Influence of Internet accessibility and demographic factors on utilization of web-based health information resources by resident doctors in Nigeria

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Abstract

Background: The internet is a huge library with avalanche of information resources including healthcare information. There are numerous studies on use of electronic resources by healthcare providers including medical practitioners however, there is a dearth of information on the patterns of use of web-based health information resource by resident doctors. This study therefore investigates the influence of internet accessibility and demographic factors on utilization of web-based health information resources by resident doctors in tertiary healthcare institutions in Nigeria.

Methods: Descriptive survey design was adopted for this study. The population of study consist of medical doctors undergoing residency training in 13 tertiary healthcare institutions in South-West Nigeria. The tertiary healthcare institutions are Federal Medical Centres, University Teaching Hospitals and Specialist Hospitals (Neuropsychiatric and Orthopaedic). A pretested, self-administered questionnaire was used for data collection. The Statistical Package for the Social Sciences (SPSS) was used for data analysis. Data were analyzed using descriptive statistics, Pearson Product Moment correlation and multiple regression analysis.

Results: The mean age of the respondents was 34 years and males were in the majority (69.0%). A total of 96.1% respondents had access to the Internet. E-mail ($\bar{x}$ =5.40, SD=0.91), Google (=5.26, SD=1.38), Yahoo ($\bar{x}$ =5.15, SD=4.44) were used weekly by the respondents. Preparation for Seminar/Grand Round presentation ($\bar{x}$ =8.4, SD=1.92), research (=7.8, SD=2.70) and communication ($\bar{x}$ =7.6, SD=2.60) were ranked high as purposes for use of web-based information resources. There is a strong, positive and significant relationship between internet accessibility and utilization of web-based health information resources (r=0.628, $p<0.05$). Internet accessibility (B=0.911) and demographic variables: gender B=-2.027), designation (B=-0.343) educational qualification (B=2.411) significantly influence utilisation of web-based health information resources of the respondents.

Conclusion: A great majority of the respondents have access to the Internet and used web-based health information resources more for academic purposes than patient care. Training is required to promote use of internet health information resources among resident doctors. The findings of this study will be useful to the management of the 13 healthcare institutions regarding provision of appropriate internet facilities that will enhance access and use of web-based health information resources by resident doctors.

Keywords: *demographic factors, health information, Internet accessibility, Nigeria, resident doctors, utilization, web-based information resources*

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Résumé

Contexte: L'internet est une énorme bibliothèque avec avalanche de ressources d'information, y compris l'information de soin de santé. Il existe de nombreuses études sur les modes d'utilisation des ressources électroniques entre les fournisseurs de soins de santé, y compris les médecins au Nigeria cependant, il ya un manque d'informations sur les modes d'utilisation des ressources d'information de soin de santé sur l'internet parmi les médecins résidents au Nigeria. Cette étude examine donc l'influence de l'accessibilité à l'internet et facteurs démographiques sur l'utilisation des ressources d'information de santé sur le Web par les médecins résidents dans les établissements de soins de santé tertiaires dans le sud-ouest du Nigeria.

Méthodes: Une recherche de conception descriptive a été adoptée pour cette étude. La

population d'étude est composée de médecins subissant des formations résidentielles dans 13 établissements de soins de santé tertiaires dans le sud-ouest du Nigeria. Les établissements de soins tertiaires étaient les Centres Médicaux fédéraux, les hôpitaux d'enseignement universitaires et les hôpitaux spécialisés (neuropsychiatriques et orthopédiques). Un questionnaire auto-administré testés à priori, a été utilisé pour la collecte des données. Le Logiciel statistique pour les sciences sociales (SPSS) a été utilisé pour l'analyse des données. Les données ont été analysées à l'aide de statistiques descriptives, corrélation du produit moment de Pearson et l'analyse de régression multiple.

