

## USE OF INFORMATION COMMUNICATION TECHNOLOGY AMONG OPTOMETRISTS IN NIGERIA

EBEIGBE JA, OVENSERI-OGBOMO G.

### ABSTRACT

**Background:** Since the development of the computer and the evolution of the internet, information communication technology (ICT) has had a positive impact on health care delivery systems worldwide, particularly in the areas of disease control.

**Objective:** The purpose of this study was to determine the level of utilization of ICT in eye care services, among Nigerian Optometrists.

**Method:** This was a quantitative cross-sectional study with the use of questionnaires. It was conducted in July of 2014 during the scientific conference and annual general meeting of the Nigerian Optometric Association which was held in Asaba, Delta State. The questionnaire investigated the practice, pattern, use and access to internet.

**Results:** Three hundred questionnaires were given out and 243 were returned properly filled. Among those who reported gender, there were 42.4% males and 56.4% females. Age of respondents ranged from 25 to 50 years with a mean age of  $30 \pm 2.12$  years. Majority of the respondents (86.6%) had access to internet often. Ninety four point two percent (94.2%) of the respondents owned a portable electronic device with internet access. Smartphones were the most commonly owned hand held device (72.9%). The younger age group spent significantly longer hours online per day than the older age group ( $p = 0.045$ ). Length of time spent online per day was however not dependent on gender. Majority (42.2%), of the respondents used internet for 'personal matters'. Twenty point seven percent (20.7%) of the respondents often communicate with their patients via email. Communication with patients via email was not related to gender ( $X^2 = 3.180, p = 0.204$ ). A total of 47.5% often seek online assistance in patients' diagnosis while 40.9% rarely do so. Facebook (33.0%) and WhatsApp (29.0%) were the commonest social media platforms used. There was no significant relationship between respondents seeking online assistance in patients' diagnosis and gender ( $X^2 = 4.787, p = 0.091$ ) but was significantly related to age ( $X^2 = 21.073, p = 0.021$ ).

Seventy percent (70.0%) of respondents researched patients' ailments online. Researching patients' ailment online was not related to gender ( $X^2 = 5.507, p = 0.064$ ) but was significantly related to age ( $X^2 = 20.563, p = 0.024$ ).

**Conclusion:** Most Optometrists have internet access on their digital devices which they used for both personal and professional matters. However, younger Practitioners were more inclined to use the internet for patient management than the older ones. The gains of ICT can only be fully harnessed in health care, when the majority, if not all professionals, become knowledgeable and are willing to utilize computers and ICT.

**KEYWORDS:** Information, communication, technology, eye care, internet.

Department of Optometry, Faculty of Life Sciences, University of Benin, Benin City

#### Correspondence to:

DR J. A EBEIGBE

Email: [jennifer.ebeigbe@uniben.edu](mailto:jennifer.ebeigbe@uniben.edu)

Telephone: 2348023470140

#### INTRODUCTION

The modern health care system in recent times have been transformed by the computer revolution and information communication technology (ICT), in areas like teaching, communication, storage and retrieval of medical or health information.



This has positively affected how students are taught, how patients are managed and the training of health workers among other things.<sup>1</sup>

Since the development of the computer and the evolution of the internet, information communication technology (ICT) has had a positive impact on health care delivery systems worldwide, particularly in the areas of disease control.<sup>2,3</sup> The Internet provides opportunities to get current information on various aspects of human endeavors, including different aspects of diseases, interact with colleagues via videoconferencing and enhance communication amongst colleagues in different continents. Free access to various resource locations like Medline, medical journals and textbooks provide the latest information on breakthroughs in medicine, which also encourages learning and research.<sup>4,6</sup> Optometric informatics is the use of electronic communication and information technologies to provide and support a diverse group of activities related to eye health and vision care for the practitioner. It describes the use of ICT in optometric practice whether in patient record management, communication with patients and colleagues and other sundry application of ICT.<sup>7,8</sup>

With the advent of personal computers and lately, mobile electronic ICT devices, these aspects of optometric practice have evolved considerably. This is more so with the introduction of various internet platforms called social media and introduction of smartphones with internet access.<sup>9</sup>

