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A Qualitative Inquiry and Review of Telemedicine: A Case Study of Cameroon

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ABSTRACT

Cameroon is classified by the World Health Organization (WHO) as having a critical shortage of health personnel despite healthcare being one of the nation's Millennium Development Goals. Telemedicine has the potential of addressing the issue of shortage of health personnel in Cameroon and improving on the health conditions of rural patients. The concept of Telemedicine refers to the use of information and telecommunication technologies to develop information and expertise necessary for healthcare services provision. It also involves collaboration in order to develop geographically separated participants, including physicians and patients. Cameroon has been slow in implementing and sustaining this concept unlike other African countries such as Ghana, Mali, South Africa, Uganda. People in the rural areas are still moving to urban spaces in search of better health facilities instead of staying where they are and using new technologies to reach the specialists both nationally and internationally. Hence, in this paper we present an extensive literature review that produced peer-reviewed interventions of telemedicine in sub-Saharan Africa. This study was performed to assess the level of knowledge and perception of the target population towards Telemedicine in Cameroon.

Introduction

Cameroon, a country located in the Central Africa that shares borders with Nigeria and Chad. With a population of roughly 24 million people, Cameroon has seen a rise in poor healthcare and premature deaths due to A good start to running a telemedicine program is conjoining a rural kiosk through which medical information can be sent to a doctor who is in an urban area. However, history shows that people used to visit the kiosk when it first started, but numbers began to decline. Even though there were challenges with the kiosk project in the beginning, it later became a functional project in the end [1]. Currently the status of telemedicine in Cameroon is dwindling. A South African tech expert, John Akintosin stated that there has been impressive broadband access that is even good in rural areas [1]. Despite this, Telemedicine has become more difficult to deploy to rural areas. While some countries have corporations that help with providing telemedicine, Cameroon has continued to suffer a major setback. In this paper we will cover the present status of telemedicine in Sub-Saharan Africa and how it has either improved or remained constant since the first project back in 2000. Different studies will also be discussed as far as how they have worked and if there were any pros or cons to the methods being used. Lastly, we will discuss the possible future of telemedicine in Cameroon with either improving current methods or starting new ones.

Literature Review

The search for interventions of telemedicine in sub-Saharan Africa was restricted to English language and was carried out by a wide search on Google-Scholar. This wide search includes peer-

reviewed journals, conference proceedings, books and archives from World Health Organization. To retrieve best results, the following databases and literature resources, PUB MED and Southern University Online. Library. In all, we identified around 110 sources, which were reduced to 20. This reduction was based on our inclusion criteria which are our keywords. The result of database search, that is, the peer-reviewed definitions are listed below (Table 1).

Table 1: Literature Study Summaries.

S/N	Author/Year	Title	Type of study	Sample	Data Collection Approach	Limitations	Key Findings
1	Edoh T et al. (2016)	Predicting Telemedicine system user satisfaction in Sub Saharan Africa	Mixed Method	20 patients and 5 healthcare practitioners	Survey and interviews	The study did not investigate how the prediction of user satisfaction levels could influence system implementation and the use or launch of tele-healthcare solutions for improving healthcare provision in medically underserved regions	The outcomes in our study may help eHealth application and telemedicine developers to predict user satisfaction with an application without conducting a costly survey to evaluate QoE and subsequently fix any issues to increase QoS and thus QoE.
2	Mars M (2013)	Telemedicine and advances in urban and rural health care delivery in Africa	Qualitative research	Case study reviews	Systematic literature review	Legal and ethical issues in Telemedicine have not been resolved in Africa and there are still a lot of obstacles in Telemedicine adoption.	Tele education is lacking in Africa and mobile phones have the potential to skyrocket the use of Telemedicine in Africa
3	Ekanoye F et al. (2017)	Telemedicine diffusion in a developing country: A case of Nigeria	Qualitative research	Case Study	Systematic literature review	Lack of proper Telemedicine structure in Nigeria	In order for Telemedicine to function properly in SSA there must be improved infrastructure vision finance training programs and enough doctors on call to name a few.
4	Shiferaw F & Zolfo M (2012)	The role of Information and Communication Technology towards universal health coverage: the first steps of a Telemedicine project in Ethiopia	Mixed Method	10 sites for pilot study and 20 physicians trained.	Descriptive Case study	The pilot study failed due to the fact that it was implemented by few practitioners in few places and the results cannot be generalized	The study proved that ICT application could reduce shortage of healthcare personnel in Ethiopia and that other factors such as e-governance should be considered for Telemedicine to succeed in Ethiopia.
5	Bediang G et al.(2014)	The RAFT Telemedicine network: lessons learnt and perspectives from a decade of educational and clinical services in low- and middle -income countries.	Qualitative research	Scientific papers reports workshop proceedings informal discussions	Literature review	The RAFT project lacked good methodologies for impact evaluation	The RAFT project has offered lots of educational health care and clinical programs including its expansion to Nepal and Bolivia.
6	Mars M (2010)	Health capacity Development through Telemedicine in Africa	Qualitative study	Review of literature reports personal observation	Literature review	SSA has a shortage of health workers and Telemedicine and Tele-education will help address shortage of healthcare and lack of knowledge problems	Tele-education is more successful in terms of implementation than Telemedicine
7	Jivraj I et al. (2011)	Prevalence and severity of Diabetes Retinopathy in North West Cameroon as identified by Ophthalmology	Qualitative study	253 patients` eyes were examined	Retrospective review	Diagnosing and managing the prevalence of diabetes which is fast increasing in Africa	Out of the 253 patients` eyes that were reviewed Diabetic retinopathy was found to be common in people with diabetes who attended teleophthalmology clinics in Northwest Cameroon.

