

Computer use among doctors in Africa: Survey of trainees in a Nigerian teaching hospital

Ime E. Asangansi^{ab}, Oluwakayode O. Adejoro^{*ab}, Oladimeji Farri^{ab}, Olusesan Makinde^{ac}

Abstract

The field of medicine and medical practice requires the use of computers for support in information processing, decision making and records keeping. The success of information and communications technology applications in health is dependent on the level of computer use by health professionals especially doctors. This questionnaire-based study assessed the level of computer and internet use by doctors in a Nigerian Teaching Hospital as well as their perception of the medical recording system in their place of practice. The study is planned to be carried out similarly in other centres across Africa; this survey will serve as a pilot.

Keywords: *health informatics, Nigeria, Africa*

Background

The computer as a tool has transformed information and data handling in all fields of endeavour. With the internet and the numerous networks^{1,2} within it, the world is fast turning into a global village. The health professions have been tremendously affected by the information and communications technology (ICT) revolution especially in the areas of information access, storage, retrieval, analysis and dissemination. Computers have been used to manage patients at a distance (telemedicine), to manage hospitals and their patients' records and to search and retrieve pertinent information for research and assist in clinical decision making. In general, clinical practice has been tremendously improved by the technological interventions and a new and rapidly growing field of applications called health (or medical) informatics has emerged.^{3,4,5,6}

However, serious implementations of the above occur mainly in the developed countries and only in few pockets in the developing world, where health informatics is in high level use. In most of the developing world, separated by the digital divide due to many reasons including high cost of hardware, software and connectivity⁷, computer use and literacy though rising is still very low. More so, little is known about the level of computer use in health facilities within these communities.

In a study conducted among a selected population of doctors in Nigeria by Ozumba in 2002⁸, only about 0.5% of doctors searched the internet for information relating to their clinical practice/research, though 72% of respondents believed that the internet had a role to play in medical practice. In a survey of health professionals and medical students in Lagos, Nigeria, Bello et al.⁹ reported that only 26% of respondents had a computer

and only 27% of doctors demonstrated computer literacy. Ajuwon et al.¹⁰ in a study of medical and nursing students in a teaching hospital in Nigeria found that only 42.6% of the sampled students' population could use a computer.

This is in sharp contrast to what obtains in Europe, America and Australasia. A study in 2002 among a selected population of student doctors in Malaysia showed that 94.3% of respondents could use a computer¹¹. Similarly higher values have been obtained for medical/dental students in Europe¹² and Saudi Arabia¹³. A study carried out in New Zealand in 2002¹⁴ showed that 99% of practices use specifically designed patient management system software to assist with recording of patient and clinical consultation details and to help with the daily running of their businesses. In a survey of physicians across eleven North American, European and Asian countries in 1998, 80% of physicians were found to own a computer and 44% of these physicians had accessed the Internet and their predominant place of internet access was in the home¹⁵. Recent studies have however shown remarkable improvements in this figures^{16,17}.

Not much is reported in literature about the level of internet access amongst doctors and the use of electronic medical records in health facilities in Africa. The success of any health informatics program will depend on the skill level and the perception of those who will run it.

Rationale for the study

Responding to the clause 'the world is turning into a global village', one needs to know where exactly

^aBiohealthmatics African Network Initiative
Nigeria

^bUniversity College Hospital
Ibadan
Nigeria

^cUniversity of Ibadan
Ibadan
Nigeria

^{*}corresponding author
Box 1177
Akure
Ondo State
kadejoro@yahoo.com

Referencing this article

Asangansi, I. E., Adejoro, O. O., Farri, O., & Makinde, O. (2008). Computer use among doctors in Africa: survey of trainees in a Nigerian teaching hospital [Electronic Version]. *Journal of Health Informatics in Developing Countries*, 2, 10-14 from <http://www.jhdc.org/index.php/jhdc/issue/view/4>.

we are and what needs be done to make us get along with the other parts of the world in achieving this goal. The success of any health informatics program is hinged on the skill set of the personnel involved. Data from the health sector is enormous and many times there is the risk of the load of data becoming a useless bundle of records.

