



AVAILABILITY, ACCESSIBILITY AND FREQUENCY OF USE OF ICT TOOLS BY HEALTH PROFESSIONALS IN ILORIN METROPOLIS

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Abstract: This research explores the availability, accessibility and the extent of ICT usage by health professionals in Ilorin metropolis. Data was collected using a sample size of 174 health service providers in 34 public and private hospitals by means of a structured questionnaire. Findings from this study indicate that the ICTs that were commonly available and used by the health professionals are the older ICTs. These include TV set, DSTV, photocopiers, fax machines, and convergent technologies like mobile phones and computers. Although, Internet driven facilities like video-conferencing, teleconferencing, web discussion forums and email among others, were not readily available to the health professionals, a comparative analysis reveals that there was superior availability and use of computers, projectors, e-mails and Internet by health professionals in private hospitals than those in public hospitals. This is as a result of the financial implications of procurement and installation of these facilities. Interestingly, the level of awareness of users on the numerous benefits of ICTs on their job and productivity is quite impressive. It is therefore, concluded that hospitals' regulatory agencies should collaborate with International agencies such as World Health Organization (WHO), United Nations Organization (UNO) and the European Union, among others, to aid in the successful implementation and funding for the procurement of sophisticated ICTs to facilitate the dissemination of up to date health information to public and private hospitals.

Keywords: ICTs, Health professionals, Usage, E-mail, Teleconferencing, Video-conferencing

1.0 Introduction

The health sector is one of the largest information consuming sectors. As a result, access to up-to-date and timely information by health professionals remains a sine qua non for proper diagnosis, prevention and treatment of diseases. Readily available information that affects the well

being of patients is always critical and over the last decade, the advent of Information and Communication Technologies (ICTs) have contributed immensely to the continuous learning, sharing and dissemination of health information amongst professionals. The United Nations, in a report, corroborated the fact that ICTs have the

capacities of contributing to health education, knowledge sharing, health monitoring, health statistics gathering and achieving the millennium developmental goals (UNDP, 2003). This encompasses the full range of ICTs from radio, television, communication resources such as fax machine, telephone (fixed and mobile), email, Internet, Personal Digital Assistant, manual and computerized data systems, databases, satellite technology and so on. It is therefore essential for health professionals to have access to ICTs and use them to update their knowledge and skills in order to be relevant in the medical profession and also to conform to best the practices.

Some studies have shown that despite the immense benefits of ICTs as a means of delivering quality health care services, the potential of ICTs have not been fully harnessed by health professionals especially in developing countries. This is due to problems of access (slow or unreliable Internet connectivity), high subscription cost of information materials; lack of awareness of what is available; lack of relevance of available information (i.e. not meeting professionals' needs in terms of scope, style, or format); lack of time and incentives to access information; and lack of interpretation skills (Gatero, 2011). These enumerated problems may affect the availability, accessibility

and use of ICTs by health professionals particularly in developing countries. Furthermore, Idowu (2003) stated that most of the health institutions in developing countries are battling with some identified barriers such as high cost of ICT equipment, power failures, and inadequate telecommunication facilities. Except these challenges are promptly attended to, the benefits of ICTs may not be realizable both at the short and long run. In essence, the myriad of problems in the health sector may not be totally eliminated by merely acquiring these technologies, but harnessing the technologies for development.

This study therefore, intends to explore the available ICTs, accessibility and extent of use by health professionals in public and private hospitals in Ilorin Metropolis. Such benefits which include making better treatment decisions; providing higher quality and safer care; national and local health information systems supporting the development of effective, efficient and equitable health systems, among others can achieve the desired outcomes only if ICTs are available, accessible and used accordingly (Davies et. al. 2006).

1.1 Statement of Problem

Universal access to information by health professionals is a prerequisite for meeting the Millennium Development Goals and achieving

health for all (Godlee et al, 2004). Health related millennium goals center on improving the health of the poor and the marginalized, combating child mortality rate and the prevention of diseases such as HIV/AIDS. On this note, many health institutions in developing nations are now harnessing the potentials of ICTs to improve the delivery of quality health care services. However, it has been observed that despite the high cost of ICT equipment, many health institutions are still struggling and investing heavily on procuring the tools considering their potentials. This high cost is limiting the availability of the tools and consequently affecting access to the tools and frequency of use by the health professionals. Based on this premise, the research questions can be stated thus:

1. Are ICT tools available for use by health professionals in Ilorin metropolis?
2. Are these tools accessed at variance by health professionals in Ilorin metropolis?
3. What is the extent of use of ICT tools by health professionals in Ilorin metropolis?
4. What activities do the health professionals in Ilorin metropolis undertake with ICT tools?
5. How do health professionals in Ilorin metropolis perceive

the impact of ICT tools on their job functions?