8	Sarfo FS et al. (2017)	Tele-neurology in Sub Saharan Africa : A systematic review of literature	Qualitative study	Articles from PubMed and Cochrane library from January 1 1980 to April 30 2017 were reviewed	Literature review	Shortage of neurologists networks to utilize tele neurology platforms in order to improve on neurology care in SSA.	It was observed that feasibility and satisfaction of participants with telemedicine as well as improved knowledge base of participants after the educational course but noted access to healthcare by patients did not ch No studies have evaluated the use of telemedicine for care of patients with neurological disorders
9	Blaya JA et al. (2010)	E-Health technologies show promise in developing countries	Mixed Methods	2043 citations searched	Survey interviews focus groups	Data was collected by different institutions thus the chances for error was high	There is an increase in the number of randomized trials performed over the years on e-health evaluation in Africa.
10	Bali S (2018)	Barriers to development of Telemedicine in Developing countries	Qualitative Study	Articles Reports	Literature Review	Policy barriers lack of Telemedicine organizational structures and lack of physicians are all limitations	Telemedicine has not yet become an integral part of the healthcare system in Africa but growing gradually
11	Ruxwana NL et al. (2010)	Reviewed articles ICT applications as e-health solutions in rural healthcare in the Eastern Cape Province of South Africa The potential of ICT for rural communities	Mixed Methods	38 completed questionnaires	Questionnaires interviews case study	Shortage of ICT infrastructure hardware and software	Most participating staff saw their low level of ICT skills as a major hindrance to the growth of e-health solutions and they also believed that lack of information is a major hindrance to e-health application
12	Shiferaw F & Zolfo M (2012)	The role of information communication technology (ICT) towards universal health coverage: the first steps of a telemedicine project in Ethiopia	Mixed Method	10 healthcare sites for case study with two physicians per site	Descriptive case study interview	During the implementation of the project about 70% of the population faced connectivity issues among others which led to the failure of the pilot	61% of physicians and 83% of nurses knew about Telemedicine and how to use the system
13	Scott RE & Mars M (2015)	Telehealth in the developing world: current status and future prospects	Qualitative Study	PubMed articles e-health books and reports	Literature Review	Poverty lack of Telemedicine equipment shortage of health workers	Africa is plagued by shortage of healthcare personnel in rural areas poor transportation network and the main way to resolve Telemedicine issues is to establish an evidence based Telehealth strategy
14	Kahn JG et al. (2010)	Mobile' Health Needs and Opportunities in Developing Countries	Qualitative Study	Exhibits and case studies	Review case study exhibits	Lack of local mhealth technical capacity training	There is a huge potential for m-health including economic outcomes
15	Combi C et al. (2016)	Telemedicine for Developing Countries	Qualitative Analysis	Journals reports	Literature Review	Training and financial aspects when designing Telemedicine software systems for developing countries	A taxonomy of features of Telemedicine were derived from the projects and systems available
16	Déglise C et al. (2012)	SMS for disease control in developing countries: a systematic review of mobile health applications	Qualitative Study	98 applications evaluated	Peer and literature review	Connectivity and lack of information	Majority of the applications focused on HIV/AIDS using bulk messaging by the population. Mobile phones are promising for disease control interventions in developing countries

