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TELEMEDICINE ACCEPTABILITY IN SOUTH WESTERN NIGERIA: ITS PROSPECTS AND CHALLENGES

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ABSTRACT: The use of advanced technology to deliver healthcare services at a distance has proven to be one of the defining medical revolutions of the 21st century. With the unwieldy healthcare system under scrutiny, telemedicine can be one of the answers for increasing access and at the same time decreasing the cost of healthcare service delivery. Nevertheless, employing the services of telemedicine comes with a cost though its benefits transcend any cost that may be accrued. This paper presents a report of an evaluation carried out in the south western states of Nigeria, the report reveals the extent to which medical facilities in south western Nigeria has embraced telemedicine, its prospect and challenges. Structured questionnaires and interviews were used to elicit information from medical professionals who were recruited into the study using a convenience sampling method. Results obtained after analyzing the evaluation results showed that despite the awareness of telemedicine by medical practitioners in south western Nigeria, only few medical facilities have integrated telemedicine into their services.

Keywords: e-health, Telemedicine

1. INTRODUCTION

The demand on the healthcare systems in Africa is becoming more complex due to the fragmented nature of healthcare delivery and shortage of healthcare professionals. Due to an increasing population, increasing healthcare cost, overstretched social and educational resources and Brain Drain there is shortage of healthcare professionals in Africa [1]. Statistics has shown that in Nigeria, doctors to patients ratio is 1:6400 as to 1:600 standard requirement by the World Health Organization (WHO) [11], this ratio is inadequate to efficiently deliver quality healthcare to the population that needs and deserves it, this has necessitated for a need to increase healthcare professionals to patients' ratio Nigeria and Africa at large.

In developed countries, access to healthcare services and practitioners cum patient-doctors interaction are increasingly being boosted by the advent of Information and Communication Technology (ICT). Without distance being a barrier, healthcare professionals can now employ the services of telemedicine towards efficient consultation with medical practitioners within and outside their geographic location, delivery of healthcare services and establishing continuous communication with their patients.

Tools such as telemedicine, tele-education and health informatics have of late been incorporated in the health sector to enable easy access to essential services, for example, in medical areas from referral centers by the patients on one hand and enabling the doctor to doctor consultations for the benefit of patients [6]. The World Health Organization defines e-Health as 'the cost-effective and secure use of information and communications technologies (ICT) in support of health and health- related fields, including health-care services, health surveillance, health literature , and health education, knowledge and research [20]. Telemedicine which is a subset of e-health is an integrated system of health-care delivery that employs telecommunications and computer

technology as a substitute for face-to-face contact between health service provider and client [2]. Telemedicine can improve the quality and accessibility of medical care by allowing distant providers to evaluate, diagnose, treat, and provide follow-up care to patients in less economically developed countries (Kifle M., 2006).

The Internet which serves as the backbone on which telemedicine thrives provides opportunities to retrieve up-to-date information on different aspects of diseases interact and enhance communication among medical professionals and patients especially through videoconferencing facilities and medical data processing application in the health centers. [3]. The author in [4] juxtapose the impact of telemedicine in developed and developing countries, he submitted that Telemedicine may in fact have a more profound impact on developing countries than on developed ones. Developed countries can afford all the necessary infrastructure and utility needed to set up and maintain telemedicine services but developing countries may not.

2. ISSUES AFFECTING THE ADOPTION OF TELEMEDICINE SERVICES IN SOUTH WESTERN NIGERIA

The advent of e-medicine has presented numerous opportunities for countries without adequate human resources to benefit from global manpower that resides in the developed world. However, many telemedicine projects initiated in Sub-Saharan Africa have always failed without tangible benefits. One of the causes of failure is because there are inappropriate telemedicine implementation frameworks [8]. The challenges militating against the development and adoption of telemedicine can be categorized into technological and non-technological challenges and these are often multi-directional. The technological challenges include lack of infrastructure to host telemedicine projects whereas, the non-technological challenges include individual and government policies, which address the ethical issues like the concerns over patient privacy in telemedicine and lack of funding [6]. However, the ethical concerns have been reported not to be specific to telemedicine but also to general medicine practice when managing distant patients as in the case of rural areas of Africa [7]. In south western Nigeria, issues affecting the adoption of telemedicine can be grouped into Unfavorable Government Policy, funding, and technical knowhow

