Journal of Health Informatics in Developing Countries
http://www.jhidc.org/
Vol. 15 No. 1, 2021

Submitted: June 8th, 2020 Accepted: Dec 6th, 2020

Factors Influencing Adoption and Use of Information and Communication Technologies Among Nurses in Selected Hospitals in Nigeria

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Abstract

Background: The introduction of Information and Communication Technologies (ICTs) in healthcare has positively influenced how healthcare professionals including nurses, deliver patient care especially in developed countries. However, nurses in developing countries are still faced with a lot of challenges militating against effective integration of ICT into patient care. Therefore, the need to identify factors influencing the adoption and use of ICT among nurses.

Methods: The study employed a cross-sectional study design, using questionnaires to obtain data from 321 nurses in selected hospitals in Ibadan Oyo State, Nigeria. A total 305 nurses completed the questionnaire. Data were cleaned, coded and analysed using SPSS 25.0. Descriptive statistics such as frequencies, percentages, mean and standard deviation were used to summarize and present data. Furthermore, association between variables were tested using chi square at p value 0.05 level of significance.

Results: The mean age of the participants was (x=34.4±9.3). A high proportion of the participants, 35% were not efficient in the use of computers. Also, the major factors implicated by the respondents for non-adoption and use of ICT include lack of management interest, (x= 3.7 ±1.2), and poor ICT Infrastructure, (x= 3.6 ±1.3). Factors found to be associated with efficiency in computer use include age (p = 0.001), designation of the nurses (p = 0.001), gender (p = 0.011), years of experience (p = 0.001) and ownership of a personal computer (p = 0.001).

Conclusion: Multiple factors have been found to militate against adoption of ICT in healthcare especially by nurses. It is therefore imperative that concerned stakeholders take appropriate actions to provide adequate ICT facilities in their settings in order to aid better patient management.

Keywords: Factors; Information Communication Technology; Adoption; Nursing care.

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1. Introduction

The healthcare delivery system of a nation is a dynamic and evolving one, hinging, amongst other things, on how well its hospitals can deliver qualitative and affordable healthcare to its citizens. Health records are essential for good healthcare and good quality healthcare data play a vital role in the planning, development and maintenance of optimal healthcare [1]. The traditional method of information sharing has always been the norm in the healthcare sector but has been found to have a number of inefficiencies such as loss of patient's documents, delays in accessing documents, inefficiency in transferability of patient information amongst others. With the emergence of the ICT era, comes the need to also change the way information is shared among healthcare workers. The introduction of Information and Communication Technologies (ICTs) in health care has greatly influenced how healthcare professionals including nurses deliver patient care [2]. Developed countries have embraced ICT use in hospitals and health clinics, some of which include computerization of medical records, electronic scheduling for appointments and use of internet for the purpose of communication [3], which has been explored by [4] and found to be beneficial to most health care facilities for managing data and health care resources. The electronic documentation is used to provide a plan of care for patients, to organize patient care processes and to maintain effective communication between clinicians. However, the potentials of ICT in health care sector have not been fully exploited compared to other sectors [5]. Studies in developing countries such as Nigeria has found unavailability of internet driven facilities, hence non-use of ICT for activities such as video-conferencing, teleconferencing and emailing by healthcare professionals especially nurses [6].

Nurses render care to a diverse group of patients and hence have been known over the years to be the frontline profession and a key stakeholder involved in the care of patients, their acceptance of this system of documentation especially in developing countries is therefore important for its successful implementation [7]. This therefore requires them to be involved in the management of a lot of information which begins with the assessment of health care needs, developing nursing care plan, implementing actions, evaluating care given and communicating information to other health care workers through electronic health records [8]. The utilization of Information and Communication Technologies (ICTs) for health also known as eHealth in nursing care has greatly influenced how nurses plan, deliver and document care, and this will continue to evolve just as technology advances. With ICT, Nurses are expected to change their way of documenting care by shifting from paper-based records to electronic systems [9].

