Information and Communication Technology: Patients' Empowerment at Alahrar Teaching Hospital

Shimaa Ezzat Ibrahim Rezk[1]**, Magda Atiya Gaber** [2]**& Hanan Meslhy Mohamed** [3]

[1] B.S.C.Nursing. zagazig university , [2] Professor of Nursing administration, Faculty of Nursing, Zagazig University & [1] Assistant Professor of Nursing administration, Faculty of Nursing, Zagazig University[3]

Abstract

Background: Information and communication technology have been become important service for collecting information that help patients in be aware about their disease and how to communicate with their health care provider easily. **Aim of the study:** Assess the relation between information and communication technologies, and empowerment of patient 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 (263) patient was concluded from previous mentioned setting. **Tool of data collection:** Adapted information and communication technologies questionnaire, patient empowerment scale questionnaire. **Results:** more than half 52% of studied patients had moderate level regarding access and use of ICT and majority 95.1 % of studied patients had low level of empowerment. **Conclusion**: There was a significant correlation between access and use of information and communication technologies (ICT) and empowerment of patients. **Recommendation**: Establish training program for patient about using information and communication technology devices, also use information and communication technology devices to guide and instruct the patients at home after discharge.

Key words: Empowerment, Information and communication technology & Patient

Introduction

From the beginning of the 1990s, the Information and Communication Technologies (ICTs)—driven by the rise and the success of the Internet—played a major role in improving the access, the efficiency, the quality, and therefore the effectiveness of any process related to healthcare. The concept of *e-health*, that can be broadly defined as the application of ICTs to healthcare, has therefore come in common use recent years have witnessed great public interest in the e-health sector [1]

Information and communication technologies (ICT) play an important part in almost every area. ICTs have the potential to promote patient-centered healthcare at a reduced cost, increase quality care and information sharing, educate healthcare professionals and patients, stimulate a different sort of interaction with patients and health providers, and minimize travel time. The healthcare system is growing increasingly dependent upon technology, so, health science is expected to improve health care providers ICT skills [2]

Information technology (IT) refers to the use of any computers, storage, networking and other physical devices, infrastructure and processes to create, process, store, secure and exchange all forms of electronic data. Typically, IT is used in the context of business operations, as opposed to technology used for personal or entertainment purposes. The commercial use of IT encompasses both computer technology and telecommunications [3]

Information communication technology is the combination and

integration of computer work stations, telecommunications, electronics, networks and information media that affect individuals, firm and economy as a whole. The larger utilization of ICT has reduced the communication costs which ultimately facilitated the flow of knowledge and information. ICT is the contemporary symbol of technological revolution and key factor of economic growth especially in industrial economies. From the last few decades, the penetration of internet and mobile phones has accelerated the diffusion of ICT technology [4]

The term ICT refers to the most part acknowledged to cruel all devices, organizing components, applications and frameworks that combined permit individuals and organizations associated within the computerized world. Its institutional superstructure and technological infrastructure are increasingly integrated into dense, multimodal network from the individuals' micro level organization to global level through global supply chain and global cities. It is widely assumed that ICT can empower nurses and patients, encourage change, and nurture the nurses' skills development [2]

Information and Communication Technologies (ICTs) have the potential to empower Nurses and patients. ICTs are regarded as a powerful agent for variety forms of empowerment. ICTs are, thus, potent development enablers for the advancement of personnel development process and for providing individuals with tools for self-empowerment [5]

Patient empowerment (PE) is viewed as a key factor for improving health outcomes, enhancing communication between patients and health professionals, bringing about better adherence to treatment regimes, and ensuring the efficient use of primary healthcare resources. PE is a process where patients understand their role, are given the knowledge and skills by the health care provider to perform a task in an environment where there is an awareness of community and cultural differences, and where patients are encouraged to participate [6]

Patient empowerment involves educating individuals about their own health and condition so they are able to confidently make their own decisions and give informed consent regarding their care. This is an important element of person-centered care which is vital in health and social care. "Individual patient empowerment is a process that enables patients to exert more influence over their individual health by increasing their capacities to gain more control over issues they themselves define as important" [7]

Empowerment in patients has shown several positive effects, such as increased patient satisfaction with care, improved patient adherence to self-management of the treatment and better clinical outcomes. In addition empowered patients have more control over their condition and, on the other hand, being able to exert control over their condition enables them to be more empowered [8]