Résultats: L'âge moyen des répondants était de 34 ans et les hommes étaient dans la majorité (69,0%). Un total de 96,1% des répondants avaient accès à l'Internet. E-mail ($\bar{x}$ =5.40, SD = 0,91), Google ($\bar{x}$ = 5.26, SD = 1,38), Yahoo (= 5.15, SD = 4.44) ont été utilisés à chaque semaine par les répondants. Préparation pour la présentation de Séminaire / Grand Rond ($\bar{x}$ = 8.4, SD = 1,92), recherche ($\bar{x}$ = 7.8, SD = 2,70) et communication ($\bar{x}$ = 7.6, SD = 2.60) ont été classés haute comme buts d'utilisation des ressources d'information sur le Web. Il existe une forte, positive et significative relation entre l'accessibilité à l'internet et l'utilisation des ressources d'information de santé sur le Web (r = 0,628, p <0,05). L'accessibilité à Internet (B = 0,911) et les variables démographiques : sexe (B = -2,027), désignation (B = -0,343) qualification éducationnelle (B = 2.411) influencent de manière significative l'utilisation des ressources d'information de santé sur le Web des répondants.

Conclusion: Une grande majorité des répondants ont accès à l'internet et utilise plus les ressources d'information de santé sur le Web à des fins académiques. Il existe une significative positive relation entre l'accessibilité et l'utilisation de l'internet, les facteurs démographiques et l'utilisation des ressources d'information de soin de santé sur le Web. L'accessibilité à l'internet et les facteurs démographiques influencent considérablement l'utilisation des ressources d'information de santé sur le Web de la population étudiée.

Mots-clés: *facteurs démographiques, information sur la santé, accessibilité à l'internet, Nigeria, médecins résidents, utilisation, ressources d'information sur le Web*

Introduction

Advances in Information and Communication Technologies (ICTs) have resulted in the development of computer networks that allow access to large amount of information and services. Of the many computer networks developed, the internet is the most prominent and widespread. The internet is a global network of networks that enables computers of all kinds to directly and transparently communicate throughout the world. This global 'network of networks' has been described as 'Infobahn' or 'Information Super-highway[1]. It is a useful resource for locating, retrieving and transferring information electronically.

During the last two decades, there has been an explosion in the volume of published healthcare information accessible on the internet. These include databases, e-books, bibliographies, drug information sources, medical and health statistics sources, reference and consumer health information resources, online journals, evidence-based medicine resources as well as abstracting and indexing sources. These electronic resources have allowed the academic scientific community, medical professionals, students and consumers to be up to date in a previously unthinkable manner regarding the speed and efficiency of accessing and obtaining information [2]. Despite the availability of health information resources on the internet, access to suitable ICTs and reliable connections to the internet is a challenge for many health professionals and researchers in Nigeria and other countries in sub-Saharan Africa (SSA) due to limited telecommunication infrastructure [3, 4].

In industrialized countries, virtually everyone now have immediate access to ICT facilities including the internet, the situation is different in SSA excluding South Africa. Internet is poorly developed in SSA, connection cost is high and among the most expensive in the world [5]. Access to the internet is also limited in Africa due to the small markets often supplied by few operators and the fact that charges for both dial-up and broad band internet access are generally higher [6]. Also, obtaining sufficient international bandwidth is still a major problem in most African countries due to high international tariffs and lack of circuit capacity [6].

The situation of access to internet resources in Nigeria is similar to what obtains in much of other SSA countries. Although internet

facilities are now widely available in most health institutions located in urban centers and especially capital cities in Nigeria, there are challenges in accessing information resources on the internet due to infrastructural problems such as power outages and low bandwidth .

Of the factors limiting access to the internet, cost is the most important. Due to cost considerations, most institutions in Nigeria do not provide staff members with free internet access. In some cases, individuals pay internet access fees from their pockets while in others, access fees is subsidized for staff. A previous study [7] on internet diffusion in Africa revealed that 43.2% university lecturers in Kenya had access fees paid by their institutions while only 13% of their counterparts in Nigeria had internet access fees paid by their institutions resulting in high use of cyber cafes. Findings of previous studies [4, 8, 9] showed that cyber cafes are major internet access points for majority of the citizens in Nigeria. Though internet is available in Nigeria at a fee however, it is still very expensive by local standard.

Mass utility of the internet depends to a great extent on the quality of the underlying telecommunication infrastructure. Poor quality of the network remains an impediment to rapid development of the internet in developing countries [4]. There is still strong reliance on the US Internet backbone. Local and regional telecommunications infrastructure such as server connectors, local loop telecommunication lines, inter-nodal connections and switching systems among others, determine the cost and quality of access [10]. Users in countries with high bandwidth telecommunications environment are likely to have access to lower cost connections. Access to, and quality of telecommunication and connectivity available to a user is a function of the country or region where the individual lives.

