

E-health Usage among Medical Doctors in Two Teaching Hospitals in Africa

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Abstract

The paper investigates e-health usage among medical doctors in two teaching hospitals in Africa. The research is survey research anchored on the postpositivism research paradigm. The population of the study consists of 258 medical doctors which comprise 176 from the University College Hospital, Ibadan, Nigeria and 82 from the King Edward Hospital, Durban, South Africa. The heads of ICT in the two teaching hospitals were purposively selected for the structured interview, particularly for the research questionnaire that related to the issues of e-health policy documents in the two teaching hospitals and medical doctors were given the questionnaire for data collection. The findings of the study revealed that medical doctors used e-health to share knowledge with their professional colleagues and their medical students. Furthermore, the two teaching hospitals do not have institutional policy documents that guild the use of the resource. Based on the finding, the teaching hospital management needs to constitute a committee towards the formulation of e-health policy documents that will guild the medical doctors on the use of the resources. In addition, the teaching hospital management should acquire more health information technologies that will assist medical doctors to share their knowledge with their professional colleagues and their medical students.

Keywords: E-health, usage, medical doctors, teaching hospitals, Africa

Introduction

The teaching hospital is a medical facility which is established with the basic functions of providing medical education and effective medical training to train both future medical doctors and current medical doctors. In addition, teaching hospitals provide an opportunity for Graduate Medical Education to engage in residency programs under the supervision of well-experienced medical consultants. Teaching hospitals are also established with the intent of facilitating the provision of qualitative and tertiary healthcare to the general populace. One more important function of a teaching hospital is to coordinate relevant medical research (Ogundele, Ikonne, and Madkoma, 2021). This implies that teaching hospitals are established to promote qualitative and sound healthcare to healthcare users. Ogundele et al (2021) affirmed that primary teaching hospitals are established to conduct medical research. The importance of ICT ineffective medical care cannot be over-emphasised. E-health refers to the application and use of Information and communication in promoting effective healthcare delivery. Egiebor (2008) described e-health as the “cost-effective use of ICT in the support of health and health-related fields including healthcare services, health surveillance, education, knowledge” Eysenbarch (2001) argued that e-health is a field that relates to other disciplines such as clinical informatics, medical informatics, public health and other information delivering technologies such as the internet and other ICT resources being used to promote effective healthcare delivery. A critical examination of scoping review done by Pagliari et al (2005) on the definition of e-Health, it was revealed that out of 387 articles reviewed 154 articles see e-Health has been related to Information technology and telemedicine. It can be said that e-health is the application of ICT in promoting and rendering effective healthcare delivery.

There are various types of e-health which include telemedicine activities, online health information sources for patients, and interactive Patient Portal (Tanney, Epstein, and Wessei, 2011). The essence of all these resources is to increase access to high-quality care and better interaction between medical doctors and patients. The benefits of e-health include the opportunity of improving healthcare services and at the same time improving the quality of patient care. Owolabi, Evans, and Ocholla (2017) argued that medical doctors play a significant role in the adoption and use of e-health in various healthcare facilities. They go further to say that without acceptance and use of e-health in healthcare delivery there will be room for medical errors, and adverse drug effects, and medical doctors will not be able to promote evidence-based medicine. In addition, e-health creates an opportunity for better healthcare surveillance, effective health system management and clinical decision making.

E-health is the backbone of modern healthcare services in both developed and developing countries. These modern technologies assist medical doctors in various ways, particularly in improving effective healthcare delivery and evidence-based medicine. To a large extent, medical doctors have largely benefited from the evolution of e-healthcare, unfortunately, medical doctors' inadequate access to e-health resources prevents them from rendering effective and quality healthcare services to people through preventive diagnostic, restoration,

and rehabilitation care (Odini and Omuke, 2014). Furthermore, e-health also provides an opportunity for effective and easy connections between healthcare providers, patients, and governments, to educate and inform healthcare professionals and at the same time stimulate better innovation ineffective healthcare delivery. It is based on this that the study sought to find out the usage of e-health among medical doctors in two teaching hospitals in Africa.

