated that majority of 89% & 83.5% of studied nurses consider that lack of computers connected to the internet & consider lack of time the most common barriers for the use of internet at work respectively.

Figure (3) illustrated that more than two thirds 67.8% of studied nurses had moderate regarding perception of ICT, more than one fifth 21.2% of them had high level and 11% of them had low level of perception of access and use of ICT.

Figure (4) indicated that majority 94.1% of studied nurses had moderate level regarding to staff nurses' structured empowerment.

Figure (5) revealed that majority 89.4% of studied nurses at Al Ahrar Teaching Hospital had moderate level of psychologically empowered.

Table (2): revealed that there was statistically significant correlation between information and communication technologies (ICT), structured empowerment and psychological empowerment among studied nurses with ($p \leq 0.05$).

Table (1): Frequency distribution of demographic characteristics of the studied nurses (N = 236)

Nurses' Demographic Data	No.	%
Age (years)		
<20	16	6.8
20 – 30	173	73.3
>30	47	19.9

Gender		
Male	55	23.3
Female	181	76.7
Education		
Bachelor of nursing	120	50.8
Nursing Technical institute	116	49.2
Position		
Nursing Supervisor	72	30.5
Nurse	164	69.5
Experience (years)		
1 – 5	100	42.4
6 – 10	112	47.5
>10	24	10.2

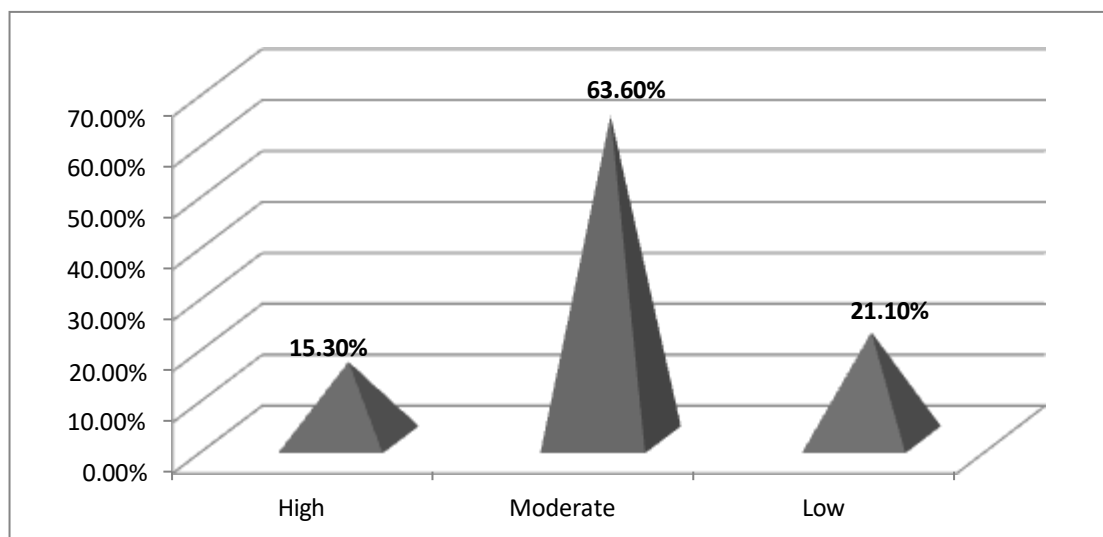


Fig (1): Percentage distribution of access and use level of information and communication technologies (ICT) among studied nurses (N = 236)