2.1 Unfavorable Government Policy

In spite of media propaganda and the current health sector reforms by the government, the public health care system in Nigeria is still inefficient in all ramifications. It is therefore argued that the problems facing the public health care system in Nigeria could be traced to poor implementation of National Health Policy as well as other health-related policies and programmes [14]. Many managers and policymakers in health and medicine are not fully familiar with the dimensions, affected areas, advantages and added values caused by these new technologies and therefore don't consider telemedicine in strategic plans for health and medical systems [16].

Nigeria operates a three-tier healthcare system comprising of the Primary, Secondary and the Tertiary levels of healthcare delivery [15]. The primary level includes Primary Health Centers (PHCs) which are mainly concentrated in the rural and semi- urban environments. The secondary level of the healthcare system includes the specialist/general hospitals and the privately-owned comprehensive health centers/clinics. The tertiary health institutions are the University Teaching Hospitals which are managed, controlled and funded by the Federal Government and by some states that have and run state universities with teaching hospitals. Surveys carried out shows that a fewer percentage of these institutions have telecommunication facilities and infrastructures that can support the adoption of telemedicine, if federal government funded health institutions have not fully adopted telemedicine approach, less should be expected from the state funded health institutions.

Political instability in the country also affects the health sector; impulsive removal of appointees overseeing the affairs of the health sector does not give room for sustaining health policies and reforms. Such instability can be seen in a recently appointed minister of health who took cognizance of the rapid growth in mobile telephony and projected that mobile health (m-Health) would become an economic tool capable of driving e-Health activities in Nigeria, after which he set up a committee to develop a policy framework for wider implementation of m-health in the nation's health sector. Few months after this, he was removed as the Health minister and the new minster failed to sustain the policy being worked on.

2.2 Funding

The absence of institutionalized National Health Accounts has amplified the weak basis for assessment of health spending in Nigeria. This is particularly so as all levels of government have concurrent responsibility for funding the sector [15]. Nigerian government funds approximately 31% of the total health expenditure in Nigeria [9]. The health sector has experienced a sharp decline in the amount made available in the countries annual budget, in 2007, Nigeria budgeted 9.7% of her total budget for the health sector but as at 2012, the annual allocation has dropped to 6.7% of the total budget [14].

With health care insurances largely absent for the majority of the Nigerian population, the remaining

costs for health care have to be paid out-of-pocket by its users [9]. Global Health Observatory Data Repository puts private expenditure on health to be 95.7% while external resources for health are put at 53% as at 2012. The 2006 United Nations Human Development Index puts Nigeria at 159 out of 177 countries, with 67.98 per cent of the population living below $1.25 a day and 79.2 of working poor people living below two dollars a day [12]. These statistics showed that the health sector is not well funded and citizens have to pay for the health services they want to enjoy. It also showed that a high percentage of Nigerian population will not be able to afford the services provided by telemedicine. Therefore, the cost of establishing telemedicine in resource poor countries like Nigeria must be balanced against need for drugs and other medical equipment.

2.3 Lack of Technical Know How

Telemedicine though still in its infancy stages in Africa is potentially a very useful conduit of health-care given the fact that the continent is resource limited and still enduring the effects of scarce human resource especially, in health [19]. In most instances foreign experts are employed to set up the infrastructures needed, after setting up, they are expected to train the staffs on ground about how to maintain the facilities. Successfully implementing telemedicine services within developing countries demands consideration of how the local people will support the services when the "foreign developer" has moved on [6]. When the installed telemedicine facilities break down, the cost of bringing back the foreign experts to repair faulty equipments are horrendous.