The importance of e-health resources in health care delivery cannot be undermined. Emmanuel (2021) had earlier observed that e-health is not being used in most teaching hospitals in Africa due to a lack of sustainable resources to facilitate the adoption and use of e-health resources. It is in line with this that the study intends to investigate the use of e-health among medical doctors in the two teaching hospitals in Africa.

Statement of the problem

E-health is crucial resource for modern healthcare systems, particularly in African countries with a high burden of emerging infectious diseases and the fragile healthcare systems. Coupled with the absence of comprehensive healthcare coverage remained a serious challenge for medical doctors to provide quality patient care, especially in the absence of e-health facilities.(Akintunde, Akintunde, Musa, Sayibu, Tassang, Reed & Chen, 2021). Inadequate access and use of e-health resources among medical doctors in developing countries have brought medical errors and wrong diagnoses. Many people are victims of the consequence of medical doctors' inability to medical doctors to have access to e-health resources effectively. Atolabi and Federico (2017) noted that cases of medical errors and wrong diagnoses could have been prevented in Africa content if medical doctors have access to and the ability to use e-health tools effectively.

In addition, the problem of wrong medical diagnoses is becoming rampant not only in Africa but globally. American College of Physicians (2017) reported that over 98,000 people die annually in the US which cost the government \$838 billion as a result of inadequate access to e-health facilities. Studies have shown that in developed countries where medical doctors have access to e-health facilities, it has brought about improved healthcare delivery by adherence to guidelines, enhancing disease surveillance, promoting evidence-based medicine and reducing medical errors (Aranda-Jan, Mohutsiwa-Dibeand Loukanova2014) while the reserved is the case in Africa continent (Olok et al., 2015).

Research questions

1. What are the purposes of using e-health resources among medical doctors?
2. What policies guide the use of e-health among medical doctors in the selected teaching hospitals?

Hypothesis

There is no significant difference between the use of e-health resources by medical doctors and medical practices.

Literature review

Effective utilization of e-health among medical doctors depends on medical doctors' readiness to adopt and use the resources. Olok, Yagos and Ovuga (2015) argued that for medical doctors particularly in teaching hospitals to use e-health, they need to have a positive attitude towards the use of the technology. This implies that they need to have the necessary skills and competencies to use the resources. According to Gerber, Olazabal, Brown and Pablos-Mendez (2010), medical doctors in developing countries such as Nigeria and South Africa need to use e-health, particularly for the treatment of patients, conducting research, tracking diseases and at the same time for public health. This can be done through the application of technologies to bring about effective healthcare delivery for patients.

Monaghesh and Hajizadeh (2020) highlighted various benefits of e-health for medical practitioners in tertiary healthcare institutions including health safety improvement, reduction in health care cost, decision making and providing an opportunity for effective knowledge sharing among medical doctors. On the other hand, Eysenbach (2001) enumerated various purposes of using e-health including the promotion of effective healthcare, enhancing quality care, evidence-based, providing opportunities for the empowerment of both health caregivers and patients and lastly, providing access to effective communication between patients and medical doctors and also between medical doctors and medical students. In developed countries such as USA, UK, and Finland promote the use of e-health among medical doctors in their teaching hospitals by encouraging patients to have access to necessary ICT resources that will give them relevant health information (Hayriene et al, 2008).

The Federal Ministry of Health (2014) listed various e-health that is commonly used in developing countries including mobile health popular known as m-health services, telehealth, health informatics which is commonly used to support healthcare decision making and e-learning which is being used by various medical practitioners including the medical doctors. The essence of these resources is to permit medical doctors and other healthcare workers to have access to correct healthcare information, timely and reliable information. Also, bring about improvement in the quality of healthcare systems. Furthermore, extant literature indicates that m-health is focusing on the application of various mobile resources and other wireless technologies which are commonly used for effective healthcare. Extant literature indicates that the proliferation of telecommunications and at the same time ICT resources in both developed and developing countries are creating great opportunities for strengthening care systems and at the same time improving effective healthcare.

