# Knowledge and utilization patterns of information technology among healthcare personnel in Lagos University Teaching Hospital, Lagos.

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**Abstract**

**Objective:** The field of healthcare practice requires the use of computers for processing information, decision-making, record keeping and teaching. To ensure success of information and communication technology, adequate application of Information Technology is required by health care professionals. Current information on knowledge and utilization pattern of information technology among healthcare personnel in developing countries is scant. The objective is to assess the knowledge of Information technology among healthcare personnel in the Lagos University Teaching Hospital, Idi-Araba as well as the factors affecting its use.

**Method:** Self-structured pretested questionnaires that probed into the knowledge and utilization of Information Technology were administered to a stratified randomly selected group of 300 male and female dentists, medical doctors, radiographers, nurses and pharmacists. Descriptive statistics on their knowledge and utilization patterns were calculated.

**Result:** A total of 239 participants (79.6%) responded, with a mean age of 25.8±5.4 years. Majority (67.5%) respondents reportedly had received some form of formal computer training, while the remaining 76 (32.5%) had no training. Most of the respondents, 167 (69.9%) respondents demonstrated good knowledge of Information Technology, while 33 (13.8%) showed a fair knowledge. Only 39 (16.3%) respondents demonstrated poor knowledge of Information Technology. Most of the respondents (58.2%) never participated in video conferencing.

**Conclusion:** Despite the fact that the respondents had generally good knowledge and utilization habits of Information Technology, most of the respondents had never participated in Video conferencing, which is an important innovation in the modern day management of the patients. The medical personnel would benefit from the provision of adequate infrastructure, utilizing Information Technology.

**Key words: Information, Technology, Knowledge, Utilization, medical, dental.**

## Introduction

Information Technology often referred to as IT can be defined as tools, which facilitate the electronic communication, processing, transformation of information and the sharing of knowledge[1]. Information Technology (IT) helps in improving health care delivery such as in disease control, diagnosis, patient management and teaching[2-3]. It is usually categorized into diagnostic, therapeutic technology which is used in exchange of vital information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers[4]. Advancements in Information and Communication Technology in the last quarter of the 20th century have led to the ability to more accurately profile individual health risks[3], understand better, basic physiologic and pathologic processes[5] and to revolutionize diagnosis through new imaging and scanning technologies. The use of Information Technology in developing countries of Africa is however, still very limited[6,7]. The reasons for the limited use have been attributed to high cost of hardware, software and low internet connectivity. All these have resulted in the low computer literacy in the community with sparse record of computer use in health facilities within these communities[8].

Nigeria is a developing country and the most populous country in Sub-Saharan Africa, with an approximate population of about 167 million people[9].Preventable diseases and premature death still inflict a high toll in this country. The use of health technologies, which forms the backbone of the services to prevent, diagnose and treat illnesses and diseases[1] could help in reducing morbidity and mortality.

The importance of an information technologically competent workforce cannot be over emphasized in an institution like the Lagos University Teaching Hospital, Lagos. Clinical informatics aims to improve patient care with the use of high intelligence technological equipments. A skilled workforce is an essential ingredient for the effective use of IT in health. The workforce is skilled going by their professional training and clinical competence, Information Technology will aid effective delivery of service which is very relevant to the much desired level of success in patient management seen in developed countries. To do this, a baseline assessment of the current situation regarding the knowledge and use of IT among the medical personnel becomes a necessity and this is the major thrust of this study.

Moreover, this research is of significance to the field of Medical Information Technology, as it extends the knowledge base that currently exists in that field. It will also provide useful information for policy and decision makers on the availability and use of Information Technology among the health care professionals in the Lagos University Teaching Hospital, Lagos as well the factors which play an important role in its availability and use or otherwise.