6. What are the likely constraints in the utilization of ICT tools by health professionals in Ilorin metropolis?

In view of this, the overall objective of this research is to determine the availability of ICT tools, level of accessibility and extent of use by health professionals in Ilorin metropolis using sampled public and private hospitals. Specifically, this research paper will address the following sub- objectives:

1. Determine the state of ICT facilities in selected public and private hospitals in Ilorin metropolis.
2. Find out the activities ICTs are used for by health professionals in Ilorin metropolis.
3. Determine the places of access to ICTs by health professionals in Ilorin metropolis.
4. Determine the impact of ICTs on the job functions of health professionals in Ilorin metropolis.
5. Evaluate the attitude of health professionals in Ilorin metropolis towards the use of ICTs.
6. Determine the constraints to the utilization of ICT tools by health professionals in Ilorin metropolis.

7. Suggest policies and strategies that will support ICTs interventions in health institutions in Ilorin metropolis.

2.0 Literature Review

2.1 Successful ICT Interventions in the Health Sector

The application of information and communication technologies tools (ICTs) or alternatively e-health tools to successful health care delivery had been widely demonstrated through various ICT health projects in developing and developed world. E-health, an umbrella term that encompasses the use of ICT in healthcare, includes telemedicine, where medical advice or consultation is provided over long distances via Internet, radio, telephone and other communication devices. In another vein, e-health is the use of ICT tools for dissemination of health related information such as HIV/AIDS and vaccination hubs using radio, television, Internet or short message service (UNDP, 2007) Successful application of e-health tools in the developed economies had contributed to the delivery of quality healthcare services. For instance, rapid access to health information can easily be achieved via the World Wide Web (WWW), Internet and other relevant facilities like online databases. On the contrary, the utilization of e-health tools in the developing countries are posed with challenges which needs to be addressed. These barriers include

lack of computer equipment, lack of computer skills, cost of computer and so on. These have contributed to the unreliability, inaccessibility and lack of sustainability of ICT infrastructures (Ouma and Herseman, 2008).

E-health projects that were supported by organizations such as World Health Organization (WHO), United Nations (UN) European Union (EU) and various Non-Governmental Organizations (NGO's) have led to the successful implementation of e-health solutions especially in the developed world. For instance, EU supported projects had placed Europe in a world leading position in the use of health networks, Electronic Health Records (EHR) and deployment of health information systems.

Specifically, ICTs had contributed quantitatively to the health sector in some developing economies through ICT pilot projects. For instance, Greenberg (2005) indicated that a number of ICT pilot projects have demonstrated improvement such as 50% reduction in mortality or 25-50% increase in productivity within the healthcare system. E-health projects had been successfully implemented in countries like Indonesia, Philippines and Thailand. In Indonesia, an integrated web based GIS was designed to monitor and detect outbreak of dengue fever amongst children. Similarly, in the Philippines, a Community Health Information system was designed to

disseminate health information to the community and public at large. It is worthy to note that these individual projects were implemented in phases and improved on overtime. In Thailand, a low cost hospital information system was designed for rural hospitals to perform certain functions such as work flow management, patient appointment, billing and patient registration. In order to curtail cost, free open source software applications (FOSS) were utilized in a networked environment linking fifty (50) rural hospitals to facilitate knowledge sharing (UNDP, 2007).

Similarly, in Uganda the effective use of ICT had prevented avoidable maternal death. In Bangladesh and India the global satellite technology combated the outbreak of epidemics and ensured the effective prevention and treatment through adequate online health information. In South Africa, three health information systems were developed. The first was a National Health Care Management Information System (NHC/MIS). This system was designed to track medical records, patient registration, billing and scheduling in some selected hospitals. The following information was generated from the system: patient record, ID verification blood group, last ten (10) diagnoses, treatment prescription and medical aid (Electronic Government, 2004). Secondly, an information system

was also implemented in the South African Province of Limpopo which consisted of 42 Hospitals (2 mental health facilities, 8 regional facilities and 32 district facilities). The information system was designed to improve patient care, manage efficiency of hospitals and increase the quality of services, track patients records, admission, discharges and transfers, appointment etc. This project was successful only in few of the hospitals; some factors identified for the failure include not taking into account the social/professional culture of health Organizations, lack of education of users, failure of developers to identify and learn from past projects. Thirdly, the South African District Health information System (DHIS) is a systematic data gathering tool that was used to identify public health issues. The Health information system programme (HISP) model was adopted in implementing DHIS. The implementation steps were categorized into six steps: Step 1- Establishment of district into teams, Step 2- Performance of an information audit of existing processes, Step3- Formulation of operational goals, Step 4- development of system and structures to support data handling, Step 5- Capacity building of health care providers. Step 6- Development of an information culture. The HISP model was successfully implemented in all the districts (Electronic Government, 2004).

In view of the above, Davies et al. (2006) argues that the successful implementation of health information system must consider the following factors: pay attention to past experiences, involve users in the planning and design of the system, build information culture, strengthen capacity of users, set realistic goals and lastly focus on the benefits of the system rather than the technology. In concrete terms, the utilization of e-health tools such as health information systems, websites, electronic health records, medical databases by health professionals will facilitate the following benefits identified by Davies, Trude, Mcconnell, Ramirez, Shields, Drury, Kumekawa, Louw, Fereday, and Nyamai-Kisia, (2006):

1. Improve dissemination of public health information;
2. Enable remote consultation, diagnosis and treatment through telemedicine;
3. Enhance collaboration and cooperation among health professionals by sharing of learning and training resources;
4. Support more effective health research and its dissemination and access to research findings;
5. Strengthen the ability to monitor incidence of public health threats and respond in a more timely and effective manner;
6. Improve the efficiency of health systems.