However, nurses have been found to have insufficient technical skills and knowledge in dealing with the use of ICT innovations in the provision of care for their patients and clients. The pace of ICT

development in nursing practice has also been slow even though it is viewed as a fundamental tool that nurses need to get the information vital in the provision of holistic care [10]. Various challenges are being faced by different health institutions where the utilization of ICT is concerned. Several barriers are also noted to impede use of ICT among nurses, which may include behavioural issues like perception and satisfaction of nurses towards ICT and time frame required for documentation, doubts especially by older nurses about working in an environment filled with technology and fear of making errors while using the technologies[7]; characteristics of the individual, the technology and the organizational context [11], including the belief that technology can affect the nurse-patient relationship, the questioning of the quality of health care given through eHealth and technology issues such as interoperability, user friendliness and installation issues [12]. Another study also found electric power supply, Government attitude, cost of ICT equipment, telecommunication facilities, internet connectivity as well as resistance to new technology as barriers to integration of ICT into nursing care [13].

In an era of increasing use of technology, it is necessary that nurses who mostly share information about patient care among themselves and between other healthcare workers get acquainted with these technologies in order to be able to render wholistic care to patients. This study therefore, seeks to identify the factors affecting the adoption and utilization of ICT in nursing care among nurses in selected hospitals in Ibadan, Oyo State Nigeria and determine the recommendations for improvement.

2. Subjects and Methods

2.1 Study design

The descriptive cross-sectional study design was used for this study. A self-administered questionnaire was used to gather relevant data from professional nurses aimed at assessing the factors affecting the use of ICT in nursing care in selected hospitals in Ibadan, Oyo State Nigeria.

2.2 Study setting

This study was carried out in two selected hospitals which are University College Hospital and Adeoyo Maternity Teaching Hospital, Ibadan, Oyo State Nigeria.

2.3 University College Hospital

The University College Hospital (UCH) is a federal institution which is situated at Queen Elizabeth road, Oritamefa, Ibadan and it is attached to the University of Ibadan. It was established in 1948 with 850 bed spaces and 163 examination couches with occupancy rate ranging from 55-60%. It runs many undergraduate and post-graduate programmes. The hospital has 56 service and clinical departments and runs 96 consultative outpatient clinics a week in 50 specialty and sub specialty disciplines. The Nurses in the hospital make use of a number of ICT equipment such as Closed User Group mobile phones used to

make interprofessional and interdepartmental calls, television with DSTV subscriptions, few units involving nurses do video conferencing. Also, majority of the nurses make use of smartphones and some have personal computers which they use for learning and research activities.

2.4 Adeoyo Maternity Teaching Hospital

The Adeoyo Maternity Teaching Hospital (AMTH) Ibadan, Oyo state was established in 1927. It is situated at Yemetu, Adeoyo area of Ibadan North Local Government area of Oyo State. The hospital is the training centre for the premier school of nursing and midwifery both of which are currently in Eleyele, Ibadan. It is a secondary health care facility and serves as reference centre for primary health centres, with a bed capacity of 255. The overall hospital nursing head is the Chief Nursing Officer (Deputy Director, Nursing Services, and Oyo State Hospitals Management Board). The hospital has ICT equipment such as television with DSTV subscriptions.

2.5 Study population

The study population comprised of nurses working in University College Hospital and Adeoyo Maternity Teaching Hospital, Ibadan. Oyo State Nigeria.

2.6 Sampling technique

University College Hospital and Adeoyo Maternity Teaching Hospital were purposively selected and the simple random sampling technique was used to select wards/units that were used for the study. Random sampling technique was also used in selecting nurses that participated in the study across the randomly selected wards and units in the selected hospitals.

2.7 Instrument for data collection

The instrument for data collection was a self-administered. The instrument went through face and content validity, where expert in the field of information communication technology critical reviewed the questionnaire. Also, researchers compared the instrument with current and relevant literature, matching the construct of the instrument to the set objectives structured after a thorough and extensive literature review. The instrument had a Cronbach's Alpha value of 0.6, which made the instrument to be reliable for the study. Furthermore, the instrument is made up of 6 sections:

Section A collected information about socio-demographic characteristics of respondents. Section B collected information about factors influencing the adoption and use of ICT in nursing care. Section C collected information about aspects of nursing care where ICT can be adopted and used. Section D collected information about impacts of ICT adoption and use in nursing practice. Section E collected information about stakeholders involved in the adoption and use of ICT in nursing care; while Section F collected information about functioning ICT equipment in the health institution.