Patients can even consult the internet to obtain information about health care issues at the click of a button. The worldwide web affords the patient the opportunity to access medical information even before seeking health care. This puts some amount of pressure on the health care practitioner to be at his best professionally.<sup>10</sup>

An information-proficient workforce that is computer literate, trained in information management skills and motivated to use the well-designed clinical systems is now a necessity in a developing country such as Nigeria.<sup>11</sup> Clinical informatics aim to improve patient care by the intelligent application of technology and increase the effectiveness and efficiency of care as well as patient safety. Informatics can fulfill its promises in developing countries only if health care professionals are trained in basic computing skills and information technology. Designing such training will necessitate an assessment of baseline knowledge and the utilization patterns of all personnel involved in health care delivery.<sup>12</sup>

In a previous study,<sup>13</sup> physicians' use of personal digital assistants (PDAs) was associated with more rapid provider responses, fewer medication prescription errors, and improved data management and documentation. Email communication between physicians and patients was found to increase access to care and patients' perception of care quality.<sup>14</sup> Similarly, industry research found that a third of physicians have changed a patient's treatment as a result of an internet search. Anecdotal accounts of enhanced patient care resulting from treatment innovations shared between physicians on social networking websites have also been published.<sup>15</sup>

The purpose of this study is to determine the level of utilization of information communication technology in eye care services, among Nigerian Optometrists.

## METHOD

This was a quantitative, cross-sectional study with the use of questionnaires. It was conducted in July of 2014 during the scientific conference and annual general meeting of the Nigerian Optometric Association which was held in Asaba, Delta State. Three hundred questionnaires were given out to all the



attendees present and 246 were returned. Three of the questionnaires were not properly filled and could not be included in the study. The others were not returned, probably because a lot of participants did not fill out the questionnaires immediately they were given out, but planned on returning them at subsequent sessions which some never did.

The questionnaires were pretested with a small group of Optometrists prior to the study, to determine the strength of the questions contained in them, in terms of format and wording, to be sure they could elicit the proper responses.

The pretested questionnaires were self-administered and designed to investigate the knowledge, attitude and utilization of computer and information technology among Optometrists. The first section of the questionnaire obtained socio-demographic information of the respondents. Participants' use of various internet-based communication technologies was assessed by asking, 'Have you used any of the following?' with seven technologies listed – (1) 'used a portable device, such as an iPod, cell phone, personal digital assistant (PDA), smartphone, etc, to download information from the internet,' (2) 'blogged (wrote in an online diary),' (3) 'used a social network site, such as Sermo, Twitter, LinkedIn, UpToDate, or ResearchGate,' (4) 'used widgets (online applications built by one website that can be displayed on another website),' (5) 'used email to communicate with patients,' (6) 'downloaded podcasts (digital audio or video files),' and (7) 'subscribed to RSS (Really Simple Syndication) feeds of frequently read websites in order to receive notification of content updates.'

Other information obtained with the questionnaires included the length of time spent online and how much of that time was spent on personal entertainment or on research purposes.

#### *Data analysis*

The information contained in the questionnaire was digitally captured and data analyzed using the Statistical Package for Social Sciences (SPSS v.21). The data was presented in appropriate tables and charts. Categorical variables were analyzed with chi square tests while qualitative data was analyzed with the appropriate Student's t-test. The level of significance was specified at 0.05.

## **RESULTS**

### *Characteristics of respondents*

A total of 246 questionnaires were completed and returned. This represented a response rate of 82%. Three questionnaires were not included in the analysis because they were incompletely filled i.e. more than 25% of the questions were not answered. Thus the results presented are for 243 respondents. Of the 238 respondents who reported their gender, there were 101 (42.4%) males and 137 (56.4%) females. Five respondents did not report their gender. One hundred and forty-nine of the 239 respondents (62.3%) were aged 25 – 35 years. Four respondents did not indicate their age (Table 1).

One hundred and twelve of the respondents (46.1%) practice in privately owned clinics while 104 (42.4%) practice in public hospital eye departments, 17 (7.0%) respondents were Optometric Educators and five (2.1%) respondents were involved in group practice. One respondent engaged in a combination of practice modes. Four (1.6%) respondents did not report their practice setting.