2.2 Related Works

Quite a number of studies in the literature have evaluated the use and impact of ICT on the health sector in developing countries. Some studies that have considered the use of ICT's in Nigerian Teaching Hospitals include (Idowu et al 2003; Adeyemi & Ayegboyin, 2004; Olatokun & Adeboyejo, 2009) among others. Specifically, Idowu et al (2003) identified ICT indicators such as mobile phones, personal computers, non-hospital Internet facilities in four Nigerian teaching hospitals: Obafemi Awolowo University Teaching Hospital Ile-Ife, Ladoke Akintola University Teaching Hospital Ogbomoso, Lagos State University Teaching Hospital and University College Hospital Ibadan. Amongst the ICTs that were readily available, mobile phones were highly utilized by almost all the medical experts in the teaching hospital; they were essentially used for communication consulting and generally for improving health care services. In the surveyed hospitals, there was lack of Internet connectivity which greatly impaired health delivery services. On their own part, Adeyemi and Ayegboyin (2004), in a survey involving four general hospitals, 10 primary health-care centers, and six private hospitals in Nigeria reported that none of the institutions had e-mail access or a Web site and only very few of the

workers possessed personal computers or had any measurable computer skills. On the contrary, Olatokun & Adeboyejo (2009) reported a 100% Internet usage by (Nurses and Pharmacist), 98.1 % (Medical doctors) and 96.2% (Nurses/ Midwives) at the University College Hospital (UCH) Ibadan. This clearly shows that Internet facilities are becoming entrenched and indispensable in the hospital environment.

Similarly, Ouma & Herselman (2008) investigated ICT infrastructures and e-health technologies in place in five rural hospitals in Kenya. A technology assessment was carried out within the five rural hospitals focusing on the access level of ICT, current condition of ICT infrastructure and the barriers militating against the use of ICT. The findings from their study revealed that ICT infrastructures that existed include computers, Internet, and information systems in the pharmacy and finance offices respectively. However, Electronic Health Records (EHR) and tele-medicine were not in place. Barriers to the successful implementation of ICT in these rural hospitals include lack of computer equipment, lack of computer skills and cost of computer. These barriers affected the reliability, accessibility and sustainability of ICTs in the rural hospitals. It is note worthy to realize that factors such as attitude

problem, cultural/environmental factors are likely barriers that can militate against the successful implementation of ICTs in a rural environment.

Another study by Adedoyin, Imam and Oladapo (2009) investigated the ICT literacy among the health workers of Igbinedion University Teaching Hospital (IUTH) Okada, using a survey method to elicit information from the respondents for the study. Among other things, the study revealed that a greater number of respondents which represents 74.5% of the sampled population are aware of the use of ICT equipment in health institutions; though media and friends were the major sources of awareness to the respondents. The study also revealed that 66% of the respondents were aware of tele-medicine but unfortunately 76.6% do not have ICT equipment in their various departments. The study also investigated the attitude of health workers in IUTH to the use of ICT and it was revealed that non-availability of ICT equipment had hindered the health workers from showing serious interest, leading to a widespread apathy towards ICT because of lack of facilities for their use. The study concluded from its findings that a greater number of health workers in the developing nations are becoming aware of the use of ICT in health institutions to increase the effectiveness of health care services delivery.

Jimoh, Pate, Lin, and Schulman (2012) also investigated the potential of information and communication technology (ICT) adoption among maternal and child health workers in rural Nigeria. A prospective, quantitative survey design was used to collect data from quasi-randomly selected clusters of 25 rural health facilities in 5 of the 36 states in Nigeria over a 2-month period from June to July 2010. A total of 200 maternal and child health workers were included in the survey, and the data were analyzed using a modified theory of acceptance model (TAM). The results indicated that there was no significant difference between ICT knowledge and attitude scores across the states. There were significant differences in perceived ease of use ($P<.001$) and perceived usefulness scores ($P=.001$) across states. Midwives reported higher scores on all the constructs but a lower score on endemic barriers (which is a more positive outcome). However, the differences were only statistically significant for perceived usefulness ($P=.05$) and endemic barriers ($P<.001$). Regression analysis revealed that there was no interaction between worker group and age. Older workers were likely to have lower scores on knowledge and attitude but higher scores on perceived ease of use and perceived usefulness. It was also revealed that worker preference for ICT application in health varied across

worker groups and conflicted with government/employer priorities.

In contrast to what obtains in public and private hospitals in developing countries, the basic ICT infrastructure consisting of computers and Internet connections is today available in most of the General Practitioner practices in Europe (Empirica, 2008). The electronic storage of administrative and medical patient data, the use of computer during consultation with patients and other uses of ICT in the health area are becoming more and more a daily experience among General Practitioners in Europe. However, there is still room for improvement when it comes to electronic networks connecting their IT systems with other health actors, the electronic exchange of patient data and electronic interactions with patients. Today, almost all General Practitioner (GP) practices in the European Union use a computer, thereby benefiting from all eHealth has to offer.