2.8 Data collection procedure

The questionnaires were administered to the respondents at their different wards and units for a duration of 2 weeks. Some of the questionnaires were however administered indirectly through the unit heads in the institution. Informed consent was taken before the administration of the questionnaires. The completed questionnaires were returned to the researchers with the assistance of the ward/unit heads. The researchers trained and assigned one research assistant for one day, who assisted in the administration and collection of some of the questionnaires.

2.9 Statistical analysis

Data was cleaned, coded and entered into the Statistical Package for Social Sciences version 25.0, which was used to analyse the data. Descriptive statistics such as frequency distribution table, mean, standard deviation and figures were used to summarize and present the results from the study.

2.10 Ethical considerations

Ethical approval was obtained from UI/UCH ethical committee with number UI/EC/20/0017 and permission was gotten from the head of each ward, informed consent was gained from the nurses and the study was explained to them. All the information collected from the subject was kept in strict confidentiality and anonymity. The nurses were well addressed in good manner and also the staff were informed on the necessity and advantages of the study. The study was non-invasive and no harm was done to the participants.

3. Results

Table 1 shows the socio-demographic characteristic of the participants. A total of 321 nurses from two facilities were enrolled into the study. However, only 305 questionnaires were valid for analysis, with staff from Adeoyo Maternity teaching hospital, Ibadan, Oyo State being 44 (14%) and staff from UCH, Ibadan, Oyo State being 261 (86%). The mean age of the participants was ($\bar{x}$=34.4±9.3). The mean years of experience in nursing practice was ($\bar{x}$= 10.4±8.6) Also, 43.6% % of the participants have bachelor's degree in nursing. A high proportion, 35% were not efficient in the use of computers.

Table (1) Socio-demographic Information of Participants

	Mean (SD)	**Frequency (n = 305)**	**Percentage (%)**
Age	**[$\bar{x} = 34.4 \pm 9.3$]**		
20 – 29 years		102	33.4
30 – 39 years		112	36.7
40 – 49 years		64	21.0
50 – 59 years		27	8.9

Years of experience [$\bar{x} = 10.4 \pm 8.6$]		
1 month – 12 months	31	10.2
1 – 5 years	84	27.5
6 – 10 years	80	26.2
$>$ 10 years	110	36.1
Designation		
Intern Nurses	34	11.1
Nursing officer I/II	164	53.8
PNO/SNO	24	7.9
ACNO	11	3.6
CNO	63	20.7
AND	9	2.9
Gender		
Male	21	6.9
Female	284	93.1
Qualification		
RN	52	17.0
Post-Basic (RN/RM/RPHN)	106	34.8
B.N.Sc	133	43.6
Masters	14	4.6
Marital status		
Single	109	35.7
Married	196	64.3
Own a personal computer		
Yes	225	73.8
No	80	26.2
Efficiency in use of computers, internet and software		
Excellent	89	29.2
Very efficient	109	35.7
Fairly efficient	101	33.1
Not efficient	6	2.0

Table 2 shows the factors affecting adoption and use of ICT in Nursing care. Results from the study indicate that the major factors implicated by the respondents include lack of management interest, ($\bar{x}$ = 3.7 ±1.2), Poor ICT Infrastructure, ($\bar{x}$ = 3.6 ±1.3), lack of electricity, ($\bar{x}$ = 3.5 ±1.4), as well as poor

availability of internet services, ($\bar{x}$ = 3.5 ±1.4).