This study highlights the level to which medical practitioners apply computers to tasks at their places of work. The study determines the accessibility of the internet to doctors, the view of doctors regarding the cost of a computer and the problems associated with the medical recording system at their places of work. It would also highlight any correlation between the availability of, vis-à-vis the accessibility to computers on one hand and the level of their knowledge and utilization, on the other hand.

Methodology

The survey was conducted at Nigeria's premier and largest teaching and research hospital, the University College Hospital (UCH), Ibadan. The hospital has more than 45 medical specialties and sub-specialties and runs more than 75 consultative clinics weekly with 805 beds for admission. It is the only teaching hospital in Oyo state and draws patients from all over Nigeria. UCH is the major tertiary centre in Ibadan, West Africa's largest city. To date, over 12 million patients have received care in the hospital. The hospital has dedicated computers with internet connections for staff. The study population consists of about 600 interns and residents undergoing training at UCH in the numerous specialties.

A pre-tested questionnaire that was self-administered was distributed to twenty randomly selected interns and residents. 145 questionnaires were distributed and filled by the trainees (interns and residents). Respondents' names were not elicited in the questionnaire in order to enhance participation and reduce respondent bias. Consent was taken and only those who agreed to participate (145 interns and residents in number) were given the questionnaires to fill. The 24-item questionnaire contained open-ended and close-ended questions that were targeted at the study objectives. The first section of the questionnaire sought socio-demographic information of the respondents. The second section sought information on computer use, internet use and their views on medical records. Data were entered into the computer and data analysis was done using SPSS package (version 14). Frequencies were calculated for the variables and cross-tabulations, chi-square and Fisher's exact tests were used when appropriate to find any associations between the categorical variables.

Results

Demographic profile

Out of 145 respondents, 101 were males while 44 were females. The mean age was 28.2 years. Their ages ranged between 23 to 49 years and most (97) were between the ages of 25 and 29 (Table 1).

Duration of practice and academic qualification
Most of the respondents (99) were interns, having had less than a full year of training at the time of the survey. 35 (24.1%) had had more than 3 full years of practice. Most of the respondents (71.7%) had had only a graduate degree in medicine while the rest (28.3) had obtained a postgraduate degree other than the medical degree (Table 1).

Personal Skills/Competencies

The personal skills and information-handling competencies of the respondents are presented in Table 2. 55 (37.9%) of the respondents could not use a word processing software while 87% answered that they could not use any software for basic statistical analysis. Only 97 of the respondents could make their own slides for presentation. A large number (115) could use MEDLINE/Pubmed but only 57 had published a paper.

Access to the internet/personal computer (Table 3)
All respondents had access to the internet but predominantly, the places of access were cybercafés/hotspots. Most spent one to five hours weekly on the internet. Only 75 (51.7%) had a personal computer.

Medical Recording System

The medical recording system at UCH is paper-based; the Medical Records department houses paper based records for more than a million patients. When asked about the problems with the recording system, most of the respondents mentioned inaccessibility to the health records of patients from different locations (41.4% of respondents) as a major problem. Mention was also made that data was difficult to present from paper case-notes (33.3% of respondents) (Table 4).

107 of respondents answered that the paper-based system hampered research (Table 5) and a larger number (129) think that the computer-based system will be a better system. 2 respondents thought otherwise while 14 were undecided (Table 5).

The major reason given by the respondents on why the computer-based system was better was better accessibility of records to doctors. Other popular reasons were that it would be cheaper on the long run and that parts of the records from different departments could more easily be tracked (Table 6).

Important associations

The younger respondents tended to have multiple access to the internet when compared to the older respondents ($p = 0.01$) but there was no statistical correlation between the age of respondents and hours on the internet.