3.0 Methodology

Hospitals under the National Health Insurance Scheme (NHIS) were used as the population of study from which 50% of the hospitals in Kwara central senatorial district were randomly sampled. NHIS was established under Act 35 of 1999 by the Federal Government of Nigeria to register licensed government or private health care practitioners or facilities, for the provision of easy and affordable healthcare to all

Nigerians. The instrument for data collection was mainly questionnaire developed and designed based on a 22 item criteria and divided into 7 sections. It was examined to ensure content validity and reliability within the target context. A pre-test of the questionnaire was performed using 3 experts in the ICT area to assess logical consistencies, ease of

understanding, question item sequence, adequacy, and context fitness. Necessary modifications were made according to the comments collected from these experts. Furthermore, the reliability of data collected was validated using Cronbach's alpha statistics for each of the sub scales, and the results is as follow:

Table 1: Reliability Results

Construct	No. of Items	Cronbach's Alfa
ICT Facility Used and Extent of Use	2	0.812
Task and activities carried out with ICT	2	0.836
Access to ICTs	6	0.892
Impact of ICTs	1	0.676
Attitude Towards ICTs	2	0.852
Constraints to the Use of ICTs	3	0.809

The first section of the questionnaire consists of demographic profile of respondents. The second section of the questionnaire was on ICT facilities used and extent of use, the third section consists of questions on tasks and activities carried out by health professionals using ICTs, the fourth section was on access to ICTs, the fifth section contained questions on impact of ICTs on the job functions of health professionals, the sixth section was on attitudes towards ICTs and the seventh section was on constraints to the use of ICTs. The questionnaire were randomly distributed within the research population, a total of 250 questionnaire were randomly administered within three months, 210 were received, and 36 of them were not useable. The remaining

174 valid and complete questionnaires were used for the quantitative analysis. These represented a useable response rate of 69.6%. The data collected was analyzed using the statistical package for social sciences (SPSS) version 15.0.

4.0 Presentation of Results

Table 2 below shows the demographic information of the health professionals. Female health professionals were more than twice their male counterparts; this is as a result of the fact that females were more in the nursing profession than males as revealed by a cross tabulation analysis of gender and category of health professionals. A high percentage of the health professionals are within the age of 26 and 35 years and about three quarter of the respondents had

between 0-10 years experience, this implies that there were younger health professionals in the study area. Also, there were more health professionals in private hospitals than in the public hospitals signifying that private hospitals are more in number in the metropolis. Nurses were more in number as naturally expected and the few, neither doctors nor nurses, were

laboratory technologists, pharmacists, and community health workers. All the health professionals have the minimum qualification for their respective professions with only 2 of them having additional qualification in other areas i.e. FRCOG (Fellowship of the Royal College of Obstetricians and Gynecologists).

Table 2: Demographic Information of Respondents

Variables	Frequency	Percent
Gender		
Male	54	31.0
Female	120	69.0
Age		
26 – 30yrs	63	36.2
31 – 35yrs	63	36.2
36 – 40yrs	19	10.9
41 – 45yrs	9	5.2
46 – 50yrs	14	8.0
51 and above	6	3.5
Type of Health Institution		
Public	73	42.0
Private	101	58.0
Category of Health worker		
Doctor	57	32.8
Nurse	97	55.7
Others	20	11.5
Highest Educational Qualification		
Registered Nurse	47	27.0
Registered Nurse Midwife	36	20.7
B. Sc Nursing	14	8.0
M. Sc Nursing	1	0.6
PhD Nursing	1	0.6
MBBS	53	30.5
Additional degrees in other areas	1	0.6
Others	21	12.1
Years of professional experience		
0-5	85	48.9
6-10	45	25.9
11–15	18	10.3
16-20	3	1.7
21-25	11	6.3
26–30	3	1.7
31 and above	4	2.3

ICT Facility Used and Extent of Use

The result of the analysis revealed that the ICT facilities and ICT enabled services that had more than 40% availability and functionality include DSTV (66.1%), TV set (87.4%), mobile/land phone (82.8%), computers (75.9%), printers (62.6%), email (50.6%), Internet searches (43.1%). Others like fax machine, video camera, multimedia projector, PABX, photocopiers, video/audio conferencing. recorded less than 40% availability and functionality. Furthermore, more than 40% of the health professionals claimed never to have used multimedia projector (63.2), video camera (61.5%), fax machine (62.6%), photocopier (52.9%), video recorder (51.7%), mobile/land phones (53.4%), video conferencing (70.1%) and Internet searches (41.4%) in the course of their professional duties. While those ICTs used very often include digital camera (53.4%), computers (61.5%), email (40.2%). Health professionals in Ilorin metropolis claimed that some of the ICT facilities they use are available on personal purchase.

Further analysis to correlate the availability and use of ICTs among health professionals in public and private hospitals revealed a significant difference in the use of email, computers, projectors and Internet searches respectively. With a p-value of 0.000, private hospitals recorded higher percentage in the availability and use of computers, projectors, Internet and emails. On the other hand, there was no significant difference in the availability and use of other ICT equipment and enabled services among health professionals in public and private hospitals.