The ICT have been widely applied in the field of professional medical care to serve the humanistic demands of patients, improve medical service qualities and patients' safety, raise nursing staffs' working efficiency, and facilitate the interaction between nursing staffs and patients. The ICTs are satisfactorily employed to inspire nursing staffs' learning motivation with good efficacy [9]

The ICT created impressive impacts on the both medical services

and nursing ones. This emerging trend of intensively applying high technologies will keep enhancing nursing service qualities and even inspire nursing revolution the smart technologies in the nursing field will raise administration efficiency as well as human resource management in hospitals and this trend of nursing technology development will revitalize nursing staffs' working efficiency and well beings which tightly encourage nursing staffs with positive coral values [10]

The application of ICTS not only saves nursing staffs' time, but also increases the interaction between nursing staffs and patients or their families. Through the interaction process, the knowledge and concepts of humanized nursing services, health promotion and disease prevention can be implemented in daily life. Among them, establish a relationship of close trust, so that patients or their families can actually feel the core value and professionalism of nursing services, thereby promoting the brand and services of the hospital organization [9]

The internet is not only used to search for information; it is also frequently used to contact people who share the same interests or health problems, especially in relation to chronic diseases or cancer, and to form mutual help groups. The exchanges among patients in online communities favors learning about the management of the disease, improves empowerment, helps to establish social support links and can even enhance adherence to treatments [11]

The use of the internet or digital tools not only helps chronic patients to improve their health when they share their concerns and doubts in online communities, but also seems to be associated with beneficial effects in individual interventions, improving adherence and self-management. Nurses, as an active part of health communication with the patient, can suggest and recommend these spaces for exchange among patients to guide them, thus helping to increase their empowerment and health literacy .[12]

Aim of the study

The aimed of this study was to assess the relation between information and communication technologies (ICT), and empowerment of patients at Alahrar teaching hospital.

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

- Identify the patients' use of ICT at Alahrar Teaching Hospital**.**
- Determine the patients' empowerment level at Alahrar Teaching Hospital.

Research questions:

- To what extent do the patients use ICT at Alahrar Teaching Hospital?
- What is the level of patients' empowerment at Alahrar Teaching Hospital**?**

Research Design:
An exploratory descriptive research design was used to achieve the objective of the present study.

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

Study subjects:

The study sample was a random sample of inpatients according to the following **inclusion criteria**:

- Age above **18** years old.
- Both genders.
- Have at least one device of ICT (mobile phone, laptop, computer or personal digital assistant (PDA).
- Ability to communicate.
- Agree to participate in the study.

Exclusion criteria:

- Patients at pediatric ward and critically ill patients.
- Age below 18 years old.
- Refuse to participate in the study.

Sample size:

Assuming that frequency of using technology by individuals in Egypt between 2018 and **2019** is 53% **(Statista,** 2019)[13] and rate of admission of patients at Alahrar teaching hospital is 6954 in the last 6 months, **So** sample size is calculated by openepi program to be 363 patients with confidence level of 95%.

Tools of data collection:

Two tools were used to collect data for the study Adapted information and communication technologies for patients (ICTs) questionnaire and Patient empowerment questionnaire

Tool 1. Adapted information and communication technologies for patients (ICTs) questionnaire: developed by **Lupianez-Villanueva** ,[14] to assess use, access and barriers of ICT. It organized into three sections as personal characteristics, Access and use of ICT & Perceptions and barriers of ICTs utilization:

I: **Socio-demographic and practice details**, this section aimed to identify personal and disease experience among patients at Alahrar teaching hospital as: gender, age, diagnosis and department.

II: **Access and use of ICT**, this dimension aimed to identify practice and experience of ICT as: Are you an internet user? & Do you use the internet for your disease purpose?

Scoring system
It used 4 points Likert scale in which 4 refers to 'very frequently' and 1 refers to 'never' (Tukayo et al,2022) [22]

- High Access and use of ICT ≥ 75%
- Average Access and use of ICT 60- < 75%
- Low Access and use of ICT < 60

III: **Perceptions and barriers of ICTs utilization**, this section aims to boost perceptions, opportunities, and challenges of ICTs among patients at Alahrar teaching hospital, as: How do you consider the Internet in your health? & Do you believe individuals' quality of life would improve if they go online searching for health information?