Demographic variables such as age, gender, Internet experience, income among others have been found to influence Internet usage by medical doctors [11-17]. Age is one of the individual characteristics that have been found to play a substantial role in influencing Internet usage. It has been observed that youths tend to be more comfortable with using computer and the Internet than adults. This trend has also been observed among medical doctors. Younger physicians were more likely to consider and use the Internet as a valuable source of medical information than their older colleagues [18, 19]. In a survey of computing skills, students, junior residents, and faculty were more confident than senior residents in performing Internet tasks such as retrieving patient information or conducting a MEDLINE query [20].

With respect to gender, males are more Internet savvy than females. Male physicians have more experience and greater confidence in using the Internet than female physicians [12, 19]. Lorence & Parkt [16] found that though males use the Internet more than females but females are dominant users of online health information. Training recency has also been found to influence internet usage among medical doctors. It has been observed that doctors who recently graduated from medical school or completed the residency training used the Internet more than those who graduated several years ago. A study among obstetricians and family physicians showed that recent medical graduates (younger physicians) were more likely to consider the Internet as a valuable source of medical information [19].

A number of studies [9, 16, 17, 21, 22] have addressed patterns of internet use among medical practitioners. However, there is a dearth of information on how internet accessibility and demographic factors influence use of online health information resources. This study is meant to fill this gap in knowledge.

The study objectives are to determine the relationship between internet accessibility and demographic factors on utilization, and ascertain the influence of both internet accessibility and demographic variables on utilization of web-based health information resources by resident doctors in tertiary healthcare institutions in South-West Nigeria.

Methods
This paper is part of a large survey of resident doctors in tertiary healthcare institutions in South-West Nigeria. A component of the study with full description of the ethical approval, methods, instrument and data collection has been published in a paper titled "Influence of Motivational Factors on Utilization of Internet Health Information Resources by Resident Doctors in Nigeria", The Electronic Library 2015, 33 (1):103-119.

Study Design
Correlation type of descriptive survey design was adopted for this study. Total enumeration technique was used to cover all 1280 resident doctors in the 13 tertiary healthcare institutions in South-West Nigeria. All the resident doctors

(Registrars and Senior Registrars) in the 13 training healthcare institutions were invited to participate in the study. Data collection for this study was from July to December, 2011.

Setting and population of study

The study was conducted in 13 tertiary healthcare institutions located in five states in South-West Nigeria. The healthcare institutions consists of seven University Teaching Hospitals, three Federal Medical Centers, two Neuropsychiatric Hospitals and one Orthopaedic Hospital. The study population comprised of 1280 medical doctors undergoing residency training in the 13 healthcare institutions.

Instrument for data collection Measures

A pre-tested, self-administered questionnaire was used for data collection. The questionnaire had four sections including demographic profiles of the respondents, Internet accessibility, motivational factors and online health information resources utilization. The demographic profiles of the respondents elicited were age, gender, marital status, designation, educational qualification, institution, among others. Questions on Internet accessibility was developed based on a comprehensive review of the relevant literature. There were 10 items on Internet accessibility, respondents were asked questions such as "Do you have access to the Internet?", "Where do you have access to the Internet?", "Which of the following best describe your Internet access?

Utilization of internet health information resources consisted of 2 sub-sections: Frequency of Internet health information resources utilization and purposes for use of online health information resources. Frequency of use of Internet health information resources consisted of twenty-four (24) items presented in a-6 point scale ranging from Daily (6) to Never (0). Nine questions was used to elicit information on purposes for use of web-based health information resources by resident doctors.

The questionnaire was pre-tested among 29 resident doctors at the Faculty of Dentistry, University College Hospital, Ibadan, Nigeria. As a result, the 29 resident doctors from this facility were excluded from the study.

Data Collection Procedure

Administration of questionnaire was done by the authors and trained research assistants. Grand Rounds and Annual Scientific meetings of the Association of Resident doctors were the fora in which questionnaires were administered to the respondents. A total of 1,280 copies of the questionnaire were distributed and 901 were completed and returned, given a response rate of 70.4%.

Method of Data Analysis

All the completed and returned copies of the questionnaire were verified for completeness in the field. These were collated, coded, fed into the computer and analyzed using the Statistical Package for the Social Sciences (SPSS). Data was analyzed using descriptive statistics including frequency counts, percentages, standard deviation and variance. Person Product Moment Correlation and multiple regression analysis was used to test for relationship and influence between the Independent and dependent variables.