## Materials and method

The study was conducted at the Lagos University Teaching Hospital (LUTH) Lagos, one of the foremost teaching and research hospitals in Nigeria. The primary factors that were considered in choosing the Lagos University Teaching Hospital were: LUTH is a national referral hospital, and one of the largest tertiary hospitals in Nigeria with a bed capacity of 805. It offers highly specialized services and has a high concentration of medical professionals specialized in different medical fields. It is a major training institution for healthcare personnel in various disciplines and a reference point for training post-graduate medical doctors in various specialties. It is also an institution which provides internship opportunities for health professionals. The presence of this mix of features made LUTH appropriate for this study, hence the choice of the site.

The hospital has more than 45 medical specialties and sub-specialties and runs over 75 consulting clinics weekly with 805 beds for admission. This study was a cross-sectional study of descriptive nature, to find out the knowledge and use of Information Technology among medical personnel in the Lagos University Teaching Hospital (LUTH) Lagos, as well as the factors affecting the use of Information Technology among the study population. The study was carried out among male and female medical doctors, dentists, pharmacists, radiographers and nurses in the Lagos University Teaching Hospital, Lagos. There are 539 medical doctors, 77 dentists, 90 pharmacists, 25 radiographers and 799 nurses in LUTH, Lagos. The total study population was 1530.

### Sampling Method

A non-probability sampling technique, quota sampling method was used. The total study population was divided into mutually exclusive groups that differ in important ways: Medical doctors, dentists, pharmacists, radiographers and nurses. To ensure appropriate representation of each group, a quota sampling was used as it is a more representative non-probability sampling method, and also due to the nature of the professionals, it was quite difficult to assemble all the professionals in the hospital at a particular point in time for this study.

### Data analysis

Data collected were analyzed both manually and electronically. Data analysis was done using SPSS version 15.0. Chi-square test was used to test any association between the categorical variables.

Assessment of knowledge was based on the response score using the following criteria; Knowledge score: each correct response was awarded one mark, while no mark was awarded for NO responses / wrong responses. The total marks for knowledge was 12 and was graded as Good (9-12), Fair (6-9), and Poor (0-6).

### Ethical Considerations

Ethical approval was sought and granted by the Ethics and Research Committee of the Lagos University Teaching Hospital, Lagos. During the design of the research, a number of issues were identified including the need to inform participants of the purpose of the research, to obtain informed consent, the requirement of confidentiality and the right of the participants to decline to participate.

## Results

The study was conducted among medical and allied personnel in Lagos University Teaching Hospital, Idi-Araba, Lagos. Out of the 300 questionnaires that were distributed to the respondents, 239 questionnaires were completely filled and returned, which gave a response rate of 79.6%. The entire returned data sheets were analyzed using SPSS version 20.

The age of the respondents ranged from 18-40 years old. The mean age of the respondents is 25.8 ± 5.4 years. One hundred and fifteen (48.1%) respondents were between 18-24 years old with more females (57.7%) than males (41.5%). There were 23 (9.6%) dentists, 96 (40.2%) medical doctors, 83 (34.7%) nurses, 8 (3.3%) radiographers and 23(9.6%) pharmacists **(Table 1)**.

A large proportion (88.7%) of the respondents could define information technology correctly **(Table 2)**.

About the knowledge of respondents on common application software, Microsoft Word was the most popular software (95.3%), followed by Microsoft Power Point (93.3%) and Microsoft Excel (90.8%). The least popular software was SPSS (44.8%) **(Table 3)**.