### *Internet access and usage*

Of the 243 respondents, five (2.1%) did not respond to whether they have access to internet or not. Of those who responded, 206 (86.6%) reported that they have access to internet often while 25 (10.5%) reported that they rarely have access to internet and seven (2.9%) reported not having access to internet. Access to internet was neither influenced by age group ( $p = 0.799$ ) nor gender ( $p = 0.375$ ).



Two hundred and twenty-nine (94.2%) of the respondents owned a portable electronic device with internet access while the remaining 14 (5.8%) either did not own one or did not report owning one. Smartphones were the most commonly owned hand held device with 213 (72.9%) reporting owning a smartphone. This was followed by those who own an iPad or other tablet device with 59 (20.2%). Smartphones were also the single most owned device 158 (65.0%). Figure 1 shows the distribution of ownership of hand held devices with internet access.

Majority of the respondents spend between 1 – 2 hours online per day. Eight (3.3%) did not state the length of time spent online per day. Figure 2 shows the distribution of time respondents spent online per day.

The younger age group spent significantly longer hours online per day than the older age group ( $p = 0.045$ ). The length of time spent online per day was however not dependent on gender.

The respondents use various social media platforms to interact. It is noteworthy that each respondent use more than one social media platform. A total of 181 (33%) respondents use Facebook while 176 (29%) respondents use WhatsApp application. Figure 3 shows the distribution of social media usage.

#### *Purpose of internet use*

A total of 242 (99.6%) use the internet for varying purposes. One (0.4%) respondent did not respond to this question. Majority (42.2%), of the respondents use internet for 'personal matters'.

Furthermore, 50 (20.7%) of the respondents often communicate with their patients via email while another 122 (50.4%) rarely communicate with their patients via email. Figure 3 below shows the frequency with which respondents communicate with their patients via email. One person did not respond

to this question. Communication with patients via email was not significantly related to gender ( $X^2 = 3.180, p = 0.204$ ).

A total of 115(47.5%) often seek online assistance in patients' diagnosis while 99 (40.9%) do so rarely and 28 (11.6%) reported not ever seeking online assistance in patients' diagnosis. One participant did not respond to this question. There was no significant relationship between respondents seeking online assistance in patients' diagnosis and gender ( $X^2 = 4.787, p = 0.091$ ) but was significantly related to age ( $X^2 = 21.073, p = 0.021$ ). The younger age groups were more likely to seek online assistance for patients' diagnosis.