17	Jennings L & Gagliardi L (2013)	Influence of mhealth interventions on gender relations in developing countries: a systematic literature review	Qualitative	173 articles were retrieved for review	Systematic Literature Review	Lack of programs that will transfer rather than reinforce the digital divide	Mobile phone programs can influence gender relations in positive ways
18	Chanda KL & Shaw JG (2010)	The development of telehealth as a strategy to improve health care services in Zambia	Descriptive Study	reviews personal experience news report	Literature Review	Lack of modern communication technologies underdevelopment financial aspects	Reduces barrier between patients and physicians in rural areas
19	Bagayoko CO et al (2014)	Medical and economic benefits of telehealth in low- and middle-income countries: results of a study in four district hospitals in Mali	Mixed Methods	Questionnaire administered to healthcare officials in four district hospitals	Survey consultation logs	Enhanced ultrasound training	Telehealth activities contributed in improving medical diagnostics in obstetrics and cardiology increase in attendance records at health centers
20	Bagayokoa CO et al. (2011)	Can ICTs contribute to efficiency and provide equitable access to the health care system in sub-Saharan Africa? The Mali experience	Qualitative Study	RAFT reviews reports and Telemedicine reviews in Mali	There are no reports on unsuccessful projects	There are no reports on unsuccessful projects	Numerous Telemedicine projects were reviewed including RAFT Pact-e-sante including medical education and the support of health professionals with the use of innovative tools

According to Table 1, Telemedicine is important in helping health practitioners diagnose and treat patients with the use of Information Communication Technology. The authors opined that the majority of the population in Ghana, Ethiopia and Africa as a whole living in remote areas and slums with little or no access to healthcare as well as limited benefits of being insured or no health insurance at all [2-6]. Mobile Health and other ICTs in this case is the better way to reach out to patients in remote areas with chronic diseases and lack of medical personnel to attend to them due to poverty which prevents them from moving to larger cities for treatment. This is evident from the results of case and pilot studies carried out in this communities to assess the impact of mobile Health and other ICTs which yielded positive results to a greater extent [6-12].

Research Design

The purpose of this study was to use a qualitative method to determine the current state and investigate quality in Healthcare and telemedicine interventions in Cameroon. One overarching research questions guided this research: "What is the current state of healthcare in Cameroon".

Participant

The study participants that volunteered to participate in the interview were medical practitioners in Cameroon's public hospitals. Participants in the study are very familiar with the use of health information technology tools. Participants signed an informed consent form.

Data Collection

The study adopted a qualitative data collection method. The interview method was chosen to obtain in-depth information in regard to telemedicine interventions

Data Analysis

Indicators from the interview protocol were identified to assist with the coding. Researchers coded the interview transcript. Themes and patterns were then compiled according to the research questions. Results from the analysis are discussed in the following sections.

Qualitative Results

Results indicate several trends in telemedicine and Health Information Technology as well as various challenges that confront them in Cameroon.

What Do You Think About the State if Healthcare in Cameroon?

Interviewee A felt that It is a mess. "Despite the number of doctors being trained in Cameroon each year, we still face a very high patient to doctor ratio (we have a lot of brain drain). It is even worse at the peripheries and villages. Few doctors agree to practice there, and so there is very minimal access to specialized health care. As a result of it, multiple clandestine "clinics" are opened up and manned by unqualified nurses". Interviewee B felt that A lot is wrong with the health system, not even sure where to start: Limited resources is a real problem coupled with lack of Universal Health coverage or some sort of pension scheme makes things worse. This is even more apparent when you leave the big towns "I think there is no accountability in most of our public health facilities and that's why money and the little resources are misused"; Corruption - but that's everywhere in the country so not surprising. The fact that when MDs graduate from public schools, they only receive salaries 2-3 years later (1 year later if you have the right contacts or if you're lucky) is a factor that plays into malpractices in my opinion. Also, most doctors won't want to work in remote areas where they are

sent because of the lack of resources that they have at their disposal in those facilities. "We can agree that everyone is more efficient when they have proper working conditions" [12-14]. Interview C felt disappointed "The state of health in Cameroon is still in a deplorable state. Central hospitals are grossly under equipped with majority of staff unsatisfied and unmotivated. This has bred lack of empathy towards patients .Despite an increase in number of medical doctors being posted by state ,most of them remain redundant as most of the facilities lack the basic infrastructure to enable them work. The current crises in North and South West of Cameroon has only made matters worse". Do you understand the concept of Telemedicine? If Yes respond to the next question? All interviewees understood the concept of telemedicine. Do You Think Telemedicine Can Solve the Current Healthcare Challenges in Cameroon?