**Table 1: Socio-Demographic Characteristics of Respondents**

| Variable | Frequency | Percentage |
|---|---|---|
| **Age (Years)** | | |
| 18-24 | 115 | 48.1 |
| 25-30 | 82 | 34.3 |
| 31-35 | 19 | 7.9 |
| 36-40 | 10 | 4.2 |
| Non-response | 13 | 5.4 |
| **Total** | **239** | **100.0** |
| **Sex** | | |
| Male | 99 | 41.5 |
| Female | 138 | 57.7 |
| Non-response | 2 | 0.8 |
| **Total** | **239** | **100.0** |
| **Religion** | | |
| Christianity | 167 | 69.9 |
| Islam | 65 | 27.2 |
| Others | 1 | 0.4 |
| Non-response | 6 | 2.5 |
| **Total** | **239** | **100.0** |
| **Marital Status** | | |
| Single | 181 | 75.7 |
| Married | 52 | 21.8 |
| Divorced | 3 | 1.3 |
| Non-response | 3 | 1.3 |
| **Total** | **239** | **100.0** |
| **Occupation** | | |
| Dentist | 23 | 9.6 |
| Medical Doctor | 96 | 40.2 |
| Nurse | 83 | 34.7 |
| Radiographer | 8 | 3.3 |
| Pharmacist | 23 | 9.6 |
| Non-response | 6 | 2.5 |
| **Total** | **239** | **100.0** |

**Table 2: Knowledge of Respondents on the Definition of Information Technology**

| Definition of Information Technology | Frequency | Percentage |
|---|---|---|
| **An Interconnection of Computer Networks.** | | |
| True | 163 | 68.2 |
| False | 67 | 28.0 |
| Non - response | 9 | 3.8 |
| **Total** | **239** | **100.0** |
| **Processing and Disseminating of Computer hardware and software, telecommunications and digital electronics.** | | |
| True | 212 | 88.7 |
| False | 19 | 7.9 |
| Non - response | 8 | 3.3 |
| **Total** | **239** | **100.0** |
| **The Process of Disseminating Information by word of Mouth.** | | |
| True | 46 | 19.2 |
| False | 180 | 75.3 |
| Non - response | 13 | 5.4 |
| **Total** | **239** | **100.0** |
| **The same thing as the Internet.** | | |
| True | 123 | 51.5 |
| False | 104 | 43.5 |
| Non - response | 12 | 5.0 |
| **Total** | **239** | **100.0** |

**Table 3: Knowledge of Respondents on Common Application Software**

| Application Software | Frequency | Percentage |
|---|---|---|
| **Microsoft Word** | | |
| Yes | 228 | 95.3 |
| No | 8 | 3.3 |
| Non response | 3 | 1.2 |
| **Total** | **239** | **100.0** |
| **Microsoft Excel** | | |
| Yes | 217 | 90.8 |
| No | 15 | 6.3 |
| Non response | 7 | 2.9 |
| **Total** | **239** | **100.0** |
| **Microsoft Power Point** | | |
| Yes | 223 | 93.3 |
| No | 13 | 5.4 |
| Non response | 3 | 1.3 |
| **Total** | **239** | **100.0** |
| **SPSS** | | |
| Yes | 107 | 44.8 |
| No | 123 | 51.5 |
| Non response | 9 | 3.8 |
| **Total** | **239** | **100.0** |
| **EPI-INFO** | | |
| Yes | 124 | 51.9 |
| No | 105 | 43.9 |
| Non response | 10 | 4.2 |
| **Total** | **239** | **100.0** |

A large proportion (71.5%) of respondents had knowledge about telemedicine, of which 29.6% claimed their source of information was from the internet; 21.2% heard about IT through friends, 19.6% from a formal lecture, 14.9% from Journals, 13.1% from Newspapers, and only 1.6% claimed their information about telemedicine was from other sources **(Table 4)**.

The overall knowledge of respondents about IT is GOOD since most of the respondents (69.9%) had good knowledge. 33 (13.8%) had FAIR knowledge and only 39 out of 239 respondents (16.3%) had POOR knowledge **(Table 5)**.

Most of the respondents were familiar with social networks sites like Facebook (93.3%) and Twitter (87.9%). However, a relatively smaller percentage of respondents were aware of the Medical websites that can be used in research such as Medscape (67.8%) and Pubmed (71.1%). Hinari was the least popular among respondents; only 45.6% of respondents were familiar with it.