2.4 Internet

Internet serves as the backbone of any telemedicine services, in Nigeria, not all parts of the country have access to internet and those that does pay heavily for it. Most telemedicine services are always online and in real time, hence needs a fast, stable and uninterrupted internet service. Many physicians who travel to developing countries now take their laptops with them, or check in to internet cafes to maintain their medical contacts [5]. Therefore, sustaining telemedicine services in any country requires a stable communications strategy that connects the developing country with the global internet, without huge debts to pay for the connectivity. In addition, there should be a security framework that protects health professionals and their patients from electronic snooping [6]

Although, Africa lags behind in information and communication technologies infrastructure some efforts are underway to a success solution with respect to telemedicine. Development researchers have hailed the Internet as a revolutionary tool that enables efficient global transfer of information for telemedicine, trade and e-commerce, on-line digital libraries and education [5]

Other factors affecting the adoption and implementation of telemedicine in south western Nigeria are: less computer literacy among the many already long serving professionals [19], lack of proper education to use telemedicine approaches effectively, unstable power supply, and inadequate infrastructures like high speed internet needed to support telemedicine projects

3. MATERIALS AND METHODS

Health institutions in south western part of Nigeria was used as a case study, this involves retrieving a list and emails of these institutions and subsequently paying a visit to those who have adopted telemedicine approach. Based on existing different epistemological assumptions, information system and social sciences research utilizes both quantitative and qualitative methods [17]. Quantitative research methods were preferred because the research findings will apply to more than one population, thereby increasing the possibility of generalizing the research findings [18]. In this research work, information was elicited from medical professionals by conducting interviews and also through structured questionnaire.

3.1 Location of Study

Nigeria is the most populous nation in Africa with an approximate population of 177 million as at year 2014 [14]. Presently, Nigeria is made up of 36 states and a Federal Capital Territory; it is grouped into six geopolitical zones as shown in Figure 1 namely North Central, North East, North West, South East, South South, and South West.

Figure 1: Geo-political Zones in Nigeria.

Of all these regions, seven states are located in the most populated North Western zone followed by the South Western. The south western zone has six states

namely Oyo, Osun, Ogun, Ondo, Ekiti and Lagos. The Population of the states as at 2013 are as shown in Figure 2, the distribution shows that Lagos State has the largest population with Ekiti state having the least population. Nigeria demographic profile reveals that the urban population is 49.6 while the rural population is 50.4% [13].

Figure 2: Population Distribution among South Western States [30]

3.2 Case Study

Health facilities in the south western region were used in this research work; these include Government and Private Hospitals. The distributions of these facilities are shown in Figure 3.

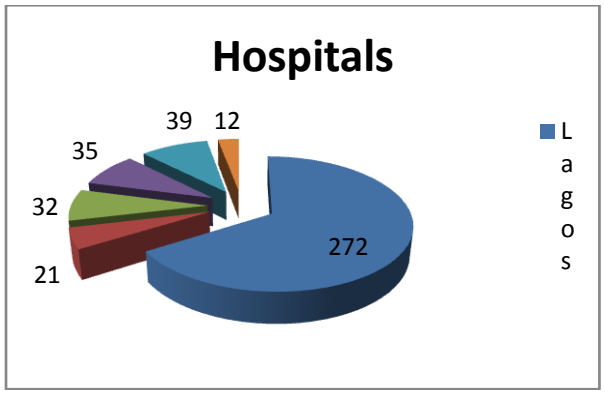

Figure 3: Distributions of Hospitals in South Western States

Many of the health facilities shown in Figure 3 are aware of telemedicine but not all these health facilities have telemedicine infrastructures**.** The distribution of health facilities with telemedicine infrastructures in the south western states is as shown in Figure 4.

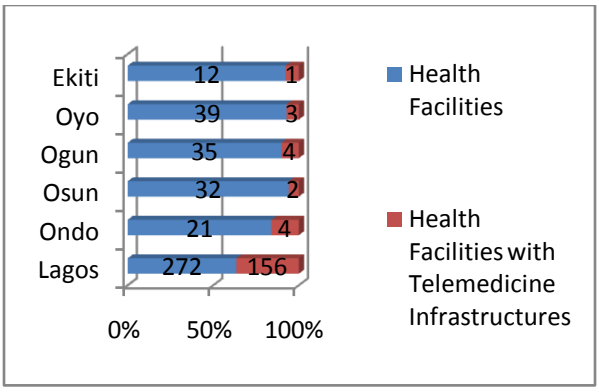

Figure 4: Health Facilities with Telemedicine Infrastructures

3.3 Sample Size

As documented in [18] purposive sampling method, which is a non-probability sampling method was adopted in this study. This sampling approach entails choosing respondents who are believed to have a background and fore knowledge of the subject of discourse rather than respondents who might be ignorant of the subject matter. This always results in having a fewer sampling method but the elicited information is always valuable and not misleading.