To promote the use of e-health in South Africa, the South African government makes a policy for the adoption of ICT in effective healthcare delivery in the country. The policy goes further to say that by the year 2017, all the teaching hospitals in the country should have the necessary ICT resources to promote effective healthcare delivery (Department of Health South Africa, 2012). According to the Nigeria Federal Ministry of Communication (2015 -2020), it was clearly stated that by the year 2020, all healthcare facilities will be equipped with necessary ICT facilities.

Ibeneme, Ukor, Ongom, Dasa, Muneene and Okeibumo (2020) reported that Nigeria is one of the countries that has adopted and developed e-health strategies to promote effective e-health

policy in the country. Other African countries that have adopted and developed e-Health policies are South Africa, Zambia and Rwanda. Nigeria's government to promote the use of e-health usage among medical doctors the government is planning to develop a policy that will strengthen the health system to support the attainment of universal health coverage. For the effective realization of this, various ICT resources need to redeploy to various healthcare facilities to promote service delivery, and to increase access and healthcare coverage.

Owolabi, et al (2017) noted that both Nigeria and South African governments have developed e-health strategies intending to allow for effective planning, and at the same time coordinating various e-health programs in the two countries, particularly in terms of regulatory, policy and governance, capacity building and human development.

Methodology

The study adopted a -post-positivism paradigm which focuses on qualitative and quantitative research approaches. The study is survey research. Both questionnaires and interviews were used to collect data for the study. The questionnaire was given to the medical doctors to identify the purposes of using e-health resources while an interview was conducted with the head of the ICT in the two selected teaching hospitals to determine the status of policy documents guiding the use of e-health in the two selected teaching hospitals. was drawn from the ten purposively selected medical departments in King Edward Hospital, Durban South Africa which is a teaching hospital of the University of Kwa-Zulu Natal. The selected departments were Anaesthesia, Haematology, Medicine, Orthopaedic and Trauma, Paediatric, Eye, Noise and Teeth (ENT) psychiatry, radiology, surgery, obstetrics and gynaecology. The justification for using purposive sampling to select the teaching hospital was because of the availability of a large number of medical doctors in this setting is tertiary institution healthcare.

The target population of the study comprises 510 medical doctors which consist of 343 medical doctors from the University College Hospital, Ibadan, Nigeria and 167 medical doctors from the King Edward Hospital, Durban, South Africa. However, the study sampled 80% of the medical doctors from the two teaching hospitals respectively. The justification for using the 80% was based on the earlier study by Hazra and Gogtay (2016) in a similar study in India. The target population was stratified by their medical departments in the hospital setting and then the individual medical doctor was sampled using PPS and Simple Random Sampling was used to select from PSS. However, Probability Proportionate (PPS) to Size had been used in various studies. Ani (2014) used Probability Proportionate to Size (PSS) in his study on the accessibility and utilization of information resources for researchers and the effects on productivity in Nigerian universities. Evans (2013) employed the use of Probability Proportionate to Size (PSS) in his study on predicting user acceptance of electronic learning.

Thus, based on convenience sampling, Ngwelezane Hospital, South Africa, was used for the pilot study. The hospital is a tertiary hospital that performs functions that are similar to that of the two teaching hospitals used for this research. Fifty medical doctors were given copies of the questionnaire to fill in and they were allowed to comment on the clarity and suitability of

the instrument. To ensure adequate reliability of the questionnaire, Cronbach’s Coefficient Alpha was used to measure the internal consistency of the questionnaire items. Taber (2018) recommends that alpha values should not be less than 0.7. However, the overall index value is 0.712 which indicated an acceptable range for the continuation of the study. This implies that all the items in the sections are reliable for use in the study.

Results

Research question 1: What are the purposes of using e-health?