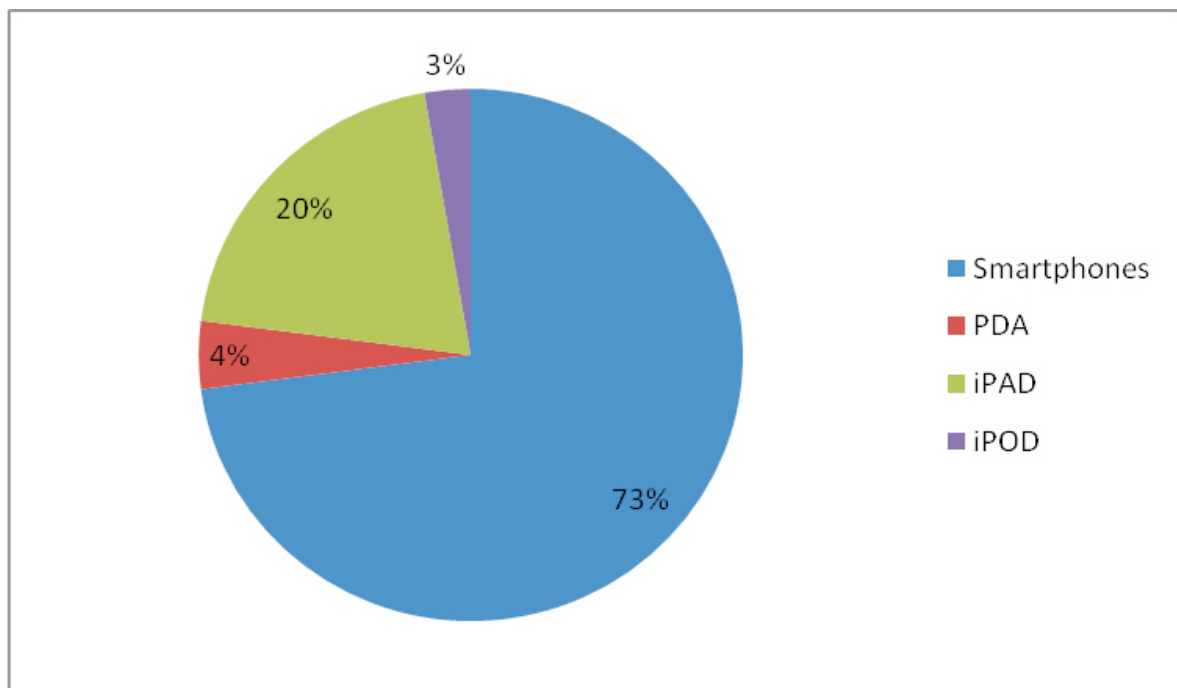
Similarly, as much as 170 (70.0%) of respondents researched patients' ailments online, another 65 (26.7%) rarely do so while a meager eight (3.3%) respondents had never researched patients' ailments online. Researching patients' ailment online was not related to gender ( $X^2 = 5.507, p = 0.064$ ) but was significantly related to age ( $X^2 = 20.563, p = 0.024$ ).



**Table 1: Distribution of age and gender of the Respondents**

Age range	Gender		Total (%)
	Male (%)	Female (%)	
25 – 30	28 (27.7)	41 (30.8)	69 (29.5)
31 – 35	34 (33.7)	44 (33.1)	78 (33.3)
36 – 40	13 (12.9)	25 (18.8)	38 (16.2)
41 – 45	9 (8.9)	14 (10.5)	23 (9.8)
46 – 50	11 (10.9)	8 (6.0)	19 (8.1)
>51	6 (5.9)	1 (0.8)	7 (3.0)
<b>Total</b>	<b>101 (100.0)</b>	<b>133 (100.0)</b>	<b>234 (100.0)<sup>a</sup></b>

$\chi^2 = 8.435$ ,  $p = 0.134$ . <sup>a</sup>The total of 234 represents the total respondents who reported both their ages and their gender.



**Figure 1:** Distribution of ownership of portable electronic device with internet access (n = 292. This is because some respondents own more than one device).