Table (2) Factors affecting adoption and use of ICT in Nursing care

	Strongly Disagree *f*(%)	**Disagree *f* (%)**	**Neutral *f* (%)**	**Agree *f* (%)**	**Strongly Agree *f* (%)**	**Mean/ SD**
High cost of equipment	41 (13.4%)	70 (23.0%)	47 (15.4%)	87 (28.5%)	60 (19.7%)	3.2 ± 1.3
Poor ICT Infrastructure	30 (9.8%)	57 (18.7%)	21 (6.9%)	109 (35.7%)	88 (28.9%)	3.6 ± 1.3
Lack of privacy and security	45 (14.8%)	90 (29.5%)	47 (15.4%)	78 (25.6%)	45 (14.8%)	3.0 ± 1.3
Lack of electricity	37 (12.1%)	60 (19.7%)	14 (4.6%)	96 (31.5%)	98 (32.1%)	3.5 ± 1.4
Lack of skills, training and knowledge of computer use	42 (13.8%)	67 (22.0%)	24 (7.9%)	112 (36.7%)	60 (19.7%)	3.3 ± 1.4
Level of literacy	58 (19.0%)	58 (19.0%)	38 (12.5%)	99 (32.5%)	52 (17.0%)	3.1 ± 1.4
Lack of management interest	24 (7.9%)	36 (11.8%)	37 (12.1%)	133 (43.6%)	75 (24.6%)	3.7 ± 1.2
Inconvenient data entry	38 (12.5%)	71 (23.3%)	52 (17.0%)	96 (31.5%)	48 (15.7%)	3.1 ± 1.3
Poor availability of internet services	45 (14.8%)	46 (15.1%)	22 (7.2%)	104 (34.1%)	88 (28.9%)	3.5 ± 1.4

Score: Strongly disagree: 1, Disagree: 2, Neutral: 3, Agree: 4, Strongly Agree: 5

Table 3 shows the aspects of Nursing care where ICT can be adopted and used. Results from the study shows that the highest proportion of the nurses believe ICT can be used in the following aspects of nursing, research, ($\bar{x}$= 3.8 ±1.3), communication with other health professionals in the hospital using mobile phones, ($\bar{x}$ = 3.8 ±1.3) as well as access to information on the internet using hospital provided internet services, ($\bar{x}$ = 3.5 ±1.5). Furthermore, 60% of the nursing staffs reported the constraints are generally high while 40% had reported a minimal level of constraints in the hospitals. Also, the greatest proportion of the participants, 84% agreed that it will be of high positive impact if ICT is being adopted.

Table (3) Aspects of Nursing care where ICT can be adopted and used

	Strongly Disagree *f* (%)	**Disagree *f* (%)**	**Neutral *f* (%)**	**Agree *f* (%)**	**Strongly Agree *f*(%)**	**Mean/ SD**
Patient history taking	87 (28.5%)	67 (22.0%)	7(2.3%)	68 (22.3%)	76 (24.9%)	2.9 ± 1.6
Nursing process	103 (33.8%)	62 (20.3%)	10 (3.3%)	58 (19.0%)	72 (23.6%)	2.8 ± 1.6

Treatment and Medication administration and documentation	101 (33.1%)	66 (21.6%)	19 (6.2%)	52 (17.0%)	67 (22.0%)	2.7 ± 1.6
Telenursing	97 (31.8%)	43 (14.1%)	25 (8.2%)	69 (22.6%)	71 (23.3%)	2.9 ± 1.6
Vital signs monitoring and documentation	92 (30.2%)	52 (17.0%)	24 (7.9%)	67 (22.0%)	70 (23.0%)	2.9 ± 1.6
Appointment communication with patients and their relatives	84 (27.5%)	78 (25.6%)	16 (5.2%)	54 (17.7%)	73 (23.9%)	2.8 ± 1.6
Research	39 (12.8%)	18 (5.9%)	10 (3.3%)	141 (46.2%)	97 (31.8%)	3.8 ± 1.3
Communication with other health professionals in the hospital using hospital mobile phones	37 (12.1%)	22 (7.2%)	14 (4.6%)	120 (39.3%)	112 (36.7%)	3.8 ± 1.3
Access to nursing information on the internet using hospital provided internet services	49 (16.1%)	42 (13.8%)	22 (7.2%)	88 (28.9%)	104 (34.1%)	3.5 ± 1.5

Score: Strongly disagree: 1, Disagree: 2, Neutral: 3, Agree: 4, Strongly Agree: 5.