Task and activities carried out with ICT

Despite the fact that the respondents are qualified specialists and well educated and should be able to understand the relevance of ICT services for their research and day to day operations, it is surprising to note that more than half of the health professionals claimed not to use ICTs for research (62.6%), collaboration (88.5%), skills acquisition (75.9%) data handling (71.8%) and training (79.3%). But more than half claim to use ICTs for hospital work (61.5%). This is shown in table 3 below:

Table 3: Activities ICTs are used for

	Yes		No	
	Freq	%	Freq	%
Research	65	37.4	109	62.6
Hospital work	107	61.5	67	38.5
Data handling	47	27.0	127	73.0
Training	36	20.7	138	79.3
Personal Work	76	43.7	98	56.3
Collaboration	20	11.5	154	88.5
Skills acquisition	42	24.1	132	75.9

As shown in table 4, some type of information accessed with ICTs recorded more than 40%. These are clinical information (48.3%) and health information (66.1%), while those that recorded less than 40% are research information (30.5%), administrative information (23.0%), educational information (27.6%) and career information (11.5%).

Table 4: Type of Information Assessed using ICT Enabled Service

	Yes		No	
	Freq	%	Freq	%
Clinical information	84	48.3	90	51.7
Health information	115	66.1	59	33.9
Research information	53	30.5	121	69.5
Administrative information	40	23.0	134	77.0
Educational information	48	27.6	126	72.4
Career information	18	11.5	154	88.5

Access to ICTs

More than half of the health professionals (54.5%) started using ICTs less than five years ago, while others (45.5%) started using ICTs more than five years ago. Also, the health professionals made use of ICTs in their offices, cyber cafés, homes and schools respectively, health professionals' use of ICTs in the office recorded the highest percentage (49.4%).

Table 5: Places ICTs are made use of

	Yes		No	
	Frequency	%	Frequency	%
Office	86	49.4	88	50.6
Cyber café	60	34.5	114	65.5
Home	67	38.5	107	61.5
School	18	10.3	156	89.7

Findings also revealed that very few health professionals attended formal training (31.6%), workshops/seminars (32.8%) and conferences (12.1%) on ICT use. 29.3% claimed they have never attended any training on ICT use, 20.7% attended more than two years ago, while the remaining 50% attended one event or the other on ICT use in the last two years. For the respondents who had never attended any event focusing on the use of ICT facilities, the reasons for never having attended include lack of budget (14.4%), time constraint (14.4%) and lack of courses at proximity (12.6%). When asked to rate their skill level with the use of ICT, more than half of the health professionals rated themselves from good to excellent as shown in table 5.

Table 6: Skill level with the use of ICT

	Frequency	Percent
Poor	7	4.0
Fair	69	39.7
Good	70	40.2
Very good	20	11.5
Excellent	8	4.6
Total	174	100.0

Impact of ICTs

Table 7 below shows the ways health professionals feel ICTs have impacted on their job functions and productivity. Majority (56.3%) of the health professionals claimed that ICTs have impacted positively on their job functions and productivity in areas such as increased efficiency, better doctor – patient rapport, quicker medical diagnosis and easy collaboration among health professionals. In another way, the health professionals in Ilorin metropolis claimed that ICTs have impacted on their job functions and productivity in the area of seeking medical advice on modern surgical skills like telemedicine.

Table 7: Ways ICTs have Impacted on Health Professionals’ Job Functions and Productivity

	Poor		Fair		Good		Very Good		Excellent	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Increased efficiency	3	1.7	25	14.4	63	36.2	34	19.5	17	9.8
Quicker medical diagnoses	12	6.9	29	16.7	48	27.6	48	27.6	24	13.8
Better doctor – patient rapport	2	1.1	29	16.7	78	44.8	24	13.8	13	7.5
Increase number of publications	22	12.6	28	16.1	51	29.3	23	13.2	11	6.3

More exposure to scrutiny from patients	25	14.4	30	17.2	56	32.2	19	10.9	18	10.3
Has helped to facilitate remote consultation, diagnosis & treatment	14	8.0	30	17.2	51	29.3	42	24.1	17	9.8
Easy collaboration among health professionals	17	9.8	16	9.2	54	31.0	41	23.6	14	8.0
Enabled access to relevant medical training	4	2.3	32	18.4	44	25.3	50	28.7	25	14.4

Attitude towards ICTs

Table 7 shows the frequency distribution of the extent of agreement or disagreement to some statements about ICTs. The Health Professionals were asked to select from a list of options on whether they strongly agree, disagree or strongly disagree with some statements. As revealed in the table, more health professionals agree and strongly agree to the positive statements about ICTs like facilitating access to patient information and providing new tools for sharing knowledge. Likewise, a high percentage of the health professionals disagree and strongly disagree to the statement that they completely lack confidence in ICTs.