As a result of the stated reasons, a total of Sixty Nine (69) Health facilities were visited during the limited time frame of this study. Fifty five (55) health facilities were visited in Lagos state while four (4) were visited in Ondo and Ogun states respectively. Three health facilities were visited in Oyo State while one was visited in Ekiti state. An interactive session was held with sixty nine (69) directors of the health facilities visited, this was done so as to obtain firsthand information about their perspective to Telemedicine and the challenges hindering its full adoption in their respective regions.

3.4 Data Analysis

A total of one hundred and eighty five (185) questionnaires were returned out of the one hundred and twenty (220) questionnaires printed. Descriptive (average, frequency, standard deviation) and analytical (independent t-test) evaluation method were adopted in evaluating the results obtained. Statistical Package for the Social Sciences (SPSS) version 19 was used as the evaluation tool. Charts in Microsoft word 2013 were also used to present a graphical analysis of some results.

4. RESULTS AND DISCUSSION

This section gives a detailed analysis of the observations made during the study

4.1 Sociodemographic Characteristics of Respondents

The respondents used in this study are majorly Medical doctors, Nurses, Pharmacists and Patients, other medical personnel such as gynecologists, physiotherapists, several consultants and specialists were also selected. The distributions of the age groups, sex, professions and years of service of the respondents are as shown in Table 1.

Table 1: Sociodemographic Characteristics of Respondents

Variable	Frequency	Percentage (%)
1. Age		
20-29	62	33.51
30-39	36	19.46
40-49	32	17.30
50 and above	55	29.73
2. Sex		
Male	102	55.14
Female	83	44.86
3. Professions		
Doctors	35	18.92
Nurses	38	20.54
Pharmacists	27	14.59
Patients	43	23.24
Others	42	22.70
4. Average Years of Service		
Doctors	22	26.51
Nurses	18	21.69
Pharmacists	20	24.10
Others	23	27.71

Most of the respondents (33.51%) are youths between the ages of 20 and 29 while 29.73% are between the ages of 50 and above (61 to be precise), this age distribution shows that the sample size is a blend of young and elderly respondents with appreciable years of experience. Interestingly, 55% of respondents were males while 45% were females. 20.54% were nurses while 18.92% were Medical doctors. Pharmacists were 15 % while other medical personnel such as gynecologists, physiotherapists, consultants and specialists were 42%, this shows that an appreciable number of medical personnel were represented in the study. Furthermore, the average years of service of medical personnel used in the study shows that they have been in the medical practice for at least 18 years and hence understand the nitty-gritty of the system better.

4.2 Computer Literate Level

All the one hundred and forty two (142) medical personnel knows what a computer system is and 85% (121) have a laptop, there is no stable means of internet connectivity in south western states of Nigeria and in instances where wireless connectivity is provided, the bandwidth provided is small, hence, the upload and download speed is not strong to support fast video streaming. Subscribing to private data plans provided by network providers is another alternative but the cost of continuously subscribing to the service is enormous. The survey carried out shows that 45% (64) of the medical personnel do subscribe to a monthly private data plan, when asked how frequent they subscribe, their response shows that they do subscribe when the need arises. Hence, towards proving an effective and efficient telemedicine services, a fast, stable and high speed internet service should be guaranteed, this should preferably be a dedicated service for telemedicine purpose only. Medical personnel are not expected to be within the health facilities throughout the day; hence, there must be a provision for internet accessibility from wherever they may be for efficient communication. Also, it was discovered that a very low percentage of medical personnel (25%), especially those above 35 years of age have formal computer training, hence, possessing the computer skills required to effectively operate a telemedicine infrastructure is in doubt, therefore, formal computer training is highly recommended. Though few patients (23%) were interacted with since our focus was on medical personnel, our survey shows that 15% of the patients are computer literate. So, for an efficient telemedicine service, computer literacy of both medical personnel and patient is highly recommended.