Table 4 shows the implication of adoption and use of ICT in nursing care. Results from the study show that nurses believe Patient information can **be easily accessed**, with 47.9% strongly agreeing, ($\bar{x}$ = 4.2±1.1), there is easy collaboration among health professionals, with 44.6% strongly agreeing, ($\bar{x}$= 4.1 ±1.1) and that the quality of treatment and services improves, with 36.1% strongly agreeing, ($\bar{x}$ = 4.0 ±1.1).

Table (4) Implication of adoption and use of ICT in nursing care

	Strongly Disagree *f* (%)	**Disagree *f* (%)**	**Neutral *f* (%)**	**Agree *f* (%)**	**Strongly Agree *f* (%)**	**Mean/ SD**
Data entry error is reduced	21 (6.9%)	41 (13.4%)	30 (9.8%)	137 (44.9%)	76 (24.9%)	3.7 ± 1.2
The quality of treatment and services improves	17 (5.6%)	24 (7.9%)	21 (6.9%)	133 (43.6%)	110 (36.1%)	4.0 ± 1.1
Patient information is easily accessed	15 (4.9%)	21 (6.9%)	6 (2.0%)	117 (38.4%)	146 (47.9%)	4.2 ± 1.1

Easy collaboration among health professionals	11 (3.6%)	25 (8.2%)	13 (4.3%)	120 (39.3%)	136 (44.6%)	4.1 ± 1.1
Communication with patients improve	16 (5.2%)	32 (10.5%)	39 (12.8%)	100 (32.8%)	118 (38.7%)	3.9 ± 1.2
Computers use is time-consuming	84 (27.5%)	110 (36.1%)	26 (8.5%)	50 (16.4%)	35 (11.5%)	2.5 ± 1.4
Computer use reduces patient-providers interaction	55 (18.0%)	99 (32.5%)	25 (8.2%)	96 (31.5%)	30 (9.8%)	2.8 ± 1.3
Computers use increases work load	102 (33.4%)	119 (39.0%)	29 (9.5%)	29 (9.5%)	26 (8.5%)	2.2 ± 1.2

Score: Strongly disagree: 1, Disagree: 2, Neutral: 3, Agree: 4, Strongly Agree: 5.

Table 5 shows stakeholders involved with adoption and use of ICT in nursing. Results from the study shows that the most implicated stakeholder is the hospital medical director, with 44.9% of the participants strongly agreeing, ($\bar{x}$ = 4.2 ±1.0), followed by nurses, with 41.6% of them strongly agreeing, ($\bar{x}$ = 4.1 ±1.0), administration of the hospital, with 36.1% strongly agreeing, ($\bar{x}$ = 4.0 ±1.1).

Table (5): Stakeholders involved with adoption and use of ICT in nursing

	Strongly Disagree *f*(%)	**Disagree *f*(%)**	**Neutral *f*(%)**	**Agree *f*(%)**	**Strongly Agree *f*(%)**	**Mean/ SD**
Government (Federal & State)	22 (7.2%)	22 (7.2%)	20 (6.6%)	128 (42.0%)	113 (37.0%)	3.9 ± 1.2
Administrative	15 (4.9%)	21 (6.9%)	24 (7.9%)	135 (44.3%)	110 (36.1%)	4.0 ± 1.1
Nurses	13 (4.3%)	16 (5.2%)	25 (8.2%)	124 (40.7%)	127 (41.6%)	4.1 ± 1.0
Patients	42 (13.8%)	61 (20.0%)	53 (17.4%)	81 (26.6%)	68 (22.3%)	3.2 ± 1.4
Hospital medical director	15 (4.9%)	8 (2.6%)	13 (4.3%)	132 (43.3%)	137 (44.9%)	4.2 ± 1.0
Finance staff	26 (8.5%)	18 (5.9%)	30 (9.8%)	135 (44.3%)	96 (31.5%)	3.8 ± 1.2
Government organizations (WHO & NGOs)	23 (7.5%)	16 (5.2%)	33 (10.8%)	122 (40.0%)	111 (36.4%)	3.9 ± 1.2

Score: Strongly disagree: 1, Disagree: 2, Neutral: 3, Agree: 4, Strongly Agree: 5.