Table 8: Knowledge of Relevance of ICT

	SA		A		D		SD	
	q	%	q	%	q	%	q	%
ICTs can cut administration costs	7	3	5	6	5	4	0	7
ICTs can facilitate access to patient information	8	6	9	7	7	0	5	9
ICT applications provide new tools for sharing knowledge	9	1	4	8	9	2	5	9
Network services, including e-mail and multimedia conferencing, are essential lifelines for medical practitioners	0	5	6	2	8	6	5	9
I feel very confident using ICTs	2	6	0	2	2	4	3	7
I feel I can cope with the use of ICTs	2	4	1	1	8	1	5	9
I am completely lacking in confidence	6	4	6	7	7	3	7	0

Majority of the health professionals are of the view that ICTs are relevant to the health profession in many ways. They agree that ICTs will deliver great benefits to medical practitioners (92.0%); every health

worker must be equipped with ICTs (86.3%); the role of ICTs in health research is very essential (89.1%); ICTs can be informative for scaling up medical projects (84.5%); ICTs can link with and inform social and

interpersonal communication practices that focus on health (82.8%). On the other hand, a greater part of the health professionals disagree that ICTs will never play an important role in medicine (84.5%) and that ICTs are encroaching on medicine (83.9%).

Also, majority of the health professionals believed that organizing training regularly (94.3%), provision of enough ICT equipment/services (94.3%), implementing an effective health information system (96.0%), easy access to the Internet (94.8%), adequate power supply (93.7%), and maintenance of equipment (95.4%) among others will enhance ICT use among health professionals. Apart

from this, they proposed that giving awards and scholarships to the best ICT medical practitioners in Ilorin will enhance ICT use.

Constraints to the Use of ICTs

As revealed in table 9 below, about 50% of the health workers believe that the factors that constitute barriers to the use of ICTs to a high extent are lack of proper training, lack of ICT facilities, lack of electricity supply and lack of physical access. On the other hand, more than 50% of the health professionals identified those factors that constitute barrier to a low extent which are insufficient knowledge on use, lack of affordability and security/privacy issues.

Table 9: Factors that Constitute Barrier to ICT Use

	Low		Medium		High	
	Freq	%	Freq	%	Freq	%
Lack of proper training	57	32.8	37	21.3	80	46.0
Lack of ICT facilities	47	27.0	33	19.0	94	54.0
Insufficient knowledge on use	107	61.5	28	16.1	39	22.4
Lack of time	75	43.1	54	31.0	45	25.8
Lack of electricity supply	42	24.1	50	28.8	82	47.0
Lack of physical access	49	28.2	37	21.3	88	50.6
Lack of affordability	92	52.9	49	28.2	33	18.9
Failure of equipment	83	47.7	41	23.6	50	28.8
Security/privacy issues	100	57.5	43	24.7	31	17.8

5.0 Discussion of Results

This study has clearly demonstrated the place of ICTs on the job functions and productivity of health professionals in public and private hospitals in Ilorin metropolis due to the numerous tasks performed

through the use of these tools and more so, a positive attitude towards usage by the health professionals. The results from this study are discussed below in line with the research objectives:

(a) Determining the state of ICT facilities in public and private hospitals.

The first objective of this study was to determine the state of ICT facilities in public and private hospitals. The result of the analysis as revealed in table 1 shows that the available and functioning ICT facilities utilized by the health professionals such as TV Set (87.4%), DSTV (66.1%), Computers (75.9%), Printer (62.6%), Mobile phones (82.8%), among others, were commonly used in these hospitals. On the other hand, non use and non availability of ICT facilities such as video conferencing (70.1%), multimedia projector (63.2%), and video camera (61.5%) recorded a high percentage due to high cost of procuring these facilities by the hospitals. This accounted for the minimal usage of Internet searches (43.1%) and email (50.6%) respectively. On the whole, the available and functioning ICTs in these hospitals were the commonly affordable ones. Comparatively, a low level of usage of Internet driven facilities was reported by the health professionals; thereby hampering the delivery of quality health services and access to current health information. The low availability of Internet driven facilities is peculiar to past studies on ICT usage by health professionals (Idowu et al 2003; Adeyemi and Adebogun, 2004; Adedoyin, Imam and Oladapo 2009).

Furthermore, the significant difference recorded in favor of health professionals in private hospitals as far as the availability and use of computers, Internet, emails and projectors are concerned, is understandable. Factors such as superior service delivery, competitive edge, improved customer service and best practices among others, contribute to such notable differences. The poor maintenance culture of government in Nigeria which has rendered many of the available equipment non functional is also another negative factor. According to Castells (2000), there is concern about examples of waste, delay, mismanagement and corruption within the public sector in Africa, all of these cause inefficiency in the conversion of public expenditure into public services.

(b) Determining task and activities performed with ICT tools

The second objective was to determine the task and activities performed with ICT tools. The result of the analysis as revealed in table 2 showed that a high proportion of the health professionals were less involved in ICT related activities such as research (62.6%), collaboration (88.5%), skills acquisition (75.9%) data handling (71.8%) and training (79.3%). On the other hand, more than half of the respondents claimed to use ICTs for hospital work majorly (61.5%). This depicts that

most of the health professionals were either preoccupied with their daily task of attending to patients or attached to other mundane tasks. Health professionals need to create time to explore the benefits of ICTs through research, skill acquisition, collaboration and so on. This accounted for high percentage of those that needed health information (66.1%) compared to other types of information (research, clinical, career, and administrative) respectively. It is evident here that health professionals in Kwara central senatorial district collaborate only with their colleagues that are within close range and therefore do not participate in transnational exchange of experiences since this can only be done via Internet enabled services which most of the hospitals lack.