Interviewee A felt "While telemedicine can never replace one on one patient contact, it will go a long way in solving some of the health problems in Cameroon [14-19]. Take the aforementioned challenges in answer 1, telemedicine can ensure patient's access to doctors, thus reducing the cost of transportation to the cities, as well as reducing polypharmacy (which is common practice when solely nurses prescribe). With the current crises in both Anglophone regions, it is even more necessary." Interviewee B felt "I don't think Telemedicine alone cannot solve healthcare challenges in Cameroon. She stated, I think that for Telemedicine to be effective, the underlying healthcare system needs to be strong. We need proper policies which are actually implemented in place etc. Telemedicine will obviously solve some problems such as cut waiting times for patients and all .But work needs to be done to:- sensitize the public on this method of health care delivery. You know how skeptical people can get , and some people prefer face to face exchanges with their doctors-Confidentiality of the patient information needs to be assured-Also the Internet coverage in the country is not the most optimal and there are still people who don't use smart phone , so Telemedicine might mostly be beneficial for people in urban areas (but are they the most in need?)-Healthcare professionals need to be trained in informatics which is obviously not the case at the moment in Cameroon accountable". Interviewee "C" feels Cameroon is not ripe enough to adopt telemedicine "To begin with Cameroonians are still struggling to make ends meet with a majority still leaving in poverty, access to health care is still an issue and the state have not achieved the basic infrastructure in most of her health institutions talk less of introducing this technology which will be unarguably capital intensive.

As a nation in the 21st century we are still battling with power outages, horrible and unreliable internet connectivity, disgracefully bad roads, food insecurity, scarcity of portable water, shamefully bad governance and corruption in high places; Introduction of such a technology will be a misplaced priority, Rather, hospitals should be equipped, roads paved, bridges constructed, ambulance service revamped; effective presence of nurses, physicians and surgeons should be enforced and all ghost workers taken out of pay roll, charged and fine with abandonment of public office. Corruption that sabotages public services and devastates vital infrastructure should be rooted out and penalized There are already ongoing national malaria, HIV, TB, neonatal, infant and maternal mortality control programs, their success so far just need to be evaluated and scaled up. Telemedicine will not be able to save the millions who die every year from diarrheal diseases. It will not curb spread of tuberculosis or AIDS nor will it end the many women who die of pregnancy related complications. We all know the solutions to this problem so let's *fix the Cameroon health system*. On other hand we can consider doing a pilot study to assess its acceptance, uses, and challenges in our own context".

Discussion and Conclusion

The current study offers several implications for practice and research. First, there is a need for improving government policies and healthcare policies. The design should focus not only on the technological aspects, but also on uniformity on the goal, objectives and expectations for patients. Telemedicine is the use of medical information from one site to another, through electronic communications devices for improving a patient's health status. Telemedicine involves a various applications and services using a two-way video, email, wireless tools and other forms of telecommunication technologies. The market for telemedicine is growing rapidly across the world. One of the important qualities of telemedicine is that it puts a patient exactly into the focal point of care. There are drawbacks, of course, such as electronic glitches, physician resistance, and inadequate assessment, but there are also advantages. Those advantages include convenience, cost-efficiency, time saved from waiting room, expedited transmission of MRIs or X-rays, and privacy assurance. In addition, telemedicine requires communication and information infrastructure. The technical infrastructure elements differentiate depending on the telehealth services and organization plans to offer. In an environment with a shortage on healthcare staff, greater incidence of chronic, telemedicine offers a tool to improve the efficiency in the delivery of healthcare. Finally, despite the fact that telemedicine is a key component in achieving basic universal health care as suggested by the World Health Organization and United Nations Sustainable Development Goals, the result of our reviews prove that the immediate solution to the deplorable state of healthcare in Cameroon is for government to implement sound health policies rather than go the way of Telemedicine because an average Cameroonian will not be able to afford the cost of health associated with telemedicine infrastructure.

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