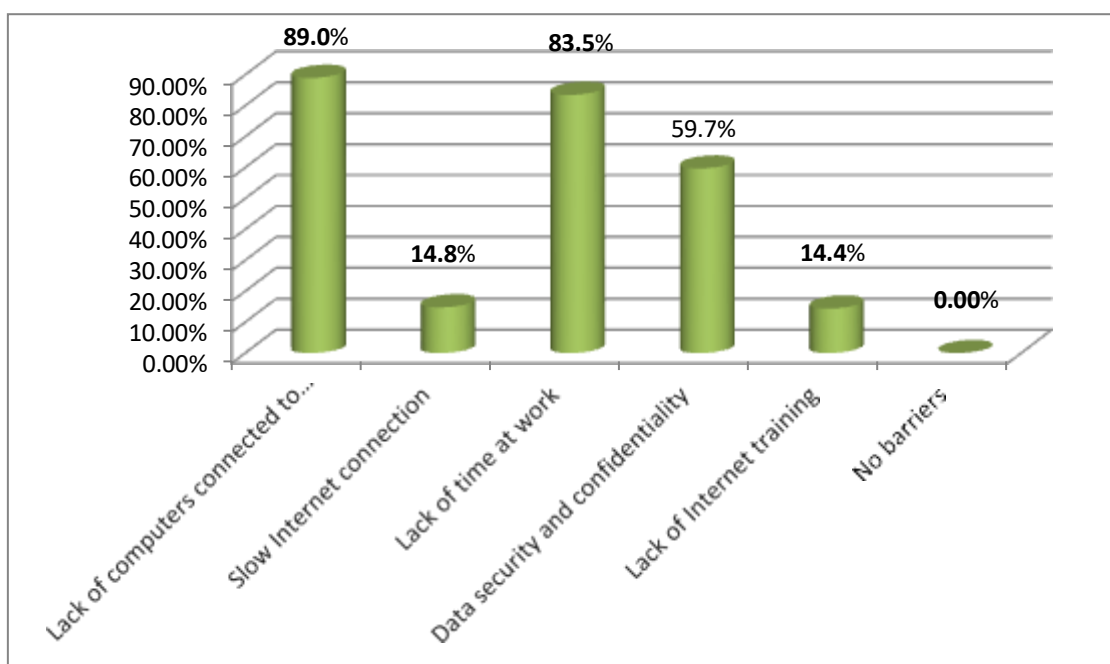


Figure (2): Percentage distribution of barriers for information and communication technology (ICT) among studied nurses (n= 236)

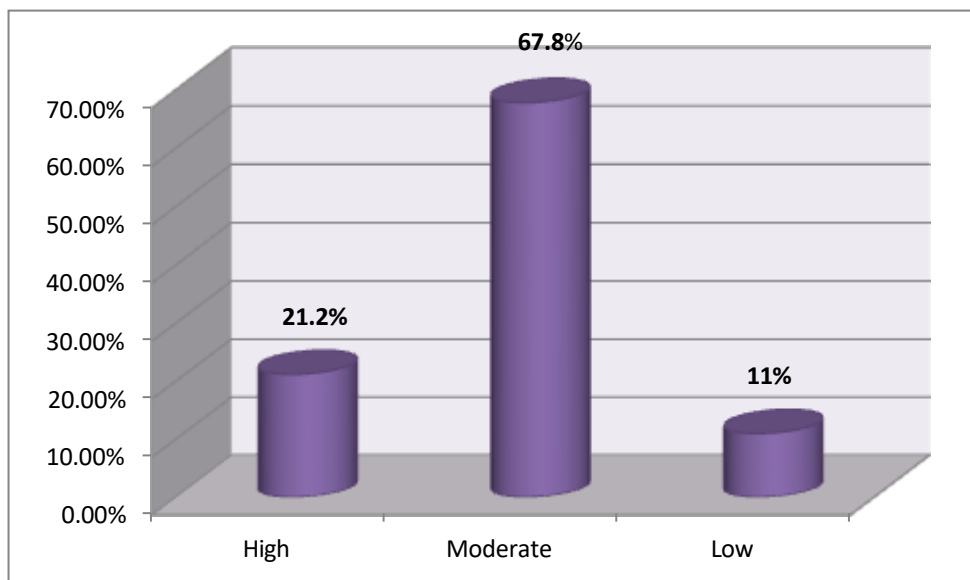


Figure (3): Percentage distribution level of perception of information and communication technology (ICT) among studied nurses (N = 236)