This section sought to identify what the medical doctors use e-health for in the selected teaching hospitals. Ten use of e-health were listed in Table 1. The most common reason for using the technology identified by the respondents in the two hospitals was the use of e-health to share knowledge with professional colleagues and medical students. Represented by 77 (93.9%) respondents from KEH and 153(86.3%) from UCH indicated this. This was followed closely by the use of e-health for medical diagnosis, by 67(81.7%) respondents from KEH and 147(83.6%) from UCH. The use of e-health for decision-making came third with 65(79.2%) respondents from KEH and 138(78.4%) respondents from UCH. The least cited purpose was the use of e-health for administrative information with 51(62.2%) respondents from KEH and 101(57.3%) from UCH.

Table 1: Purposes of using e-health

		SA	A	N	D	SD	Med ian
Variables	Hospit al	N (%)	N (%)	N (%)	N (%)	N(%)	
I use e-health for medical diagnostic purposes	KEH	27(32.9)	40(48.8)	5(6.1)	0	0	2
	UCH	48(27.3)	99(56.3)	21(11.9)	2(1.1)	0	2
I use e-health for decision making	KEH	29(35.4)	36(43.9)	8(9.8)	3(3.7)	4(4.9)	2
	UCH	35(19.9)	91(51.7)	17(9.7)	8(4.5)	4(2.3)	2
I use e-health for research purposes	KEH	26(31.7)	32(39.0)	11(13.4)	6(7.3)	7(8.5)	2
	UCH	40(22.7)	93(52.8)	21(11.9)	17(9.7)	5(2.8)	2
e-health is used for disease management	KEH	22(26.8)	43(52.4)	6(7.3)	7(8.5)	4(4.9)	2
	UCH	29(16.5)	109(61.9)	18(10.2)	18(10.2)	2(1.1)	2
I use e-health to share knowledge with my professional colleagues and medical students	KEH	27(32.9)	50(61.0)	9(11.0)	3(3.7)	5(6.1)	2
	UCH	54(30.7)	99(56.3)	24(13.6)	26(14.8)		2
I use e-health for communication purposes to alert patients about their treatments	KEH	14(17.1)	38(46.3)	11(13.4)	13(15.9)	6(7.3)	2
	UCH	30(17.0)	71(40.3)	34(19.3)	36(20.5)	5(2.8)	2
I use e-health resources for the treatment of my patients	KEH	20(24.4)	40(48.8)	11(13.4)	3(3.7)	8(9.8)	2
	UCH	30(17.0)	79(44.9)	30(17.0)	33(18.8)	4(2.3)	2
I use e-health resources to promote effective healthcare delivery	KEH	28(34.1)	34(41.5)	9(11.0)	3(3.7)	8(9.8)	2
	UCH	33(18.8)	98(55.7)	30(17.0)	13(7.4)	2(1.1)	2

I use e-health for administrative information	KEH	22(26.8)	29(35.4)	20(24.4)	6(7.3)	5(6.1)	2
	UCH	30(17.0)	71(40.3)	36(20.5)	34(19.3)	5(2.8)	2
I use e-health for treatment and practice in the hospital	KEH	19(23.2)	37(45.1)	8(9.8)	9(11.0)	9(11.0)	2
	UCH	33(18.8)	96(54.5)	23(13.1)	22(12.5)	2(1.1)	2

SA= Strongly Agree, A=Agree, N= Neutral, D= Disagree, SD= Strongly Disagree

Table2: Mean ranks of purposes of using e-health

	Hospital	N	Mean Rank	Sum of Ranks
E-health is used for disease management	KEH	82	123.47	10124.50
	UCH	176	132.31	23286.50
	Total	258		
I use e-health for medical diagnosis purposes	KEH	82	126.77	10395.00
	UCH	176	130.77	23016.00
	Total	258		
I use e-health for research purposes	KEH	82	127.55	10459.00
	UCH	176	130.41	22952.00
	Total	258		
I use e-health for decision making	KEH	82	122.55	10049.50
	UCH	176	132.74	23361.50
	Total	258		
I use e-health to share knowledge with my professional colleagues and medical students	KEH	82	114.75	9409.50
	UCH	176	136.37	24001.50
	Total	258		
I use e-health for communication purposes, to alert patients about their treatments	KEH	82	127.20	10430.00
	UCH	176	130.57	22981.00
	Total	258		
I use e-health for the treatment of my patients	KEH	82	118.36	9705.50