Frequency of use of web-based health information resources was rated with a-6 point scale where Daily=6, Annual=1 and Never=0. The mean scores, standard deviation and variance was computed for a total of 24 items using 6 as the highest score. The closer the mean score of an individual item is to 6, the more frequent the respondents used the particular web-based health information resource and the farther the mean is from 6, the less the respondents used the particular web-based health information resource. Also, purpose for use of web-based health information resources was ranked using a 10 point scale where 1-3=low, 4-6=moderate, 7-8=high and 9-10=high, with a total score of 90. The closer the mean scores are to the total score 10 for individual items, the higher the use for that particular purpose by the respondents.

The test of relationship and influence was done using Pearson Product Moment correlation and multiple regression analysis at $p < 0.05$ level of significance.

Results

Demographic profiles of the respondents

There are more males (69.0%) than females (Table 1). Majority (78.5%) of the respondents are within the 30-39 age brackets. A total of 105 (12%) respondents were less than 30 years old. The mean age of the respondents is 34 years. Only 7 (1.0%) are within the age of 50 years and above. A great majority (93.5%) hold the Bachelor of Medicine and Surgery, Bachelor of Dental Surgery (MBBS/BDS) degrees. While 2.5% respondents have Post-graduate Diplomas, 1.7% are MPH holders.

Table 1: Demographic Profile of the Respondents

Demographic Variables	Frequency	Percentage (%)
Gender		
1. Male	620	69.0
2. Female	281	31.0
Age		
< 30	105	11.7
30-39	708	78.5
40-49	81	9.0
50 and above	7	0.8
34.0 ± 4.46		
Marital status		
1. Single	284	31.5
2. Married	617	68.5
Educational Qualification		
MBBS/MBchB/BDS	842	93.5
MSC	23	2.5
MPH	21	2.3
PGD (Postgraduate Diploma)	15	1.7
Designation		
1. Registrar	572	63.6
2. Senior Registrar	329	36.4
How long have you been in residency?	39	4.4
1. No response	723	80.2
2.< 5 years	139	15.4
3. 5 years and above		
Salary Grade Level		
1. CONMESS 4	575	64.9
2. CONMESS 5	326	36.1
Have additional source of income	169	18.8
1. Yes	732	81.2
2. No		
Length of service in medical practice	109	12.1
1. No response	211	23.4
2.< Five years	411	45.6
3. 5-9 years	142	15.8
4. 10-14	28	3.1
5. 15 years and above		

Computer and Internet Access of Respondents

Table 2 indicates Internet and computer accessibility of respondents. Virtually all (98.2%) the respondents own a computer. A large majority (98.7%) of the respondents had ever used the Internet, 96.1% had access to the Internet however, less than half (48.5%) had received training on how to access information on the Internet. Majority (88.0%) accessed the Internet the week preceding the study.

Frequency of use of Web-based Health Information Resources

The frequency of use of web-based health information resources by the respondents is shown in Table 3. The web-based health information resources used weekly by the respondents were Google (X=5.26, SD=1.38) and Yahoo (X=5.15, SD=4.44) while Alta Visa (X=1.26, SD=2.10) and Mama (X=1.14, SD=2.00) were used annually. The result also showed that Internet portals, gateways and archives/repositories were used quarterly by the respondents. These are: online full text journal articles (Mean=3.01, SD=2.17), HINARI (X=2.85, SD=2.23) PubMed Central (X=2.78, SD=2.25) and free e-books and journals4doctors (X=2.82, SD=2.11). Essential Health Links (X=1.34, SD=1.96) and Directory of Open Access Journals (X=1.44, SD=1.97) were used annually while INASP PERI ($=0.92$, SD1.64) was never used by the respondents.

Purposes for use of web-based Health Information Resources by the Respondents

Table 4 reveals ranking of web-based health information by respondents' purposes for usage. The items were ranked as 'Low', 'Moderate', 'High' and 'Very high'. Preparation for Seminar/Grand Round presentations was ranked 'high' ($\bar{x}$=8.4, SD=1.92) by the respondents. Also ranked 'high' were: preparation for examinations ($\bar{x}$=7.8, SD=2.28), research ($\bar{x}$=7.8, SD=2.70), communication ($\bar{x}$=7.6, SD=2.60) and patient care ($\bar{x}$=6.8, SD=2.48). Use of Internet for CME was ranked moderate ($\bar{x}$=6.2, SD=3.05) while business ($\bar{x}$=4.07, SD=3.14) and games ($\bar{x}$=3.36, SD=2.99) were ranked 'low' as purposes for use of Internet health information resources by the respondents. This result revealed that resident