Table 6 shows the available and functioning ICT equipment within participants' facility. Results from the study shows that the most abundant and functioning ICT equipment in participants' hospital is TV set, 82%, with 61.6% of them not having computers.

Table (6) Available and Functioning ICT equipment within facility

	Yes *f* (%)	**No *f* (%)**
TV Set	250 (82.0%)	55 (18.0%)
DSTV	201 (65.9%)	104 34.1%)
Computers	117 (38.4%)	188 (61.6%)
Printer	96 (31.5%)	209 (68.5%)
Mobile phones	275 (90.2%)	30 (9.8%)
Multimedia projector	107 (35.1%)	198 (64.9%)
Internet services	103 (33.8%)	202 (66.2%)

Table 7 shows the chi-square test to determine an association between socio-demographic factors and efficiency in use of computers. Findings reveal that there was a significant association between age, gender, designation of the nurses, years of experience and ownership of a personal computer and efficiency in computer use with p-value ≤ 0.05.

Table (7) Association between socio-demographic factors and efficiency in use of computers

	Efficiency in PC, Internet & Software usage		χ^2	***P***
Variables	**Minimally Efficient**	**Highly Efficient**		
Age				
20 – 29 years	22 (21.6%)	80 (78.4%)	23.01	0.001**
30 – 39 years	38 (33.9%)	74 (66.1%)		
40 – 49 years	29 (45.3%)	35 (54.7%)		
50 – 59 years	18 (66.7%)	9 (33.3%)		
Gender				
Male	2 (9.5%)	19 (90.5%)	6.47	0.011**
Female	105 (37.0%)	179 (63.0%)		
Designation				
Intern Nurses	9 (26.5%)	25 (73.5%)	23.39	0.001**
Nursing officer I/II	46 (28.0%)	118 (72.0%)		
ACNO	8 (72.7%)	3 (27.3%)		
CNO	33 (55.0%)	27 (45.0%)		

PNO/SNO	6 (25.0%)	18 (75.0%)		
CM	1 (33.3%)	2 (66.7%)		
AND	4 (44.4%)	5 (55.6%)		
Qualification				
RN	20 (38.5%)	32 (61.5%)	7.70	0.053
Post-Basic (RN/RM/RPHN)	44 (41.5%)	62 (58.5%)		
B.N.Sc.	42 (31.6%)	91 (68.4%)		
Masters	1 (7.1%)	13 (92.9%)		
Years of experience				
1 month – 12 months	6 (19.4%)	25 (80.6%)	29.95	0.001**
1 – 5 years	18 (21.4%)	66 (78.6%)		
6 – 10 years	23 (28.7%)	57 (71.3%)		
> 10 years	60 (54.5%)	50 (45.5%)		
Own a personal computer				
Yes	56 (24.9%)	169 (75.1%)	39.13	0.001**
No	51 (63.7%)	29 (36.3%)		

4. Discussion

The use of ICT in health has greatly improved information sharing as well patient care among healthcare professionals worldwide. E-health projects which were supported by organizations like World Health Organizations (WHO), United Nations (UN) and other Non-Governmental Organization (NGO's) have brought about a successful implementation of e-health projects in developed countries [6]. In developing countries, with the pioneering effort of introducing the ''Made in Nigeria Primary Healthcare and Hospital Information System'' (MINPHIS) in clinical settings in Nigeria in 2004, [14, 15], significant progress is expected to have been made in the area of encouraging healthcare professionals to efficiently use ICT for improved data management and patients' care. However, the adoption and use of ICT among nurses in Nigeria has been very slow, attributed to many factors, including level of education of nurses as well as non-flexibility to new technologies. Findings from this study revealed that a high proportion of the participants, 35% were not efficient in the use of computers. Socio-demographic factors found to be associated with efficiency in computer use include age, ($p<0.05$), gender, ($p<0.05$) designation of the nurses ($p<0.05$), years of experience ($p<0.05$), and ownership of a personal computer ($p<0.05$). Also, lack of interest on the part of the management, poor level of ICT infrastructure, lack of electricity, as well as