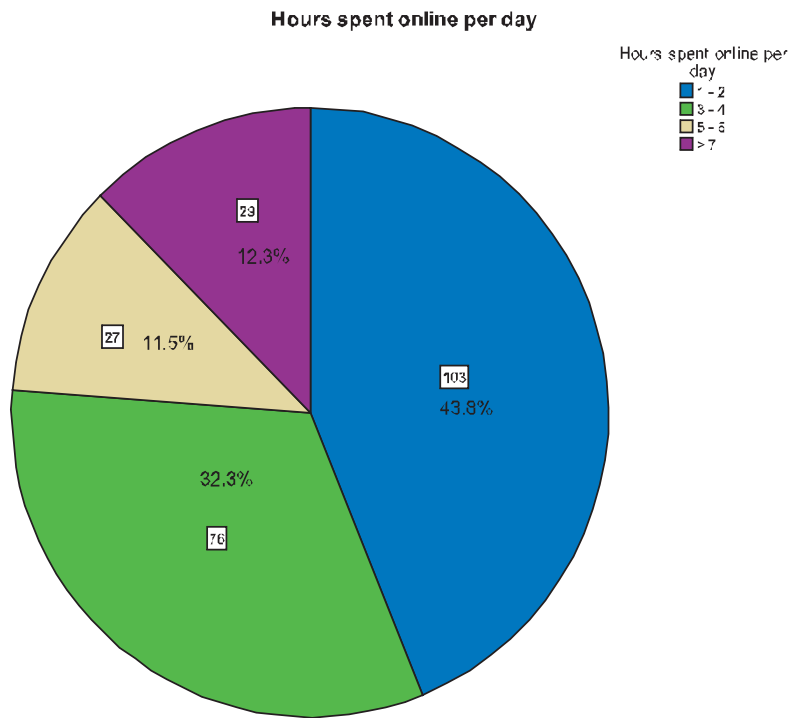


Figure 2: Distribution of time spent online per day

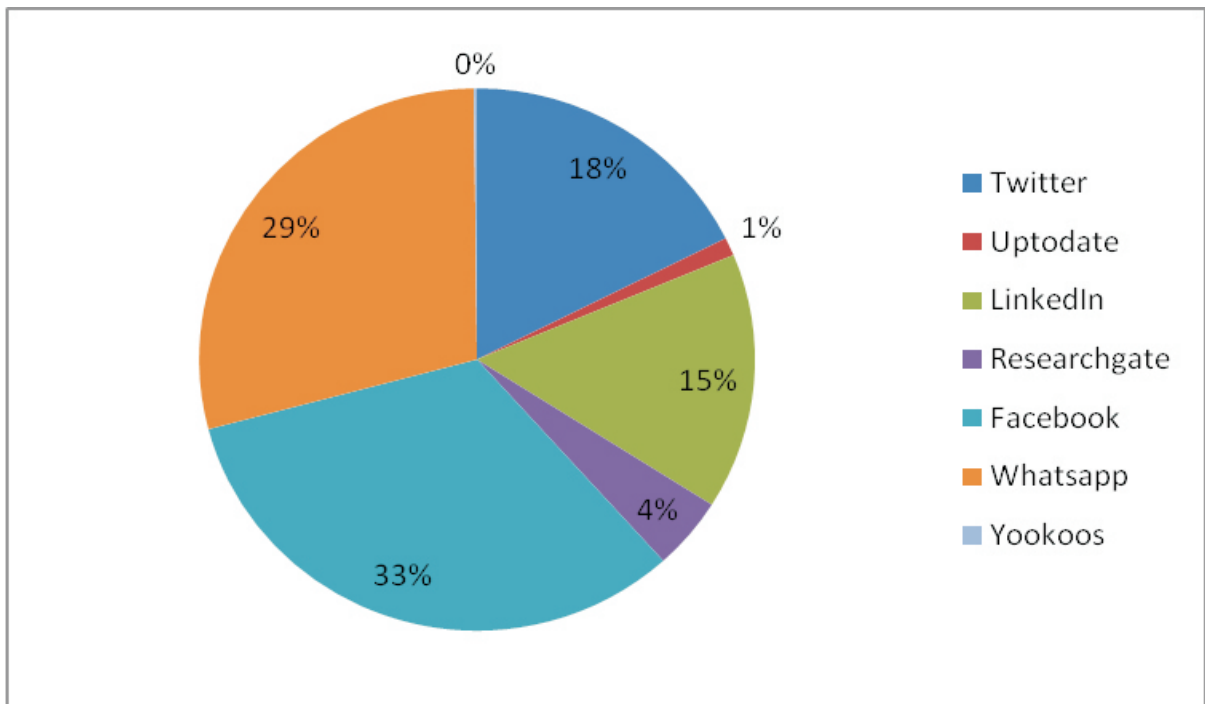


Figure 3: Distribution of participation in Social Media

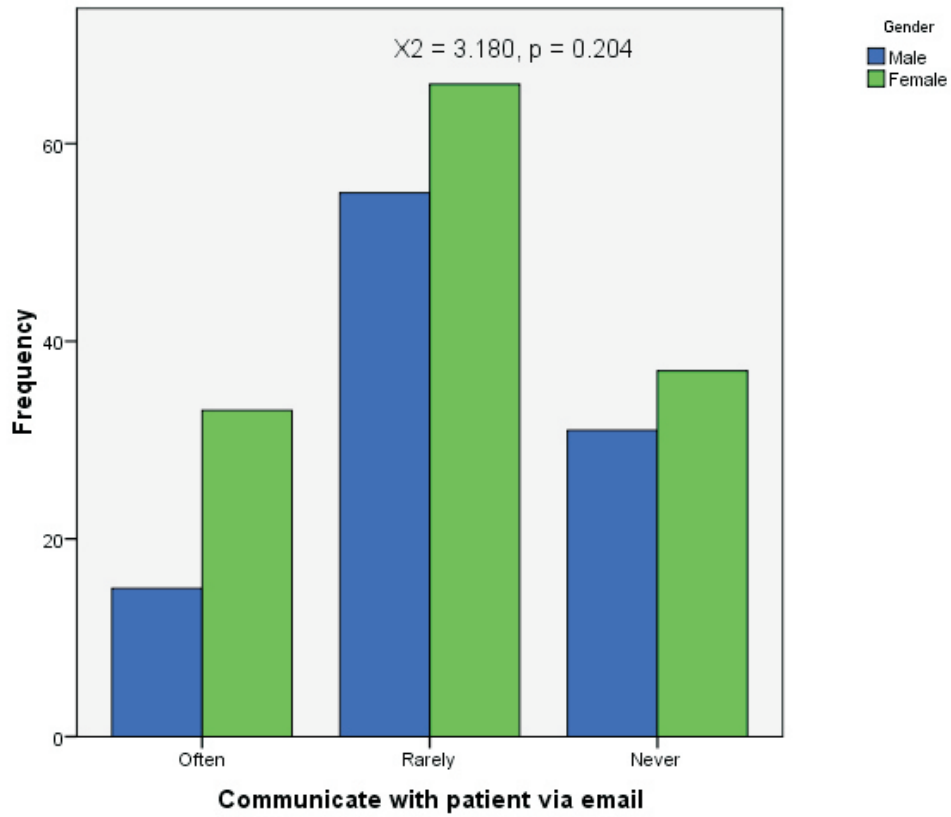


Figure 4: Distribution of Optometrists' communication with patients via email

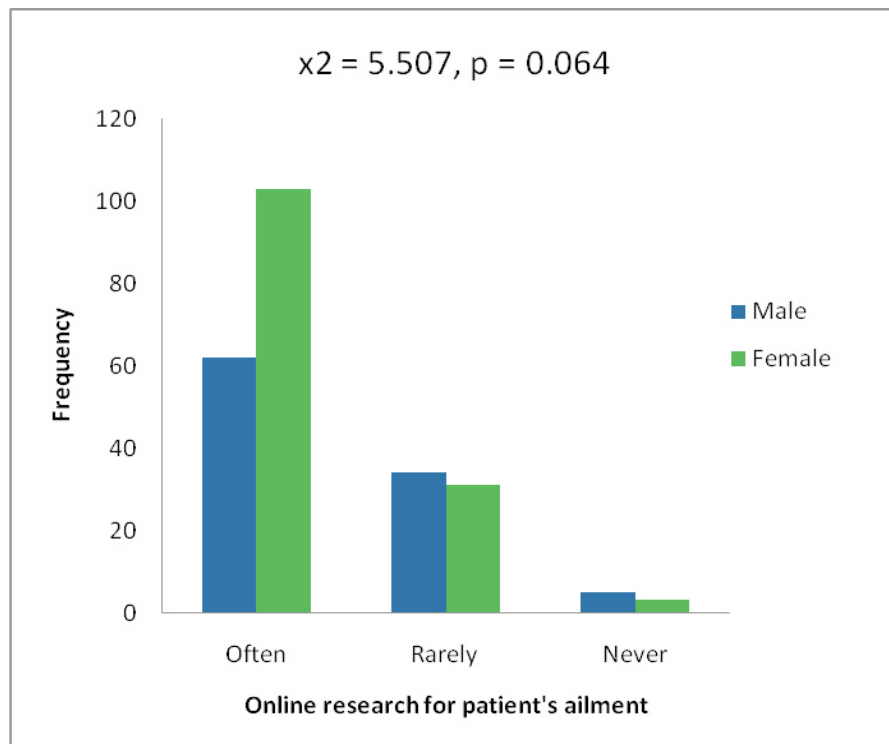


Figure 5: Optometrists' online research for patients' ailment

## DISCUSSION

The development of any nation depends very much on the advancement and application of science and technology. The role of science in the development of modern societies is not in dispute more so now that the influence of modern technological innovations is far reaching in every sphere of man's life.<sup>16</sup>

If Nigeria is to build an organized, self-reliant, and technologically compliant society, much emphasis has to be continually laid on science and technology. Majority of the respondents in this study reported access to the internet often. The most common portable device owned was smartphones. This makes the use of the internet very convenient. This is a great improvement from a few years earlier when most people had to frequent commercial cyber cafés to have access to the internet.