However, there was a linear association between age and ownership of personal computers ($p = 0.013$) i.e. older respondents were more likely to own a computer.

Only 52.3% of females could prepare their presentation slides while 73.3% of males could prepare their slides. This relationship was statistically significant ($p = 0.021$). Respondents that had practiced for longer were more likely to have computers, publish papers and have searched

the MEDLINE/pubmed and the internet.

Also, doctors who could use a word-processing software were more likely to be able to use a statistical software ($p = 0.001$) and prepare presentation slides ($p = 0.000$). That is, the personal skills/competencies tended 'to go together'. The same people also tended to have multiple access to the internet, published more and searched the internet more often.

Ownership of a personal computer, statistically, is associated with longer duration of practice ($p=0.003$), postgraduate qualification ($p= 0.003$), presence of word processing skills ($p=0.000$), statistical skills ($p=0.001$), slide making skills ($p=0.003$), use of the internet to search for medical information ($p=0.005$), browsing the internet at home ($p=0.004$), spending more hours on the internet ($p=0.001$), publishing more papers ($p=0.000$), and thinking that the computer-based records are better than paper-based ones.

Discussion

The results of this survey suggests a model that describes a tendency for information handling competencies such as word processing, statistical analysis and slide presentation-making skills to go together or cluster together in particular trainees. That is, trainees with one of these skills were more likely to have the other skills. One central factor is, however, the ownership of a personal computer. The ownership of a computer is associated with better information-handling knowledge and favorable perception of the computer-based record system, although it cannot be determined whether the ownership of a computer per se led to improved ICT knowledge and skills or was it better knowledge in the first place that led to the ownership of a computer. Also, this skilled group also contains more than males than females – suggesting a gender-based digital gap.

It might be advisable to enable and assist doctors in their acquiring of computers for personal use. Secondly, the less skilled groups such as female doctors should be encouraged and assisted in their skill and hardware acquisition. Lastly, more research is needed to understand the factors that influence computer and internet use among doctors in Africa.

Recommendation

The authors recommend that; medical schools include training on basic computing skills in the curricula; hospitals and health authorities should support the acquisition of personal computers by employees and more research should be done into factors that play an important role in computer use among doctors in developing societies.

Acknowledgements

The authors thank members of the online Biohealthmatics African Network for comments that helped shape the questionnaire. We also thank the anonymous reviewer(s) of the paper.