Table 2: Computer and Internet Access of Resident Doctors

Internet Accessibility Statements	Frequency	Percentage (%)
Owned a computer		
Yes	882	98.2
No	19	1.8
Total	901	100.0
Ever used the Internet		
Yes	886	98.7
No	15	1.3
Total	901	100.0
Have Internet access		
Yes	866	96.1
No	35	3.9
Total	901	100.0
Accessed the Internet in the last one week	766	88.0
Yes	135	12.0
No		
Total	901	100.0
Ever received training on how to access and use Internet health information resources?	424	48.5
	477	51.5
Yes		
No		
Total	901	100.0

Table 3. Frequency of Use of Web-based Health Information Resources by Resident doctors

Internet Information Resources	Mean x̄	SD	Variance
Communication			
Email	5.40	0.91	0.83
Email discussion forum	2.87	2.36	5.54
Bibliographic databases			
MEDLINE/PubMed	3.74	1.83	3.36
Scopus	1.48	1.98	3.91
African Index Medicus	1.44	1.91	3.64
Web of Knowledge	1.70	2.11	4.45
Cochrane Library	1.89	2.04	4.15
Search Engines			
Google	5.26	1.38	1.92
Yahoo	5.15	4.44	2.07
Alta Vista	1.26	2.10	4.40
Mama	1.14	2.00	4.00
Google Scholar	2.72	2.50	6.22
Internet Portals, Gateways, Archives and Repositories			
HINARI	2.85	2.23	5.00
Essential Health Links	1.34	1.96	3.82
INASP PERI	0.92	1.64	2.68
African Journals Online	2.05	2.10	4.43
Bioline International (BI)	1.56	2.02	4.08
PubMed Central	2.78	2.25	5.06
Directory of Open Access Journals	1.44	1.97	3.89
Full-text journal Articles	3.01	2.17	4.72
Electronic books (e.g. free books for doctors)	2.82	2.11	4.46
References sources	2.63	2.21	4.88
Websites			
Continuing Medical Education	2.47	2.17	4.71
Conferences proceedings, Meetings and notices	2.18	2.09	4.37
Journal Websites	2.99	2.08	4.33

doctors use web-based health information resources more for academic purposes, communication and patient care in that order.

Test of relationship between Internet accessibility and utilization of web-based health information resources by Resident doctors
The table 5 indicates that the relationship between Internet access and utilization of web-based health information resources is strong, positive and significant (r=0.628, p<0.05). A significant positive relationship exists between Internet accessibility and utilization of web-based health information resources by resident doctors in tertiary health institutions in South-West Nigeria.

Test of relationship between demographic factors and Utilization of Web-based Health Information Resources
Table 6 reveals the test of relationship between demographic factors and utilization of web-based health information resources of the respondents. The utilisation mean and standard deviation scores are =53.5285, and SD=7.40558 respectively. The result showed that demographic factors: gender (r=0.190, P<0.05), educational qualification (r=0.11, P<0.05), designation (r=0.140,P<0.05), duration in residency programme (r=0.108, P<0.05) and length of service in medical practice (r=0.213, P<0.05) have significant relationship with utilisation of web-based health information resources.

Summary of multiple regression analysis of internet accessibility and utilization of web-based health information resources by resident doctors
The summary of multiple regression analysis of Internet accessibility and utilization of web-based health information resources of resident doctors in tertiary healthcare institutions in South-west Nigeria is shown in table 7. Internet accessibility

Table 4 : Purposes for use of Web-based Health Information Resources by the Respondents

S/N	Items	Mean ($\bar{X}$)	SD	Variance
1	Research	7.8	2.70	7.30
2	Communication	7.6	2.60	6.77
3	Patient care	6.8	2.48	6.13
4	Support teaching activities	7.0	2.60	6.74
5	Preparation for presentation	8.4	1.92	3.70
6	Preparation for examination	7.8	2.28	5.20
7	Continuing Medical Examination	6.2	3.05	9.30
8	Business	4.1	3.14	9.83
9	Games	3.4	2.99	8.91

Table 5: Test of relationship between Internet accessibility and utilization of web-based health information resources by Resident doctors

Variables	N	Mean ($\bar{x}$)	SD	R	P	Remark
Utilization of WBHIR	901	52.8614	27.24650	0.628	0.0009	Significant
Internet accessibility	901	45.3811	17.68570			

NB: Significant at $p<0.05$

had significant positive influence ($F=563.979$; $p<0.05$) on utilization of web-based health information resources of resident doctors.