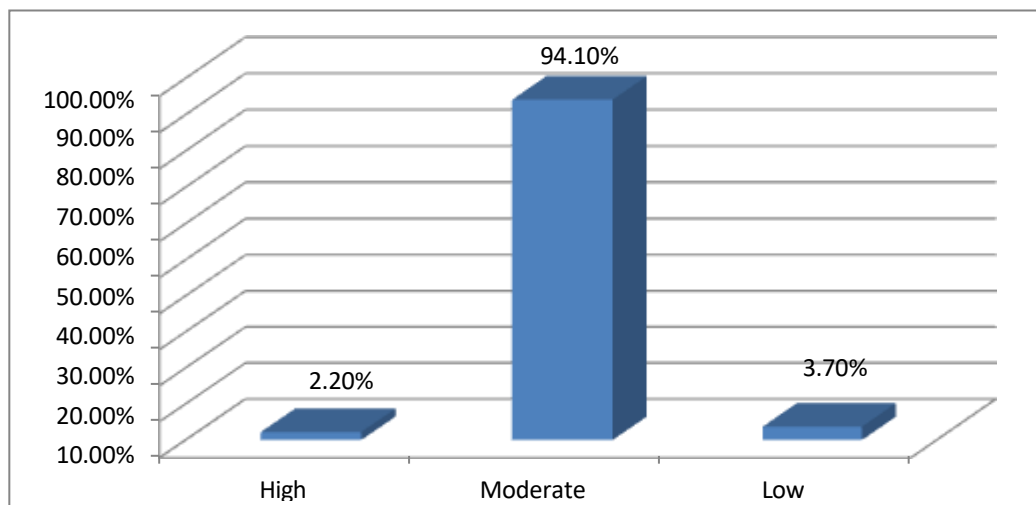


Figure (4): Percentage distribution of structured empowerment level among studied nurses at Al Ahrar Teaching Hospital (N = 236)

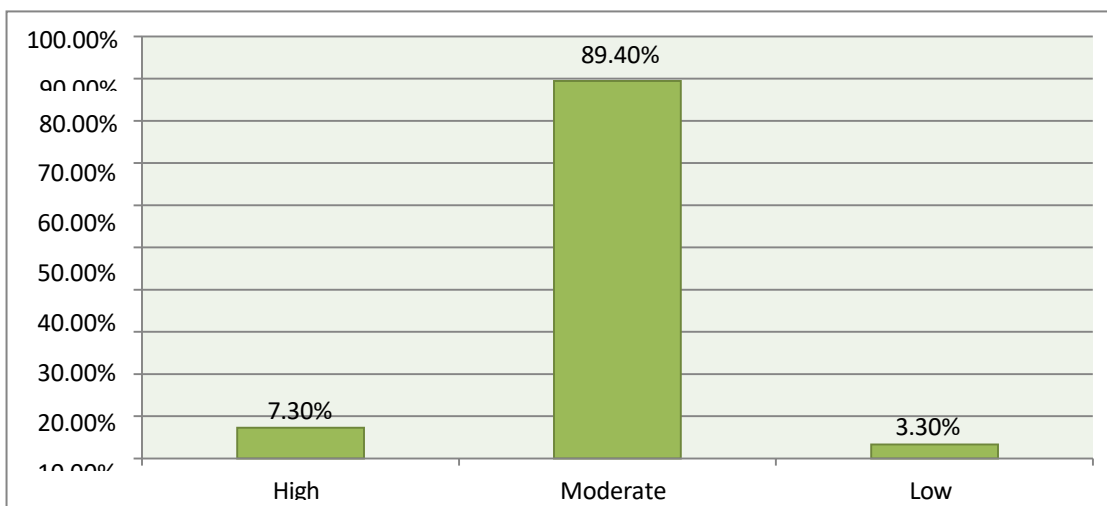


Figure (5): Percentage distribution of studied nurses' Psychological empowerment level (N = 236)

Table (2): Correlation between information and communication technologies (ICT), structured empowerment and psychological empowerment of studied nurses (N = 236)

Variables	ICT				structured empowerment		Psychological empowerment	
	Access and use		Perceptions& barriers		R	p	r	P
	R	P	R	P				
ICT	Access and use of ICT							
	Perceptions& barriers of ICT		0.494*	<0.001*				
structured empowerment		0.362*	<0.001*	0.313*	<0.001*			
Psychological empowerment		0.306*	<0.001*	0.218*	0.001*	0.284*	<0.001*	

r: Pearson coefficient *: Statistically significant at $p \leq 0.05$

Discussion

The interaction between nurses and new information technology as well as digitally controlled clinical technology has been theorized from several perspectives. Technological developments have been seen as an opportunity for nurses to get closer to patients. Information and communication technology (ICT) is a globally utilized technology for acquiring information especially in the practice and management of patient care⁽⁹⁾. This study aimed to assess the relation between information and communication technologies (ICT), and empowerment of patients at Alahrar teaching hospital.