References

1. Glowinski JV. Medical resources on the internet. *Ann Intern Med.* 1995; **123**:123–131.
2. The Internet Society. What is the Internet? 2002. <http://www.isoc.org/internet/>
3. Smith JJ, Mallard-smith RJ, Beattie V, Beattie DK. Use of information technology in general practice. *J R Soc Med* 2003 Aug; **96**(8):395-397. [Medline]
4. 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. ante Publique* 2003 Apr; **15** Spec No:191-200 [in French].
5. Coiera E. Medical informatics. *BMJ.* 1995; **310**:1381–1386. [PubMed]
6. Asangansi IE, Aiyetan PO. Public Health and Bioinformatics. *Dokita.* 2005 March; **30**(1) 24-27.
7. Mugdha R Oak. A review of barriers to implementing health informatics in developing countries; *Journal of health informatics in developing countries.* Vol. I No. I (1-4) (2007).
8. Ozumba BC. The World Congress on the Internet in Medicine, MEDNET 2002 <http://www.mednet2002.org/abstracts/display.cfm?id=63180901>
9. Bello IS, Arogundade FA, Sanusi AA, Ezeoma IT, Abioye-Kuteyi EA, Akinsola A. Knowledge and Utilization of Information Technology Among Health Care Professionals and Students in Ile-Ife, Nigeria: A Case Study of a University Teaching Hospital. *J Med Internet Res.* 2004; **6**(4):e45 <http://www.jmir.org/2004/4/e45/>
10. Ajuwon GA. Computer and internet use by first year clinical and nursing students in a Nigerian teaching hospital *BMC Medical. Inf. Dec.Making* 2003; **3**:10
11. Nurjahan MI, Lim TA, Yeong SW, Foong AL, Ware J. Utilization of information technology in medical education: a questionnaire survey of students in a Malaysian institution. *Med J Malaysia.* 2002; **57**:58–66. [PubMed]
12. Mattheos N, Nattestad A, Schitteck M, Attstrom R. Computer literacy and attitudes among students in 16 European dental schools: current aspects, regional differences and future trends. *Eur J Dent Edu.* 2002; **6**:30–35.
13. Mansor I. Computer skills among medical students: a survey at the King Abdul Aziz University, Jeddah. *J Ayub Med Coll.* 2002; **14**:13–15.
14. Rebecca Didham, Isobel Martin, Richelle Wood, Ken Harrison. Information technology systems in general practice medicine in New Zealand. *Journal of the New Zealand Medical Association*, 2004; Vol. 117 No 1198.
15. PSL Research Summary 1998 [www.pslgroup.com/PSL_whatnews.htm](http://www.pslgroup.com/PSL_whatsnew.htm)
16. The Health On the Net Winter 2004-2005 Survey Responses, http://www.hon.ch/Survey/Survey2005/raw_data.html
17. Boyer C, Baujard V, Scherrer JR, Appel RD. HON's Third survey on the Usage of the Internet for Medical & Health Internet purposes in: The Third Annual World Congress on the Internet in Medicine (MEDNET 1998), London, UK Nov 1998.

Table 1
Demography, duration of practice and academic qualification

Gender	Male	101	69.7%
	Female	44	30.3%
Age	21-25	9	6.2%
	25-30	97	66.9%
	31-35	30	20.7%
	36-40	8	5.5%
	> 40	1	0.7%
Duration of practice	< 1 year	99	68.3%
	1-3years	11	7.6%
	More than 3 years	35	24.1%
Academic qualification	Graduate	101	71.7%
	Postgraduate	41	28.3%

Table 2
Personal Skills and Competencies of respondents

	Yes	No
Word processing	90 (62.1%)	55(37.9%)
Basic statistical software use	58 (40%)	87 (60%)
Making slides for presentation	97 (66.9%)	48(33.1%)
Surfing the internet	139(95.9%)	6 (4.1%)
Medline/ Pubmed	115 (79.3%)	30(20.7%)
Ever published a paper	57 (39.3%)	87(60.7%)

Table 3
Access to the Internet/Personal Computer

Location of access	Home only	17(11.7%)
	Work only	27(18.6%)
	Mobile only	3(2.1%)
	Cybercafe/hot-spot only	78(53.8%)
	More than 1 site	20(13.8%)
Hours on the internet	<1	36(24.8%)
	1 – 5	73(50.3%)
	6 – 10	18(12.4%)
	11 -15	6(4.1%)
	>15	12(8.3%)
Own a computer	Yes	75(51.7%)
	No	70(48.3%)

Table 4
Problems with the medical record system mentioned by respondents

Inaccessible at some locations	60
Unpresentable	50
Time wasting	13
Lack of durability	4
Cumbersome (requiring space)	3
Not effective	3
Unsafe	2
Costly/Expensive	2

Table 5
Perception of the medical records system

Has the record system hampered research?	Yes	107 (73.8%)
	No	30 (20.7%)
	Don't know	8 (5.5%)
Will the computer-based record be better than the paper-based?	Yes	129 (89.0%)
	No	2 (1.4%)
	Undecided	14 (9.7%)

Table 6
Reasons for preferring computer-based records to paper-based records

Better accessibility	54
Time saving	26
Easy tracking of parts of the record	19
Safe	18
Effective clinically	16
More presentable	12
Saves space/portable	9
Durable/lasting	7
Saves cost/cheaper	2