Scoring system
It used 5 points Likert scale in which 5 refers to 'very much' and 1 refers to 'I don't know'(Tukayo et al., [22]

- High Perceptions of ICT ≥ 75%
- Average Perceptions of ICT 60- < 75%
- Low Perceptions of ICT < 60

Tool 2. Patient empowerment questionnaire: developed by the researcher based on **(Viwattanakulvanid,** **(15)** The questionnaire aimed to measure patient empowerment level. It consists of 14 statements.

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". (Affinito, et al, [23]

- High empowerment ≥ 75%
- Average empowerment 60- < 75%
- Low empowerment < 60

Field work:

The researcher reviewed of the literature regarding the study variables (ICT, patient empowerment) 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 20–30minutes to complete it, and then the questionnaire sheets collected.

Validity & 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. Tool (I) was

tested for their reliability using Cronbach's alpha. The values were revealed as follow Information and communication technology of patients (**0.794**) and Tool (I): Patient empowerment scales (٠.٨٦).

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%) **36** patients' sample, which excluded from the main sample.

Administrative design and Ethical consideration:

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 and patients 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. An official approval for data collection was obtained through an official letter containing the aim of the study was issued from Faculty of Nursing to hospital manager of Alahrar Teaching Hospital.

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): revealed that more than half 54.3% of studied patients aged above 30 years, most 71.9% of them were females, about two fifth 41.6% of them were qualified above average and more than two thirds 62.8% were unemployed.

Figure (1) displays that more than half 52% of studied patients had moderate level regarding access and use of ICT and more than two fifth 43.5% of them had low level, while 4.5% of them had high level of access and use of ICT.

Figure (2) indicates that less than one fifth of 17.1% & 16 % of studied patient consider lack of internet training & consider that data security and confidentiality the most common barriers for the use of Internet at work respectively.

Figure (3): indicates that more than half 51.5 % of studied patients had moderate level regarding Perception of ICT and less than half 45.2% of them had low level of Perception, while 3.3% of them had high level of perception.

Figure (4) displays that majority 95.1 % of studied patients had low level of empowerment, while minority 3.3%, 1.6 % of them had moderate and high level respectively.

Table (2) shows that there were significant correlation between Access and use of information and communication technologies (ICT) and empowerment of patients , in addition , there were no significant Correlation between Perceptions and barriers of information and communication technologies (ICT) and empowerment of patients.

Discussion

Information and communication technology is the use of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise. The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. Patients use (ICT) to reach for any knowledge needs for improve their health and life[4] . This study aimed to assess the relation between information and communication technologies (ICT), and empowerment of patients at Alahrar teaching hospital.

Concerning distribution of personal of the studied patients, the study results revealed that more than half of studied patients aged above thirty years, most of them were females, about two fifth of them were qualified above average and more than two thirds were unemployed. The study finding was consistent with **Ajuwon**[16] who conducted a study about "internet accessibility and use of online health information resources by doctors in Training Healthcare Institutions in

Nigeria" and showed that majority of the respondents are within the thirty -forty age and more than two thirds of them were males.

The finding disagreed with **Ismond et al**[17] who assessed the patient proficiency with internet-connected technology and their preferences for E-Health in Cirrhosi and revealed that majority of sample aged more than twenty five years, more than two thirds of them were men. More than half of the respondents had attended post-secondary education (e.g., college, professional courses).

Regarding level of access and use of ICT among studied patients the current study findings displayed that more than half of studied patients had moderate level regarding access and use of ICT and more than two fifth of them had low level, while minority of them had high level of access and use of ICT. From researcher opinion this might be due to importance of ICT services for patient in reaching for the needed information. The study finding supported by **Ajuwon**[15] who conducted a study on "internet accessibility and use of online health information resources by patients in training Healthcare Institutions in Nigeria" and showed that two third of studied sample had moderated level regarding access and use of ICT.

For distribution of barriers for ICT among studied patient the present findings indicated that less than one fifth of studied patient considered lack of internet training and considered that data security and confidentiality were the most common barriers for the use of internet at work. From researcher opinion this might due to internet services with computer available all for administrators and head of medical

department only. The study finding incongruent with **Ibebuike et al**[18] who reported that two thirds of respondents considered lack of internet training & consider that data security and confidentiality were the most common barriers for the use of internet at work.

Regarding distribution of studied patient perception level of ICT the study results indicated that more than half of studied patients had moderate level regarding Perception of ICT. From research opinions these might be due to the information and communication technologies become vital for all people that make them had moderated awareness about it. The study finding was supported by **Zhao et al**[19] who carried out a study about "barriers to accessing internet-based home care for older patients: a qualitative study" and revealed that two third of studied patient had moderated level regarding perception of ICT.