Regarding distribution of demographic characteristics of the studied nurses, the study finding showed that most of studied nurses aged between twenty-three years old. In addition, most of them were females. As well, more than half of them had Bachelor of nursing degree, regarding position more than two thirds of them were nurses and mean while slightly half of them had six-ten years of experience. This might be due to the fact that male enrollment in nursing program is considerably recent in Egypt so the majority of staff nurses were females.

The study finding accordance with **Ozan& Duman**⁽¹¹⁾ who carried out a study about “nurses’ perceptions regarding the use of technological devices in nursing care practices” and showed that about half of the nurses in the study were aged twenty-five–thirty-five, more than two thirds were female, about three quarters of them had university degrees or higher.

In addition, the study finding congruent with **Takalimane**⁽¹²⁾ who conducted a study about “perceptions of nurses regarding information and communication technology at a rural hospital in Lesotho” and indicated that the majority of the participants were females, and one third of them had worked for six to twelve years.

Also **Adesuyi et al**⁽⁵⁾ who carried out a study about “assessment and utilization of information and communication technology for client care among nurses In Primary Health Care Centers” and showed that most of the respondents were females, while more than one third already had twelve -twenty years of professional experience.

As regard access and use level of information and communication technologies (ICT), the current findings demonstrated that more than two thirds of studied nurses had moderate level regarding access and use of ICT. From researcher opinion this might be due to availability mobile as a communication and information technology devices with most of the studied sample that help them to be more access and using for ICT at the break time but there are no available computer and central internet at the hospital for staff nurses.

The study finding was consistent with **Ibebuikwe et al**⁽¹³⁾ who carried out a study about “midwives perception and utilization of information and communication technology (ICT) for health care delivery in Imo State Teaching Hospital” and reported that the majority of the respondents were of the view that they had positive level about the use of ICT while the rest minority of them had negative level about the use of ICT. On other hand the finding incongruent with **Mohammed et al**⁽¹⁴⁾ who carried out a study about “nursing perception regarding utilization of information technology at primary health care centers in Port Said” and showed that the level of access to internet was very low despite the fact that the majority reported internet availability in the hospitals they were practicing.

Regarding distribution of barriers for information and communication technologies (ICT) among studied nurses, the current findings indicated that majority of studied nurses consider that lack of computers connected to the Internet & consider lack of time

the most common barriers for the use of Internet at work. This could be due to the governmental hospital have insufficient resources and shortage in staff nurses that increase nursing work load and no enough time to use ICT so the staff use their mobile only in the break.

The study finding agreed with **Adesuyi et al**⁽⁵⁾ who conducted a study on “assessment and utilization of information and communication technology for client care among nurses In Primary Health Care Centers, Ile-Ife, Osun State” and found that most of the respondents were influenced by the insufficient of computer connected with internet that may use for ICT.

In addition, the current finding accordance with **Mohammed et al**⁽¹⁴⁾ who carried out a study about “nursing perception regarding utilization of information technology at primary health care centers in port said” and revealed that more than half of studied sample reported that from the administrative barriers for using ICT are computer not enough and work not give them enough time to use computer.

Moreover, the study finding incongruent **Eley et al**⁽¹⁵⁾ who conducted a study about “barriers to use of information and computer technology by Australia’s nurses: a national survey” and displayed that only more than one quarters of the nurses consider ‘not enough computers’, ‘lack of IT support’ and ‘lack of IT knowledge’ were to be barriers ‘very often’ or ‘always’, less than one quarter agree on lack of time is barriers for use ICT.

As regard level of perception of information and communication technologies (ICT) among studied nurses, the current finding illustrated that more than two thirds of studied nurses had moderate level regarding perception of ICT. This could be due to the perception level was affected by available nurses’ time and resources to collect data about ICT. The study finding was supported by **Mohammed et al**⁽¹⁴⁾ who assess nursing perception regarding utilization of information technology at primary health care centers in Port Said and showed that most of studied sample had moderate level regarding perception of ICT and internet using.

Regarding level of structured empowerment among studied nurses, the study findings indicated that majority of studied nurses had moderate level of structured empowerment. From the researcher opinion these might be due to lack of reward and training program is support and availability of structured empowerment in which there is a deficit in equipment and supplies needed for giving care for patient and in computer used for reaching to evidence base.