poor availability of internet services was found to contribute to factors affecting the use and adoption of ICT among nurses in the healthcare settings studied. These findings are in tandem with findings from the study of [6], where barriers to ICT implementation included lack of computer equipment, lack of electricity supply lack of computer skills, cost of computer, attitude of health professionals and cultural/environmental factors. Several other studies by [2, 13, 16, 17], identified several factors that affect the use of ICT in nursing care, including electric power supply, cost of ICT equipment, lack of technical support, lack of ICT knowledge, lack of confidence in using computers, poor internet connectivity and resistance to new technology, which also supports findings from this study. Having identified these barriers, therefore, adequate actions must be taken to surmount these barriers to improve the adoption of ICT in healthcare.

On the aspects of nursing care ICT could be used, participants majorly stated ICT could be useful in research, communication with other health workers as well as access to nursing information over the internet. This finding agrees with findings from the study of [3], in his 2017 study, where ICT was found to be useful in computerization of medical records, electronic scheduling for appointments and use of internet for the purpose of communication. Another study by [10], also stated ICT can be used in nursing practice in areas such as decision-making processes, management systems, education and research in clinical practice, which supports findings from this study.

Furthermore, the implication of adopting and using ICT in nursing care as identified by the nurses include limiting data entry error, improving staff communication with patients, improving the quality of treatment and services, as well as enabling easy collaboration among health professionals and easy access to patient's information. Up to 84% of the participants remarked the positive impact ICT will have on nursing will be high, if adopted and used. This result is in conflict findings identified in a study by [12], which revealed that participants felt that technology can affect the nurse-patient relationship and questioned the quality of health care given through eHealth. Findings from this study is however, supported by findings from [10], where ICT implementation in nursing practice was perceived to be of great benefit as it improves performance levels and limits errors, increase accessibility, improve patient participation and promote closer relationship with nursing personnel. Acknowledging the fact that the ICT era has greatly affected patient care positively especially in developed countries, where it has been fully implemented, it is therefore imperative to leverage on this, and ensure nurses are knowledgeable about the many benefits that can be accrued from using ICT in healthcare.

In addition, the major stakeholders indicated by the nurses to be in a position to influence the adoption and utilization of ICT in nursing include the finance staffs, government organizations,

government, administrative body, nurses, patients and hospital medical director. This finding is supported by findings from the study of [5], where the Director of eHealth, the hospital Medical director, finance staff and information system unit were identified as key stakeholders in adoption and use of ICT. Another study indicated that involving stakeholders such as patients, and healthcare professionals in the design of technology helps to improve its adoption in healthcare [12], which supports findings from this study.

More so, the major available and functioning equipment within the facilities include Mobile phones, TV set and DSTV. More than half reported unavailability of computers, multimedia projector, internet services and printers. Overall, up to 70% of the participants reported a minimal availability of a function set of ICT equipment (less than 5 equipment). Findings from this study is supported by findings from the study of [6], where DSTV, TV sets and mobile/land phone were found to be available in the participants' healthcare institution. Supporting findings from this study also is that of [15], where ICT indicators such as mobile phones, personal computers, and non-hospital internet facilities were identified in four Nigerian teaching hospitals, but with a lack of internet connectivity. This presents the need to reprioritize the provision of essential communication devices in healthcare settings to aid prompt communication of information, and subsequent prompt management of patient conditions.

5. Conclusion

With ICT becoming the modus operandi in dissemination of information among healthcare workers especially nurses, it is imperative that major stakeholders try as much as possible to provide functioning ICT materials to enable nurses fully adopt such into practice. It is also important that barriers limiting adoption and use of ICT be tackled to make for faster dissemination of information and storage and subsequently, improved patient satisfaction and care.