(c) Determining the places of access to ICTs

The third objective of this study was to determine the places of access to ICTs by the health professionals. Table 4 revealed that more than half of the health professionals (54.5%) had access to ICTs less than five years ago from various places such as cybercafés, homes, schools and offices. The demographic profile of the health professionals further revealed that (48.9%) had few years of professional experience between 1-5 years which is a determinant of the number of years of access to ICTs. Out of the identified places of access, the office was the first point of access to the use of ICTs. This

shows that hospitals should be better equipped with ICTs equipment and infrastructures because that is the first point of access for health professionals.

(d) Impact of ICTs on their job functions and productivity

The fourth objective determined the impact of ICTs on health professionals' job functions and productivity. Table 6 revealed that ICTs have positively impacted on the job functions and productivity of health professionals in areas such as increased efficiency, better doctor – patient rapport, quicker medical diagnosis and easy collaboration among others. This finding supports Davies et. al, (2006) in the identification of personal, interpersonal and organizational benefits of ICTs by health professionals.

(e) Evaluating the attitude of health professionals to the use of ICTs

The fifth objective evaluated the attitude of health professionals to the use of ICTs. In table 7, it was revealed that majority of the health professionals exhibited a positive attitude towards the use of ICTs due to the high level of awareness and usefulness of ICTs to the medical profession. Majority of the health professionals affirmed positively to the following statements: Health professionals should be equipped with ICTs (86.3%), ICTs in health research is very essential (89.1%); ICTs can be informative for scaling

up medical projects (84.5%); ICTs can link with and inform social and interpersonal communication practices that focus on health (82.8%). On the other hand, majority of the health professionals disagree that ICTs will never play an important role in medicine (84.5%) and that ICTs are encroaching on medicine (83.9%). This result has clearly shown that ICTs are indispensable tools to the modern day health professionals because of its numerous benefits that include the use and the delivery of quality health care services. This is in line with the findings of Adedoyin, Imam and Oladapo (2009) on ICT literacy of health professionals which revealed that majority of health professionals in developing countries are becoming aware of the usefulness of ICTs to the medical profession.

(f) Constraints to the utilization of ICTs

The Sixth objective determined the constraints to the utilization of ICTs by the health professionals. As revealed in table 8, barely half (50%) of the health professionals identified barriers of high extent such as lack of proper training, lack of ICT facilities, lack of electricity supply and lack of physical access. On the other hand, barriers of low extent constituted insufficient knowledge on use, lack of affordability and security/privacy issues. This result confirms the findings of past studies on the common barriers militating against

the use of ICTs by health professionals in developing countries (Idowu et. al, 2003; Ouma and Herseman, 2008; Chandrasekhar and Ghosh, 2001). However, these constraints to the utilization of ICTs can be minimized through the development and proper enforcement of ICT usage that must be enforced on health professionals in public and private hospitals by the relevant regulatory agencies.

6.0 Conclusion and Recommendations

This study has clearly revealed that although health professionals in the study area are aware of the usefulness of ICTs to the medical profession, however, access, usage and volume of ICTs are low. The health professionals are handicapped because there are some core ICT enabled services like video/audio conferencing that are not available for use within the hospital environment and which they cannot own by themselves. Even though the health professionals can afford to provide for themselves other ICT enabled services like Internet searches, provision of ICT equipment and services by hospitals is very fundamental to achieving the desired impact of ICTs in the health sector. The lack of necessary ICT facilities in these hospitals have resulted in low access to adequate and reliable information. This is hampering efficient health care delivery services.

Having identified barriers to the superior use of ICTs for enhanced access to current and relevant medical information, the following recommendations are suggested:

- 1) Hospital regulatory bodies should collaborate with International agencies in the area of funding by giving out grants for the successful implementation of sophisticated ICTs in health institutions in public and private sectors.
- 2) There should be training and re-training of health professionals on ICT use so that health professionals can be abreast of the latest happenings in the ICT world. Also, it is not enough to make available state of the art ICT equipment; there must be training on the use of such ICTs to guarantee adequate technical know-how and proper maintenance.
- 3) Internet access within hospital environments should be given high priority. With Internet access, health workers can collaborate with their colleagues outside the Ilorin metropolis and share experiences that will impact positively on their duties.
- 4) Hospitals should have an in-house policy that mandates staff to use ICTs in the discharge of their duties. This is because there are bound to be health professionals, particularly the older ones, that will be carefree when it comes to adopting some specific technologies.
- 5) Proper maintenance of ICT equipment should be done at all times to ensure that all available ICTs are functioning and serving.
- 6) The Government, in collaboration with hospitals' regulatory bodies, should put in place policies that will ensure that all health institutions have a minimum standard of ICT facilities within their hospital premises.
- 7) Electricity is an infrastructural necessity in the use of ICTs, hence Government should give it the priority it deserves. Also, all hospital management should supplement government electricity supply in their various hospital environments with modern power generation technologies like the solar and gas energy plants.