The present study findings supported by **El-Salam et al**⁽¹⁶⁾ who carried a study about “relationship between organizational climate and empowerment of nurses in Menoufiya hospitals” and showed that the majority of nurses reported a moderate empowerment level in hospitals, while less than one third of them reported good empowerment. In the same line **Rawah & Banakhar**⁽¹⁷⁾ who carried out a study about “the relationship between empowerment and organizational commitment from nurse’s perspective in the Ministry of Health Hospitals” and illustrated that the overall degree of nurse’s empowerment in Makkah was moderate.

The study finding disagreement with **Ageiz et al**⁽¹⁸⁾ who conducted a study about “relation between first-line managers’ servant leadership behavior and staff nurses’ empowerment at Benha University Hospital” and indicated that nearly half of staff nurses reported a high level of empowerment, while nearly one-third of them reported a moderate level of empowerment.

Regarding distribution of studied nurses' psychological empowerment Level, the current findings revealed that majority of studied nurses had moderate level of psychologically empowered. From the research opinion these might be due to the studied sample perceived that they achieved some items of competences as they had ability to do work, autonomy and impact as well as they had meaning of their work in addition, they had freedom to take decision and their opinion take inconsideration, finally they had impact as chance to use their personal imitation in work. So nurses should develop themselves and abilities and manger had to support nurses and set plan for empowerment them psychologically

The present findings congruent with **Ibrahim et al**⁽¹⁹⁾ who carried out a study about “nurse's psychological empowerment and perceived autonomy in university and teaching hospitals at Menofia Governorate/ Egypt” demonstrated seventy six percent of the studied sample had moderate level of psychological empowerment, while less than one quarter of them had high level of psychological empowerment

On other hand the study finding was inconsistent with **Abou Hashish et al.**⁽²⁰⁾, who conducted a study about “Nurses’ perception of psychological empowerment and its relationship to work engagement and job insecurity” and revealed that most of nurses experienced high psychological empowerment

Concerning correlation between information and communication technologies (ICT), structured empowerment and psychological empowerment of studied nurses, the current findings revealed that there was statistically significant correlation between information and communication technologies (ICT), structured empowerment and psychological empowerment among studied nurses. These could be due to ICT services considering as the most important sources for provide nurses information, education, save time, send and receive different patient data through that finally empowered nurse.

The study finding was consistent with **Ojeda et al**⁽²¹⁾ who evaluated the using and perceptions of information and communication technologies among Ecuadorian and nurses indicated that there was statistically significant relation between studied sample information and communication technologies (ICT), structural empowerment and psychological empowerment. Also the study findings supported by **Affinito, et al**⁽²²⁾ who carried out their study about “Empowering the Connected Physician in the E-Patient Era: How Physician’s Empowerment On Digital Health Tools Can Improve Patient Empowerment and Boost Health” and revealed that structural empowerment supported by availability of information and communication technologies services.

Conclusion:

On the light of the study findings revealed that there was a statistically significant correlation between information and

communication technologies (ICT), structured empowerment and psychological empowerment among studied nurses, In addition, majority of studied nurses at Al Ahrar Teaching Hospital had moderate level of psychologically empowered and majority of studied nurses had moderate level regarding to staff nurses' structured empowerment. Study findings demonstrated that more than two thirds of studied nurses have moderate level regarding access and use of ICT, more than one fifth of them have low level. It illustrated that more than two thirds of studied nurses had moderate regarding perception of ICT, more than one fifth of them have high level of and had low level of perception of access and use of ICT.

Recommendations were suggested:

- Provide sufficient number of computers for all nursing department to be available for communication and receive different health information.
- Give education programs for all staff nurses about importance and types of information and communication technology services and resources.
- Provide Internet or Wi-Fi services for all staff nurses and patients.
- Provide different supplies, equipment, work opportunities, work information, support and potential for staff nurses that improve their structural empowerment.
- Give continues psychological empowerment for staff nurses to achieve working objectives.
- Develop a telenursing mobile app that monitors many of the metrics the medical devices offer.
- Give continuous structural and psychological support for the staff nurses.
- Increase engagement in work opportunities, available information, support, and available of potential.
- Use information and communication technology devices to guide and instruct the patients at home after discharge.
- Establish Whats app groups.

❖ Further research

- Impact of educational program for staff nurses about information and communication technology on nursing empowerment.
- Assess factors affecting use and perception of information and communication technology devices, qualitative studies and a systematic review studies.
- Developing a tool to measure digital competences of staff nurses.

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