Concerning level of patients' empowerment, the study results displayed that majority of studied patients had low level regarding empowerment. From researcher opinion this might be due to nursing workload and no time with nurses to provide emotional support and concentrate on patient empowerment.

The study finding agreed with **Darjono et al**[20] who conducted a study about "patient empowerment index of diabetes mellitus patients" and showed that more than three quarter of studied patients had low level regarding empowerment. On other hand the study finding disagreed with **Ali et al**[20] who demonstrated that more than two third of studied patient had high empowerment level and one third of them had moderate level of empowerment.

Regarding correlation matrix between information and communication technologies (ICT), and empowerment of patients, the study findings showed that there was a significant correlation between access and use of information and communication technologies (ICT) and empowerment of patients in addition, there were no significant Correlation between Perceptions and barriers of information and communication technologies (ICT) and empowerment of patients. From researcher opinion this could be due to importance of access and use of information and communication technology in providing patient with knowledge and information health needs that increase their empowerment level.

The study finding was accordance with **Ajuwon**[15] who assess internet accessibility and use of online health information resources by doctors in training Healthcare Institutions in Nigeria and illustrated that there was significant relation between access and use of information and communication technologies (ICT) and empowerment of patients at the hospital. The study finding dissimilar with **Darjono et al**[19] who evaluate the patient empowerment index of diabetes mellitus patients and demonstrated that there was significant relation between respondents' perceptions information and communication technologies (ICT) and empowerment of patients when receiving treatment at health organization.

Conclusion:
         Overall, the study concluded that: On the light of the study findings

revealed that there was a significant correlation between access and use of information and communication technologies (ICT) and empowerment of patients. In addition, majority of studied patients had low level of empowerment. As well, the study findings demonstrated that more than half of studied patients had moderate level regarding access and use of ICT and more than two fifth of them had low level. Moreover, It illustrated that more than half of studied patients had moderate level regarding perception of ICT and less than half of them had low level of perception.

Recommendations:
Based on important findings of the study, the following recommendations were suggested for:
❖ Provide internet or Wi-Fi service for patients rooms at the units.
❖ Provide health education for patients that involve importance and types information and communication technology devices Give continuous structural and psychological support for the patients
❖ Use information and communication technology devices to guide and instruct the patients at home after discharge.

❖ **Further research**
- Impact of educational program for patient about information and communication technology on patient empowerment.
- Assess factor affecting the patient use and perception of information and communication technology devices.

Table (1): Frequency distribution of personal characteristics of the studied patients (N= 363)

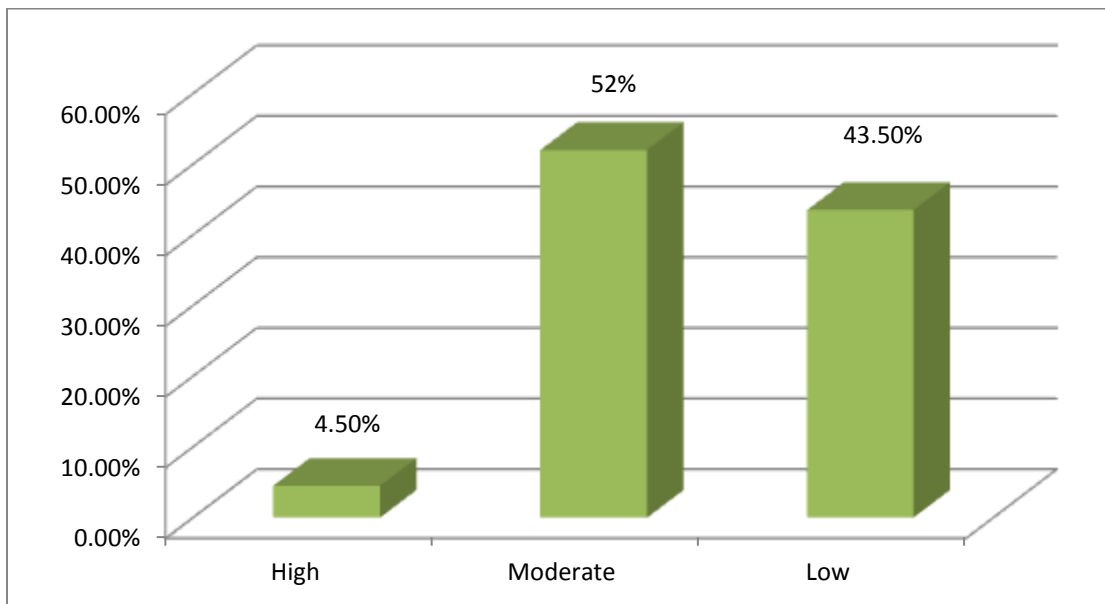| Personal Characteristics	No.	%
Age (years)		
<20	38	10.5
20 – 30	128	35.3
>30	197	54.3
Sex		
Male	102	28.1
Female	261	71.9
Education		
High Qualified	70	19.3
Qualified Above Average	151	41.6
Middle Qualified	109	30.0
Others	33	9.1
Type of Work		
Un employed	228	62.8
Others	32	8.8
Technician	73	20.1
Administrative work	13	3.6
Sales man	6	1.7
Crafts man	11	3.0