Edworthy<sup>3</sup> reviewed the applications of telemedicine and reported that it may in fact, have a more profound impact on developing countries than on developed ones. He noted that even in very remote and relatively underdeveloped communities such as the satellite stations in Uzbekistan, Cambodia and Kosovo, low bandwidth Internet reached into the most remote areas, despite their unstable political climate and poor socioeconomic environments.

The notion of 'anytime, anyplace' learning has been difficult to achieve but recently, the advent of cheaper, better supported mobile, personal technology is making e-learning more achievable than ever before. A similar situation is faced by clinicians in remote and rural areas, who often lack collaboration and support because of their geographic isolation from the large central hospitals and academic centres of excellence in the main cities. With these devices with internet access, they are able to interact with their colleagues in major centers.<sup>17</sup>

The majority of respondents in this study used the internet for varying purposes, the most

common being for personal matters. A few of the respondents reported communication with their patients often via email, while half of the respondents only do so rarely. A good percentage of the respondents reported seeking online assistance in patients' diagnosis. Majority of respondents also reported to have researched patients' ailments online.

Although there was no significant relationship between the age and gender of the respondents, a cursory observation of the graphical plot indicated that whereas there was a female preponderance in the younger respondents, there was a reversal from the age group 46 - 50 years with a male preponderance.

It had been established that computers and ICT can have numerous applications ranging from storage and retrieval of patients' clinical and socio-demographic information to patient management, particularly in specialties such as cardiology, neurology, pediatrics, general practice and even in hospital administration. All these are some of the various ways by which the internet can serve in health care.<sup>18</sup>

Recent years have witnessed a growing interest in the latest generation of Web-based collaborationware also known as Web 2.0 tools, namely wikis, blogs and podcasts, as evidenced by the growing number of publications on the subject.<sup>17-19</sup> There are many examples of online health-related professional and educational services that have adopted the use of these tools. Most professional and scientific journals are also gradually moving away from paperback prints to online-only publications. The availability of email, websites, chat rooms, multimedia presentations, and communication via internet phones, video-conferencing and even internet conferencing have rejuvenated continuing education and postgraduate studies among professionals.<sup>20,21</sup>





In this study, most Optometrists had internet access on their digital devices which they used for both personal and professional matters. However younger Practitioners were more inclined to use the internet for patient management than the older ones. ICT is the future. Health care professionals are encouraged to embrace and incorporate ICT into their practice for enhanced performance and efficiency.

Health care is an ever-evolving and information-based aspect of human life and as such the provision of structured computer and ICT training for all members of the health care team would equip them with the skills they need to practice up-to-date and evidence-based medicine, which are essential to improving the quality of health care.<sup>22</sup>

The gains of ICT can only be fully harnessed in health care, when the majority, if not all of the professionals, become knowledgeable and are willing to utilize computers and ICT. Such utilization will naturally impact on health information management. The use of Medline and other 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 multi center research, which is still very limited in the developing countries particularly in Africa.<sup>23,24</sup>