	UCH	176	134.69	23705.50
	Total	258		
I use e-health to promote effective healthcare delivery	KEH	82	120.36	9869.50
	UCH	176	133.76	23541.50
	Total	258		
I use e-health for administrative information	KEH	82	119.56	9804.00
	UCH	176	134.13	23607.00
	Total	258		
I use e-health for treatment and practice in the hospital	KEH	82	132.68	10879.50
	UCH	176	128.02	22531.50
	Total	258		

Results in Table 2 show that medical doctors in Nigeria use e-health to share knowledge with their professional colleagues and medical students. On the other hand, it was shown that medical doctors in South Africa use e-health for treatment and practice.

Table 3: Table Mann-Whitney Test

Test Statistics	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
E-health is used for disease management	6721.5	-1.006	0.314
I use e-health for medical diagnostic purposes	6992	-0.444	0.657
I use e-health for research purposes	7056	-0.308	0.758
I use e-health for decision making	6646.5	-1.151	0.25
I use e-health to share knowledge with my professional colleagues and medical students	6006.5	-2.334	0.02
I use e-health for communication purposes to alert patients about their treatments	7027	-0.355	0.722
I use e-health for the treatment of my patients	6302.5	-1.737	0.082
I use e-health to promote effective healthcare delivery	6466.5	-1.457	0.145
I use e-health for administrative information	6401	-1.523	0.128
I use e-health for treatment and practice in the hospital	6955.5	-0.506	0.613

Responses from medical doctors in KEH and UCH concerning the purposes of using e-health were compared using Mann-Whitnet Test which revealed that respondents in Nigeria and South Africa used e-health to share knowledge with their professional colleagues. The result was statistically significant ($U = 6721.5, p = .657$).

Do you have institutional policies guiding the use of e-health in teaching hospitals?

As stated in the research methodology section, the interview was used to collect data to explore if institutional policies are guiding the use of e-health in teaching hospitals. The head of ICT at the UCH, Nigeria was asked if policy documents is building the use of e-health in the hospital. The head of ICT has this to say, “ The hospital has no ICT or e-health policy documents guiding the use of e-health among medical doctors, but we follow Federal Government of Nigeria and Computer Society of Nigeria Policy, to guide our operations in the department”

The ICT manager at KEH has this to say “We don’t have an ICT policy in the hospital. As I said earlier, we only take directives from the KZN Department of Health. Likewise, we use the ICT policy from the province. As for the hospital, we don’t have an ICT policy in the hospital.”The finding implies that the two teaching hospitals do not have an ICT policy that guides the use of ICT in the hospital and this may be slowing down e-health activities

Test of Hypothesis: There is no significance difference between the mean ratings of medical doctors in the use of e-health in two teaching hospitals

Table 4: Independent sample test

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
Use of e-health	Equal variances assumed	.004	.753	-.517	256	.606	-.069	.134	-.333	.195
	Equal variances not assumed			-.489	141.029	.625	-.069	.141	-.349	.210

The result in the table above shows the t-test result of the significant difference in the mean ratings of medical doctors and the use of e-health in two selected teaching hospitals in Nigeria and South Africa. The result shows that a t-test of -0.517 was obtained with a probability value of 0.606. This probability value was compared with 0.05 set as the level of significance and it was found not to be significant. Therefore, the hypothesis of no significant difference between the mean rating of medical doctors in two selected teaching hospitals in Nigeria and South Africa on the use of e-health was accepted.