**Table 4: Knowledge of Respondents on Telemedicine**

| **Knowledge of Telemedicine.** | **Frequency** | **Percentage** |
|---|---|---|
| Yes | 171 | 71.5 |
| No | 62 | 25.9 |
| Non -response | 6 | 2.5 |
| **Total** | **239** | **100.0** |
| **Source(s) of Information** | **(N= 429)** | |
| Friends | 91 | 21.2 |
| Internet | 127 | 29.6 |
| Newspaper | 56 | 13.1 |
| Journals | 64 | 14.9 |
| Formal Lecture | 84 | 19.6 |
| Others | 7 | 1.6 |

*Respondents were allowed multiple responses for their source(s) of information about telemedicine.*

**Table 5: Respondents' Knowledge in Information Technology**

| **Knowledge** | **Frequency** | **Percentage** |
|---|---|---|
| Good | 167 | 69.9 |
| Fair | 33 | 13.8 |
| Poor | 39 | 16.3 |
| **Total** | **239** | **100.0** |

| **Formal computer training received** | **Frequency** | **Percentage** |
|---|---|---|
| Yes | 158 | 66.1 |
| No | 76 | 31.8 |
| Non -response | 5 | 2.1 |
| **Total** | **239** | **100.0** |
| **Type of Computer Training received.** | | |
| Short Course | 79 | 50.0 |
| Certificate | 42 | 26.7 |
| Diploma | 31 | 19.5 |
| Degree | 6 | 3.8 |
| **Total** | **158** | **100.0** |

## Discussion

Information has been a critical part of the medical professionals' toolkit for effective patient care[2]. Utilizing ICTs can offer the healthcare professionals with enhanced access to key data at all levels from international to local, electronic libraries of evidence, peer reviewed research and practice guidelines, and network of professionals in health and related disciplines[10]. In this study, we found that the knowledge of Information Technology among the medical personnel in a major teaching hospital was good. This was in contrast to previous study done in Ile-Ife, Nigeria where only 39.9% of subjects had good knowledge of IT[11]. It was however in agreement with a study done amongst medical student in Lagos[12]. Most subjects in this study having undergone formal computer training and easy access to internet even in their workplace. The location of the subjects might also be contributory since Lagos is a metropolitan city where there is easy access to IT tools.

Concerning the utilization habits of the respondents, Internet access was not an issue, as evidenced by a large proportion of respondents who claimed that they find it easy to access the internet in their workplace. Microsoft Office software was the commonest software used and the least was SPSS. A large proportion of the respondents spend at least 5 hours on the Internet per week with major communication via personal e-mail. This is similar to previous study pattern of utilization[13-15]. Despite the perceived cost of computers as being expensive by more than half of the respondents, the finding of high utilization patterns is also not surprising as most respondents who do not own personal computers can use them by going to Internet cafés due to the high proliferation of internet cafés in recent times. This is also consistent with the findings of others[10,16,17].

In this study a relatively low proportion used the Internet for research purposes. This is in agreement with an earlier study[18]. Despite the fact that video conferencing is an important application of Information Technology in the field of medicine, less than half of the respondents have participated in video conferencing. A possible explanation for this despite the respondents generally good knowledge and utilization habits, may be the absence of the necessary set up or required facilities within the hospital for the performance of video conferencing.

The gains of IT can only be fully harnessed when the majority, if not all, of the members of staff become knowledgeable and are willing to utilize computers and IT. Such utilization will naturally impact on health information management. The use of Medline, CD-ROMs and interactive software packages would enhance dissemination of medical information, knowledge and teaching among health care professionals. It would also improve health care delivery and collaborative multicentre research, which is still very limited in developing countries, particularly in Africa[17,18].

## Conclusion and Recommendations

This study underscores the importance of access to information resources in a hospital setting. The result of the study suggests a high level of Information Technology literacy and utilization among the study population. This is in keeping up with the beliefs of the medical personnel that Information Technology had a role to play in improving the health care delivery system in Nigeria. Respondents also had good knowledge and application of Telemedicine; however, one particular area of note is the relatively poor utilization habits of video conferencing, which is also an important tool in modern day management of the patient and medical care.