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Additional degrees in other areas ()

Others (please specify) _____

6. Years of professional experience:

0-5 () 6-10 () 11-15 () 16-20 () 21-25 () 26-30 ()

31 and above ()

SECTION B – ICT Facility Used and Extent of Use

7. Which of the following ICT equipments are available in your Hospital?

ICT products and equipment	Available & Functioning	Available but Not Functioning	Not Available	Don't Know
Multimedia Projector				
PABX (Intercom)				
Video Camera				
Fax machine				
DSTV				
Photocopier				
Video Recorder				
T.V sets				
Digital camera				
Mobile phone/Nitel phone				
Computers (Desktop/Laptop)				
Printers				
Scanners				
Others (specify)				
ICT enabled services				
email				
WWW				

Videoconferencing				
Audio conferencing				
Internet searches e.g. Google				
Others (specify)				

8. Which of the following ICT facilities do you make use of in your work and how often?

ICT products and equipment	Never	Rarely	Often	Very often
Multimedia Projector				
PABX (Intercom)				
Video Camera				
Fax machine				
DSTV				
Photocopier				
Video Recorder				
Scanners				
T.V sets				
Digital camera				
Mobile phone/Nitel phone				
Computers (Desktop/Laptop)				
Printers				
Others (specify)				
ICT enabled services				
email				
WWW				
Videoconferencing				
Audio conferencing				

Internet searches e.g. Google				
Others (specify)				

SECTION C - Task and activities carried out with ICT

9. Which of the following activities do you use ICT for?

- Research () Hospital work () Data handling () Training ()
 Personal Work () Collaboration () Skills acquisition ()
 Others (please specify) _____

10. What type of health related information do you access using ICT enabled services?

- Clinical information () Health information ()
 Research information () Administrative information ()
 Educational information () Career information ()
 Others (please specify) _____

SECTION D - Access to ICTs

11. How long ago did you **first** start to use ICT? (Please answer in *either* months or years) _____ Months ago _____ Years ago

12. Which of the following places do you usually make use of ICT?

- Office () Cyber cafés () Home () School ()
 Others ()

13. Have you ever attended any of the following events on ICT use?

- Formal Training () Workshops/Seminars () Conferences ()
 Others (please specify) _____

14. When last did you attend any of the above, focusing on the use of ICT facilities?

- 1-6 months ago () 6-12 months ago () 1-2 years ago ()
 More than two years ago () Never ()

15. If your answer to 14 above is Never, which of the following has been the reason?

- Lack of budget for staff training courses ()
 Pressure of current workload ()
 No courses at any location nearby ()
 Personal family commitments ()
 Lack of interest ()
 Time constraint ()
 Others (please specify) -----

16. How would you rate your skill level with the use of ICT?

- Poor () Fair () Good () Very Good () Excellent ()

SECTION E - Impact of ICTs

17. In what ways have ICTs impacted on your job functions and productivity?

	Poor	Fair	Good	Very Good	Excellent
Increased efficiency					
Quicker medical diagnoses					
Better doctor – patient rapport					
Increase number of publications					
More exposure to scrutiny from patients					
Has helped to facilitate remote consultation, diagnosis & treatment					
Easy collaboration among physicians					
Enabled access to relevant medical training					
Others (specify): _____					

SECTION F - Attitude towards ICTs

18. Please indicate the degree to which you agree or disagree with the following statement by circling SA for strongly agree, A for agree, D for disagree, or SD for strongly disagree.

	SA	A	D	SD
ICTs can cut administration costs				
ICTs can facilitate access to patient information				
ICT applications provide new tools for sharing knowledge				
Network services, including e-mail and multimedia conferencing, are essential lifelines for medical practitioners				
I feel very confident using ICTs				
I feel I can cope with the use of ICTs				
I am completely lacking in confidence				

19. What are your views on the relevance of ICTs to the Health profession?

- I expect that ICTs will deliver great benefits to medical practitioners ()
- I believe every health worker must be equipped with ICTs ()

- The role of ICTs in health research is very essential ()
- ICTs can be informative for scaling up medical projects ()
- ICTs can link with and inform social and interpersonal communication practices that focus on health ()
- I don't think that ICTs will ever play an important role in medicine ()
- I am worried about the way in which ICTs are encroaching on medicine ()

SECTION G - Constraints to the Use of ICTs

20. Are ICT facilities readily available to you in your hospital?

- Very Available () Available () Fairly Available ()
 Not Available ()

21. Do any of the following reasons constitute a barrier to your using ICTs?

	Not at all	Low	Medium	High
Lack of proper training				
Lack of ICT facilities				
Insufficient knowledge on use				
Lack of time				
Lack of electricity supply				
Lack of physical access				
Lack of affordability				
Failure of equipment				
Security/privacy issues				
Others (please specify)				

22. What do you think can be done to enhance ICT use among Medical Practitioners?

	Yes	No
Organize training regularly		
Provision of enough ICT equipment/services		
Implementing an effective health information system		
Easy access to the internet		
Adequate power supply		
Maintenance of equipments		

Free access to online medical journals		
Provision of latest ICT equipments		
Access to electronic publishing		
Having and implementing ICT strategy and policy		
Others (please specify)		