Summary of multiple regression analysis of demographic factors and utilization of web-based health information resources of the respondents
The multiple regression analysis of demographic factors and utilization of web-based health information resources is shown in Table 8. Demographic factors: age, marital status, gender, designation, educational qualification, duration in residency programme and length of service in medical practice collectively have significant influence on utilization of web-based health information resources of the respondents

($F=11.204$, $P<0.05$). As indicated in Table 8, the multiple relationships between demographic factors and utilization of web-based health information resources of the respondents was significant ($r=0.6870$, $p<=0.05$). The mean of adjusted R-square which is the measure of goodness fit of the model is 0.472. This implies that demographic factors accounted for 47.2% variation in utilisation of web-based health information resources of the respondents. Analogously, utilisation of web-based health information resources could be attributed to the demographic factors of the respondents.

Table 6: Summary of Test of Relationship between Demographic factors and Utilization of Web- based Health Information Resources by resident doctors

Variables	N	Mean	Std Dev ($\bar{X}$)	Utilization of WBHIR (R)	Sig P
Utilization score	901	53.5285	7.40558	1.000	- - - - -
Age	901	34.04	4.412	0.448	0.0061*
Gender	901	1.31	0.463	0.190	0.0003*
Educational qualification	901	1.1332	55.322	0.108	0.0010*
Duration in Residency programme	901	2.7175	1.54311	0.108	0.0020*
Length of service in medical profession	901	7.0552	3.79705	0.213	0.0420*
Marital status	901	1.69	0.463	0.227	0.0290*
Designation	901	1.39	0.488	0.140	0.0004*

NB: *Significant at $p<0.05$

Table 7: Summary of multiple regression analysis of internet accessibility and utilization of web-based health information resources by resident doctors

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	253617.0	1	253617.045	563.979	0.00
Residual	388534.3	864	449.693		
Total	642151.4	865			

NB: Significant at p<0.05

Influence of Internet accessibility and demographic Factors on utilisation of web-based information resources

Table 9 indicates that Internet accessibility (B=0.911) and demographic variables namely gender (B=−2.027), designation (B=−0.343) educational qualification (B=2.411) significantly influence utilisation of web-based health information resources of the respondents. The data on the table shows the relative contribution of each of the independent variables on the dependent variable (utilisation of web-based health information resources). Internet accessibility (β=0.592), made the highest contribution to utilisation of web-based health information resources followed by gender (β=−0.120).

Discussion

A large proportion (96.1%) of resident doctors have access to the internet and 99.0% have used it. This is consistent with a previous study among medical experts in Nigeria [23]. A total of 69.5% respondents access the internet daily from their homes. This figure is higher than that found in a previous study among doctors in a teaching hospital in Nigeria where less than half (44.6%) respondents accessed the internet at home and 47.3% from cyber cafes [24]. These studies showed that more doctors in Nigeria now access the internet from their homes due to availability of internet connection provided at a fee by telecommunication companies via USB modem. More than half (59.0%) respondents in our study used their mobile phones to access information on the internet. This finding is higher than that found among doctors in Ile-Ife, Nigeria [24].

This study reveals that there is a positive relationship between internet accessibility and utilization of web-based health information resources and that internet accessibility positively influenced utilisation of web-based resources by the respondents. In other words, use of web-based information resources is a function of accessibility to the Internet. With access to the internet, doctors will be able to retrieve information resources relevant to their studies and for other purposes.

Participants relied more on Google and Yahoo than databases. Relying on these search engines is fraught with four limitations. First, search engines retrieves huge amount of information some of which are not relevant. Second, some information retrieved are not filtered or indexed like those in bibliographic databases. Third, search engines such as Google and Yahoo retrieves the good, bad and ugly, selection criteria are not applied like it is with databases. Also, anyone can post a document on the web and web documents are not subjected to review before they are published. Finally, unlike databases, there is the challenge of using search techniques for more focused searches.