On the basis of the study findings, the following recommendations are made;

- The introduction of a structured computer training course, which includes the applicability of Information Technology to medicine, into the curriculum of medical students, residency and continuous medical education training (CME) programmes for all practising physicians and health workers. Medicine is an ever-evolving and information-based discipline, and as such the provision of structured computer and IT training for all members of the health team would equip them with the necessary tool needed to practice up-to-date and evidence-based medicine, which are essential to improving the quality of medical care.
- Formulation of policies and strategies that will encourage Information Technology use as tools of health care information dissemination and delivery. Policies should be flexible and constantly reviewed in keeping up with technological trends and advancements in Health care delivery system.
- Provision of the necessary infrastructures on which the use of Information Technology can take place. Adequate budgetary allocations should be made for the purchase of necessary hardware, software and other accessories, cost of installation, support and maintenance.

## References

1. Eng T. The e-Health Landscape: A Terrain Map of Emerging Information and Communication Technologies in Health and Health Care. 2001. http://www.hetinitiative.org/media/pdf/eHealth.pdf (Accessed on the 20/12/14)
2. Myers MR. Telemedicine an emerging health care technology. Health care Management (Federick) 2003; 22:219-223.
3. Edworthy SM. Telemedicine in developing countries. Br Med J 2001; 323:524-525.

4. Blumenthal D, DesRoches C, Donelan K, Ferris T et al. Health Information Technology in the United States: The information base for progress.2006;4: 32-38.

5. Satellife; Handhelds for health: Satellife's experiences in Africa and Asia. Watertown, MA: Satellife. 2005:1-56.

6. Dorup J. Experience and attitudes towards information technology among first-year medical students in Denmark: longitudinal questionnaire survey. J Med Internet Res 2004; 6:10.

7. Arora R. Computer and information technology skills of first year Medical and Dental students at CMC, Ludhiana. Health Administrator 2004; 1: 54-58.

8. Ogunsola BF, Akindojutimi, Omoike A D. Information literacy in Nigerian higher institutions- any role for Liberians? Ozean J Soc Sci 2011; 4:85-92.

9. Beuer F, Schweiger J, Edelhoff D. Digital dentistry: an overview of recent developments for CAD/CAM generated restorations. Br Dent J 2008; 204:505-511.

10. Odusanya OO, Bamgbala OA. Computing and information technology skills of final year medical and dental students at the College of Medicine University of Lagos. Nig Postgrad Med J 2002; 9:189-193.

11. Ajuwon GA. Computer and Internet use by first year clinical and nursing students in a Nigerian teaching hospital. BMC Med Inform DecisMak 2003; 3:10.

12. Nurjahan MI, Lim TA, Yeong SW, Foong ALS, Ware J. Utilization of information technology in medical education: a questionnaire survey of students in a Malaysian institution. Med J Malaysia 2002 57 Suppl E: 58-66.

13. Holtel MR, Burgess LPA. Telemedicine in otolaryngology. Otolaryngol Clinic North Am 2002; 35:1263-1281.

14. Smith JJ, Mallard-smiith RJ, Beattie V, Beattie DK. Use of information technology in general practices. J R Soc Med 2003; 96:395-397.

15. Crowe P, Howie C, Thorpe M. Self-reported computer literacy of medical students and staff: good facilities are not enough. Medical Teacher 1998; 20: 264-265.

16. Asgari-irhandeh N, Haywood J. Computer awareness among medical students: a survey. Med Educ 1997; 31:225-229.

17. Bello IS, Ezeoma IT, Akinsola A. Knowledge and utilization of information technology among health care professional and students in Ile Ife, Nigeria: A case study. J Med Internet Res 2004; 6: 45.

18. Moulin T, Retel O, Chavot D. Impact of new information and communication technologies (NTIC) on hospital administration and patient management. Care Network for Diagnosing and Treating Neurologic Emergencies. Sante Publique 2003; 15: 191-200