---

## REFERENCES

1. Olorundare S. Utilization of Information and Communication Technology (ICT) in Curriculum Development, Implementation Technology in the Service of Education ed. By DN Ezeh and Nkadi Onyegebu. 2007;223-227:Enugu: Timex.
2. Myers MR. Telemedicine: an emerging health care technology. Health Care Manag (Frederick) 2003;22(3):219-223.
3. Edworthy SM. Telemedicine in developing countries. BMJ. 2001; 8:323(7312):524-5. doi: 10.1136/bmj.323.7312.524.
4. Feliciani F. Medical care from space: Telemedicine. ESA Bull. 2003;114:54-59.
5. Cooke FJ, Holmes A. E-mail consultations in international health. Lancet. 2000; 8;356(9224):138. doi: 10.1016/S0140-6736(00)02454-5.S0140673600024545.
6. Majeed A. Ten ways to improve information technology in the National Health Scheme. BMJ. 2003;25;326(7382):202-206.
7. Turner JW, Robinson JD, Alaoui A, Winchester J, Neustadt A, Levine BA, Collmann J, Mun SK. Media Attitudes vs. Use: The contribution of context to the communication environment in telemedicine. Health Care Manage Rev. 2003;28(2):95-106.
8. Ajuwon GA. Computer and internet use by first year clinical and nursing students in a Nigerian teaching hospital. BMC Med Inform Decis Mak. 2003;18;3(1):10. doi: 10.1186/1472-6947-3-10.
9. 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.
10. Celler BG, Lovell NH, Basilakis J. Using information technology to improve the management of chronic disease. Med J Aust. 2003;1;179(5):242-246.



11. Wickramasinghe N, Silvers JB. Is IT the prescription to enable medical group practices attain their goals. *Health Care Manag Sci.* 2003;6(2):75-86. doi:0.1023/A:1023376801767.
12. James DA, Rowlands D, Mahnovetski R, Channells J, Cutmore T. Internet based ECG medical information system. *Australas Phys EngSci Med.* 2003;26(1):25-29.
13. Maulden SA. Information technology, the internet, and the future of neurology. *Neurologist.* 2003 ;9(3):149-59.
14. Kim GR, Lehmann CU. The impact of the Internet on pediatric medicine. *Paediatr Drugs.* 2003;5(7):433-41.571
15. Smith JJ, Mallard-smith RJ, Beattie V, Beattie DK. Use of information technology in general practice. *J R Soc Med.* 2003;96(8):395-7. doi:0.1258/jrsm.96.8.395.
16. Moulin T, Retel O, Chavot D. Impact of new information and communication technologies (NICT) on hospital administration and patient management. *Care Network for Diagnosing and Treating Neurologic Emergencies. Sante Publique.* 2003; 2; 15 Spec No:191-200.
17. Anon: Podcasting in medicine. *J Vis Commun Med.* 2005;28:176. doi: 10.1080/01405110600560128.
18. Wang K. Gene-function wiki would let biologists pool worldwide resources. *Nature.* 2006;439:534. doi: 10.1038/439534a. 2006 Feb 2.
19. Maag M. Podcasting and MP3 Players: Emerging Education Technologies. *Comput Inform Nurs.* 2006;24:9-13. doi: 10.1097/00024665-200601000-00005.
20. Walton G, Childs S, Blenkinsopp E. Using mobile technologies to give health students access to learning resources in the UK community setting. *Health Info Libr J.* 2005;22:51-65. doi: 10.1111/j.1470-3327.2005.00615.x.
21. Altmann U. Representation of Medical Informatics in the Wikipedia and its Perspectives. *Stud Health Technol Inform.* 2005;116:755-760.
22. Mongkolwat P, Kogan A, Koh J, Channin DS. Blogging your PACS. *J Digit Imaging.* 2005;18:326-32. doi: 10.1007/s10278-005-7548-4.
23. Ogunyade TO, Oyibo WA. Use of CD-ROM MEDLINE by medical students of the College of Medicine, University of Lagos, Nigeria. *J Med Internet Res.* 2003;31;5(1):e7. doi: 10.2196/jmir.5.1.e7.
24. Odusanya OO, Bamgbala OA. Computing and information technology skills of final year medical and dental students at the College of Medicine, University of Lagos. *Niger Postgrad Med J.* 2002;9(4):189-93.

---

**Cite this article as:** Ebeigbe JA, Ovenseri-ogbomo G.

Use Of Information Communication Technology Among Optometrists In Nigeria  
*Bo Med J* 2016; 13(2):107 - 116. **Source of Support:** Nil, **Conflict of Interest:** None declared.

---