4.3 Telemedicine Awareness

An appreciable number of medical personnel (85%) have a basic understanding of what telemedicine means though their definition of telemedicine differs, while some thought it's a platform for chatting with patients, some believe it's a platform for interaction between medical practitioners. Both views and perspective are right but telemedicine transcends that. Telemedicine is a tool that uses ICT to support health and health- related services, though it has its limitation as surgical operations and other related services cannot be done without having a surgeon or doctor on ground

though consultations with a foreign expert can be done to support or facilitate what is currently been done on ground. When the medical personnel were asked about their perspective to telemedicine, the responses obtained is as shown in Table 2

Table 2: Perception of Medical Personnel to Telemedicine

	Agree (%)	**Neutral (%)**	**Disagree (%)**
Benefits of Telemedicine			
Can be useful during Patient Diagnosis	115 (80.99)	10 (7.04)	17 (11.97)
Could Positively Improve Health Care Services	102 (71.83)	25 (17.61)	15 (10.56)
Can be useful during Emergency	72 (50.70)	22 (15.49)	48 (33.80)
Could be useful for Continuous Patient Monitoring	56 (39.43)	10 (7.04)	76 (53.52)
Necessary for easy Exchange of Information especially with foreign experts	128 (90.14)	10 (7.04)	4 (2.82)
Training of healthcare professionals and eventual building capacity	120 (84.51)	4 (2.82)	18 (12.68)
Challenges of Telemedicine			
Inadequate Funding of Health Sectors	125 (88.03)	17 (11.97)	-
Lack of Training for Physicians	105 (73.94)	10 (16.67%)	27 (19.01)
Physicians Resistance	82 (57.75)	11(7.75)	49 (34.51)
Patients Resistance	65 (45.77)	27 (19.01)	50 (35.21)
High Cost Implication	97 (68.31)	10 (16.67)	35 (24.65)
Lack of laws protecting telemedicine practitioners in hospitals	132 (92.96)	10 (16.67)	-
Lack of knowledge about telemedicine	92 (64.79)	20 (14.08)	25 (17.61)
Hospitals lack resources for implementing telemedicine projects	128 (90.14)	10 (16.67)	4 (2.82)
Patients cannot afford using Telemedicine	85 (59.86)	15 (10.56)	42 (29.58)
Patients lack knowledge of Telemedicine	66 (46.48)	14 (9.86)	62 (43.66)
Lack of support for telemedicine by government in the hospital	125 (88.03)	12 (8.45)	5 (3.52)
Lack of policies and guidelines for using telemedicine in the hospital.	129 (90.85)	2 (1.41)	11(7.75)
Lack of computers and software for implementing telemedicine	138 (97.18)	2 (1.41)	2 (1.41)
Lack of training support for staff training in telemedicine	121(85.21)	8 (7.75)	13 (9.15)

With no iota of doubt, the importance of telemedicine cannot be underestimated, the results of our analysis revealed that 80.99% of the respondents believed that telemedicine can be useful during patient diagnosis while 17% have a different view. Also, above 80% of respondents believed that telemedicine has a positive impact as it can be an effective tool in training healthcare professionals and also necessary for easy exchange of information especially with foreign experts. Most respondents agreed with the challenges of telemedicine raised, many agreed that inadequate funding, lack of training for the physicians, high cost implication, lack of laws protecting telemedicine practitioners in hospitals, lack of knowledge about telemedicine e.tc as some of the factors affecting telemedicine. Respondents have different views to patients and physicians' resistance to telemedicine; from the perspective of the patients, cost and ignorance of the benefits of telemedicine can lead to resistance of telemedicine while from the perspective of the physicians, many may believe that introducing telemedicine may replace job functions assigned to staffs which may subsequently lead to them being relieved of their jobs.

4. CONCLUSION

The gains of telemedicine can only be fully harnessed when medical practitioners and health facilities especially in the rural areas become knowledgeable and are willing to utilize it. The Government and private investors also have a role to play in ensuring that telemedicine is adopted by all. Such utilization will radically change patients and health workers perspective towards telemedicine.

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