This study also shows that use of email for communication was high, this finding is comparable to previous research [25]. It is interesting to note that use of web-based health information resources was higher for academic purposes including preparation for presentation, examination, research than for patient care. The

Table 8: Summary of multiple regression analysis of demographic factors and utilization of Internet health information resources of the respondents

Model	Sum of Square	DF	Means Square	F	R	R-Square	Adjusted R-Square	Std Error of Estimate.	Sig. P
Regression	44567.964	7	6366.852	11.204	0.6870	481	0.472	23.8384	0.0004
Residual	507465.4	893	568.270						
Total	552033.4	900							

Table 9: Relative influence of Internet accessibility and demographic factors
on utilisation of Internet web-based information resources

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig. P-Value	Remarks
	B	Std. Error	Beta(β)			
(Constant)	5.550	1.186	-	4.680	0.018	Significant
Gender	-2.027	0.591	-0.120	-3.429	0.000	Significant
Designation	-0.343	0.019	-0.006	18.053	0.038	Significant.
Educational qualification	2.411	0.303	0.051	7.957	0.025	Significant.
Internet accessibility	0.911	0.045	0.592	20.323	0.000	Significant
Age	-.1070	0.426	0.023	2.512	0.002	Significant
Marital status	-1.702	2.228	0.011	0.764	0.078	Not significant
Duration in residency	0.887	0.680	0.051	1.305	0.069	Not significant
Length of service in medical Practice	0.016	0.017	0.005	0.941	0.082	Not significant

Significant at $p < 0.05$

possible explanation is that the majority of those who use internet resources for this purpose are the senior registrars who are in the stage of conducting research as part of their training while the registrars do more of clinical work. Being a service oriented training program, one would expect that use of web-based health information resources will be higher for patient care than for other purposes.

A number of studies have shown that demographic factors have significant influence on usage of the Internet [15, 26]. In this study and at individual level, gender is the main demographic factor that influence utilisation. Significantly more males than females use web-based health information resources. The possible reason is that males have more time to navigate the maze of information available on the Internet than females. Women, in addition to having regular jobs have other commitments such as taking care of their children and doing house chores.

Significantly more males use the Internet frequently for accessing information than females. There is inconsistent finding on the relationship between sex and use of the internet. While some authors such as Bennett and colleagues [17] found that male physicians were more confident than females in using the Internet to find clinical information, others such as Chew [15] and Masters [17]found no relationship between gender and Internet use. Another demographic factor that was found to significantly influence utilisation of Internet health information resources by medical practitioners is age. Younger doctors use Internet resources than their older colleagues. This finding confirms that of a previous study in which

the majority of Internet users tend to be younger adults [27]. Masters [17] found that overall a greater percentage of younger doctors in South Africa used the Internet. Age has significant effects on daily Internet use and diversity of Internet usage [28]. This means that older Internet users are more likely to use the Internet for a lesser number of hours per day and for a lesser range of tasks than younger Internet users.

Educational qualification was found to influence utilisation of web-based health information resources of the respondents in this study. This implies that doctors who have higher educational qualification such as Masters in Public Health (MPH) and Masters in Science or other related degree use Internet resources more. This may be because those with additional qualification such as MPH are involved in research activities. This therefore means that higher educational level is likely to have a positive relationship with use of health information resources on the Internet.

Our study revealed that there is a significant relationship between designation of respondents and utilisation of Internet health information resources. Senior registrars use web-based information resources more than the junior registrars. The possible explanation is that senior registrars are expected to conduct independent research and write a dissertation before the completion of their program. They are also expected to write manuscript for publication. In addition, some of them assist with tutorial sessions for medical students. They therefore seek information on the Internet to be able to carry out these tasks. The senior registrars also rely on the Internet for up to date information to address patient's health problems than do junior

registrars. During residency, the doctors are exposed to information literacy training by librarians in the library. It is most likely that the increase in usage of these resources by senior registrars is as a result of practice of what they have been taught as well as need for the resources.

Conclusion

This study shows that resident doctors have access to the internet and use their mobile phones to access information resources. The main purposes for use of web-based health information resources was preparation for presentation and examination. More training programs should be organized to teach resident doctors how to access and use web-based health information resources. The study also showed that demographic factors have significant relationship with utilization of Internet health information resources of the respondents. Demographic factors including age, gender, educational qualification and designation significantly influence utilization of health information resources on the Internet while marital status, income, duration (years) in residency and number of years in medical practice did not.

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