Figure (1): Percentage distribution of access and use of (ICT) level among studied patients (N=363)
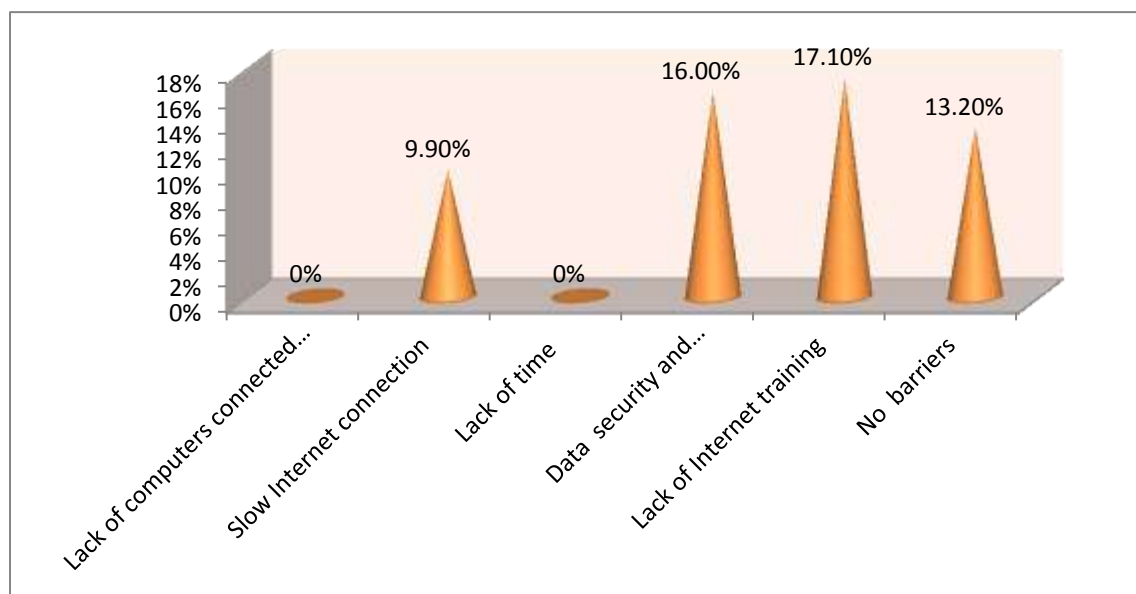