6. Declarations

6.1 Conflict of Interest Statement

No competing financial interests exist.

6.2 Funding Disclosure

None.

6.3 Acknowledgements

The authors sincerely appreciate the Nurses who consented and participated in the study.

7. References

1. Adeleke, Ibrahim Taiwo, Sunday Adesubomi Erinle, Ameenah MNd, Anamah TC, Oluseye AO, Danjuma A. Health information technology in Nigeria: Stakeholders' perspectives of nationwide implementations and meaningful use of the emerging technology in the most populous black nation. American Journal of Health Research 2014; 3, no. 1-1: 17-24.
2. Mutula, SM. Factors influencing perceptions and attitudes of nurses towards the use of ICT in patient care in KwaZulu Natal Province, South Africa. The African Journal of Information Systems 2015; 8, no. 1: 1.
3. Mwangi, BM. Factors Influencing Adoption of ICT Strategy in the Kenyan Public Health Sector–A Case Study of the Kenyatta National Hospital. PhD diss., United States International University-Africa, 2017.
4. ITU., Trends in Telecommunication Reform: Regulatory Incentives To Achieve Digital Opportunities. Retrieved from International Telecommunication Union: Publications 59Development (ITU-D): http://wftp3.itu.int/pub/epub_shared/BDT/2016/2016-Trends-En/index.html#p=1 2016.
5. Cucciniello M, Irvine L, Greta, Claudia P. Understanding key factors affecting electronic medical record implementation: a sociotechnical approach. BMC health services research 2015; 15, no. 1: 268.
6. Afolayan OT, Oyekunle RA. Availability, accessibility and frequency of use of ICT tools by health professionals in Ilorin metropolis. Covenant Journal of Informatics and Communication Technology 2016; 2, no. 1.
7. Cassano C. The right balance-technology and patient care. On-Line Journal of Nursing Informatics 2014; 18, no. 3.
8. Olajubu AO, Irinoye, OO Olowokere. A.E. Competencies and Barriers to the Use of Nursing Informatics among Nurses in Primary, Secondary and Tertiary Healthcare Facilities in Nigeria. Journal of Health Informatics in Africa 2014; 2, no. 1.
9. Fagerström C, Hanna T, Lisa A, Lina N. The role of ICT in nursing practice: an integrative literature review of the Swedish context. Scandinavian Journal of Caring Sciences 2017; 31, no. 3: 434-448.
10. Handayani, PW, Achmad NH, Indra B. User acceptance factors of hospital information systems and related technologies: Systematic review. Informatics for Health and Social Care

2018; 43, no. 4: 401-426.

11. van der Z, Teatske E. Wouters JM Janienke S. To use or not to use: The design, implementation and acceptance of technology in the context of health care. In Assistive Technologies in Smart Cities 2018; pp. 93-110. IntechOpen,.
12. Onu FU, Igwe SA. Factors That Affect the Use of Ict in Nursing Profession in Ebonyi State Nigeria. Journal of Information Engineering and Applications 2013; 3, no. 11: 63-70.
13. Idowu P, Dan C, Lucy B. Health informatics deployment in Nigeria. Journal of Health Informatics in Developing Countries 2008; 2, no. 1.
14. Idowu B, Eyitope O, Bimbo I. Information and communication technology in Nigeria the health sector experience. Journal of Information Technology Impact 2003; 3, no. 2: 69-76.
15. Adeyoyin SA. Imam, Oladapo Y. Health workers' ICT literacy in a Nigerian University Teaching Hospital. Information Technologist (The) 2009; 6, no. 2.
16. Yehualashet G, Mulusew A, Binyam T. The attitude towards and use of electronic medical record system by health professionals at a referral hospital in northern Ethiopia: Cross-sectional study. Journal of Health Informatics in Africa 3 2015; no. 1.

17 Irinoye OO., Emmanuel OA, Imoleayo F, Ntombifikile M. Nurses' perception and barriers to use of information communication technology in a teaching hospital in Nigeria. CIN: Computers, Informatics, Nursing 2013; 31, no. 8: 394-400.