Discussion of the findings

The study established the purposes for which medical doctors use e-health; it was revealed that medical doctors in Nigeria and South Africa used e-health for sharing knowledge among professional colleagues and medical students. This finding corroborated the finding of Ariati, Sensure and Handdayani(2019) among medical doctors in three hospitals in Palembang City, Indonesia which revealed that medical doctors in the hospitals used e-health resources for knowledge sharing with their professional colleagues and medical students. Also, the finding supported the finding of Kluge(2020) in a similar study in the United States of America, that medical doctors in teaching hospitals used e-health for knowledge sharing. In addition, the finding affirmed Wernhart and Gahbauer(2019), and Thilakarathne (2021) that revealed that medical doctors used e-health for knowledge sharing. The finding is also in tandem with the finding of Sabeeh, Mustapha and Mohamad (2018) in similar research in a teaching hospital in Iraq that revealed that medical doctors used e-health for knowledge sharing. This finding implies the involvement of medical doctors to share experiences, expertise and knowledge because sharing knowledge helps medical doctors to connect, improve practice and become stronger as

professionals. This indicates that e-health is a necessary information-sharing resource in effective healthcare delivery.

Furthermore, the study revealed that the two teaching hospitals have no institutional policy documents guiding the use of e-health. This finding corroborated the findings of Kilbridge, David and Classen (2008), Info Dev (2006) and Achampong (2012), Linto (2010), Rwashana, Williams, and Neema, (2009) and Achampong (2008) in their respective studies that revealed that many teaching hospitals in Africa do not have institutional policy documents guiding the use of e-health particularly in their teaching hospitals. However, the implication of this finding is that absence of appropriate policies may lead to a variety of problems which include the inability to achieve intended goals or failure to realize the anticipated benefits of the resources. The introduction and formulation of ICT policies are very necessary to promote the effective utilization of e-health resources among medical doctors.

Moreover, the study revealed that there is no significant difference in the mean ratings of medical doctors and the use of e-health. This finding contradicts the finding of Nwafor-Orizu and Onwudinjo (2015) in teaching hospitals in the South east, Nigeria that revealed that there is a significant difference in the mean ratings of medical doctors and the use of e-health. In addition, the finding of the study is in tandem with the finding of Bryant (2004) among medical doctors in Aylesbury Vale Buckinghamshire. That revealed that there is a significant difference in the mean ratings of medical doctors and the use of e-health. In addition, the finding of the study supported the finding of Aleke, Amari, Nwafor, Onyechi, Ochiaka, Onuoha, Igeweny and Osman (2020) in a similar study at the Federal Teaching Hospital, Nigeria which revealed that there is no significant difference in the mean ratings of medical doctors and the use of e-health in the medical institution. The finding implies that medical doctors are not having access to e-health resources for their medical practices. However, the availability and accessibility of e-health in the two teaching hospitals will bring about optimal performance and promote evidence based medicine among medical doctors.

Conclusion

The study revealed that medical doctors in the two teaching hospitals used e-health basically for knowledge sharing with their professional colleagues and their medical students. This implied that medical doctors in these teaching hospitals under study used e-health facilities for sharing knowledge. In addition, it was observed that the two teaching hospitals under investigation do not have institutional policy documents that guide and regulate the use of e-health, especially among medical doctors. In addition, the finding revealed that there is no significant difference in the mean rating of medical doctors and the use of e-health.

Recommendations

Based on the findings of this study, the following recommendations were made: There is a need for the hospital's management to constitute a working committee towards the formulation of e-health policy documents. In doing this, the committee should consult with various stakeholders for their input towards the formulation of institutional-based policy documents. Secondly, the teaching

hospital management should acquire more health information technologies that will assist medical doctors in sharing knowledge with their professional colleagues and their medical students. In addition, seminars, training, and conferences should be organised regularly for medical doctors to share their experience on the usefulness of e-health for effective medical health care delivery.

Furthermore, the teaching hospital management should make necessary allocations for acquiring various e-health resources for various medical practices. These resources should be made available and accessible to medical doctors in the teaching hospitals under investigation,

As a sequel to this, the limitations of the study lie in the fact that only two teaching hospitals were selected for the study. Also, ten (10) medical departments were selected for the study. As a result of this, the findings of the study cannot be generalized. In addition, the research can be replicated in more teaching hospitals in Africa. Furthermore, this study contributes to knowledge in the area of socio-informatics as it would be useful for policymakers in health care delivery and the findings of the study will be relevant to medical hospitals, teaching hospital management in identifying the relevance of e-health for effective health care delivery.

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