Figure (2):   Percentage distribution of barriers for information and communication technologies (ICT) among studied patients (n= 363)
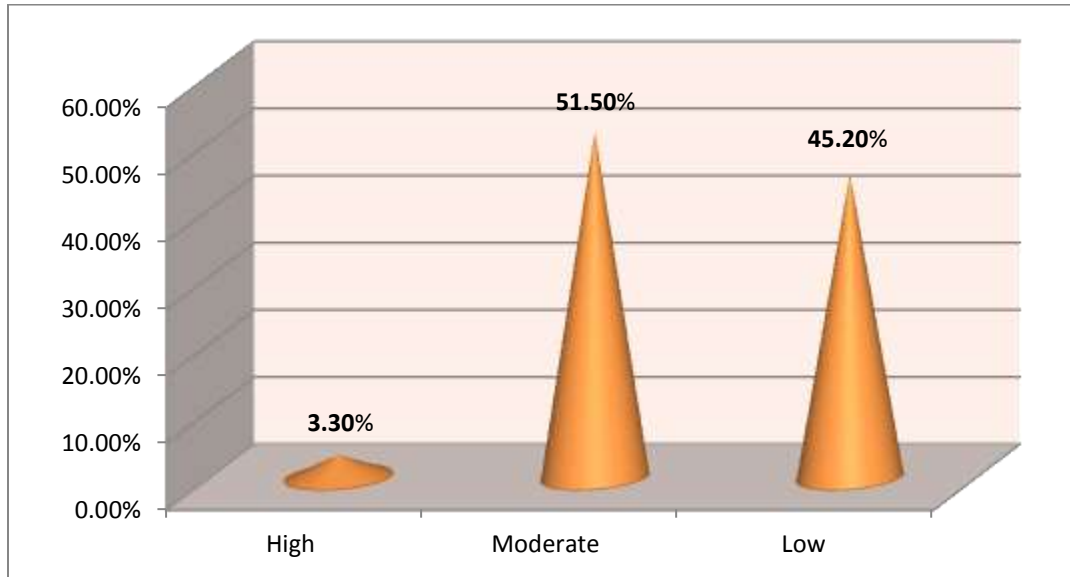
Figure (3): Percentage distribution of studied patients' perception level of information and communication technologies (ICT) (N= 363)
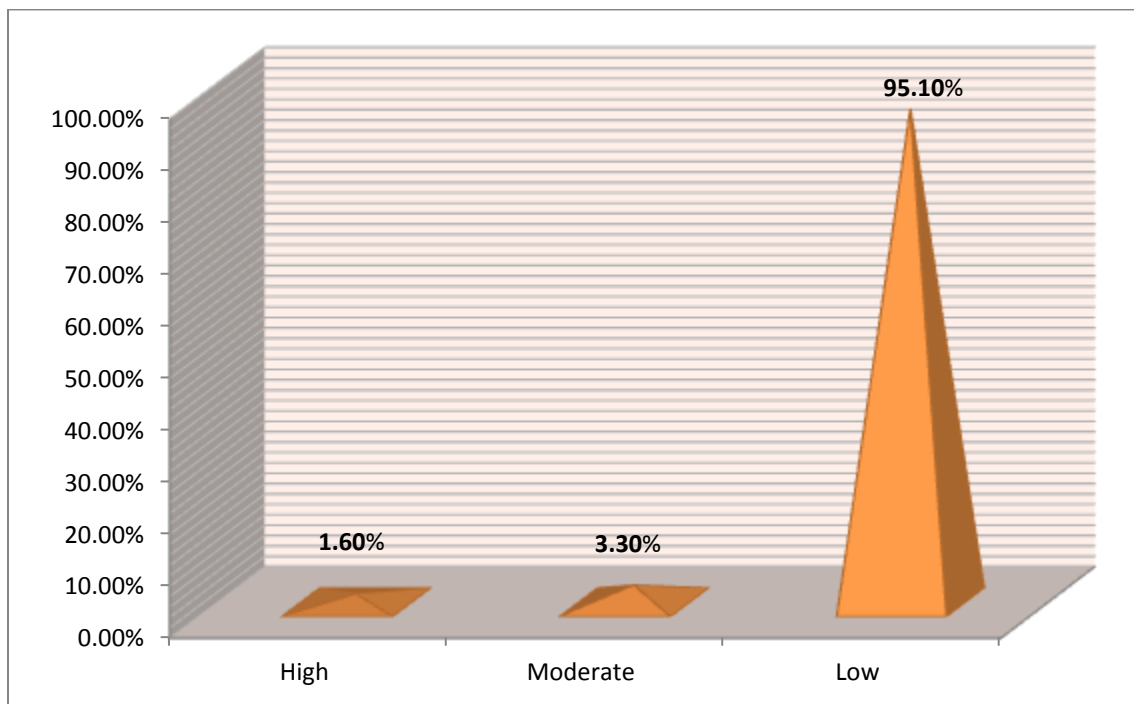

Figure (4): percentage distribution level of patients' empowerment (N= 363)

Table (2): Correlation matrix between information and communication technologies (ICT) and empowerment of patients (n = 363)

Studied variables	Access and use of ICT		Perceptions & barriers of ICT		Empowerment	
	r	P	r	p	R	P
Access and use of ICT						
Perceptions & barriers of ICT	0.244[*]	<0.001[*]				
Empowerment	0.132[*]	0.012[*]	0.045	0.389		

r: Pearson coefficient

*: Statistically significant at p ≤ 0.05

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