

## Review

# Telemedicine: A Key to Improve Healthcare Delivery in Remote Areas in Africa

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### Abstract

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Telemedicine involves the diagnosis and treatment of patients through telecommunications technology. It is a subset of a broader concept known as Telehealth. Telemedicine uses Information and Communication Technologies (ICTs) to overcome geographical barriers, and increase access to health care services. It is particularly beneficial for follow ups and rural communities with inaccessible roads and long hours to a health facility. The Aim of this article is to discuss Telemedicine as a key to improve healthcare delivery in remote areas in Africa. In conclusion, Telemedicine is a magic bullet that has the ability to proffer advancements at all levels of healthcare in Nigeria. Though it may face some challenges, these are resolvable and temporary. The promise of betterment in healthcare for both patients and providers is not in doubt.

**Keywords:** Healthcare, Nigeria, Poverty, Rural, Telemedicine

**Abbreviations:** ICT - Information and Communication Technologies; CD - Communicable Diseases; NCD - Non-Communicable Diseases

## INTRODUCTION

### Irony

This is defined as a phantom-able scenario in which Jeff Besos, Bill Gates or Mark Zuckerberg wear torn cloths, have no dignified shelter, falling –yet very treatable– health conditions, crude technology, lack of funds for education nor food on their tables; yes, with all their wealth intact.

It can also be defined by defined as the most populous black continent with its rich bounty of natural resources, holding around 30% of the world's known mineral reserves, precious stones like diamonds, rare metals, golds and even, oil and gas reserves; yet holds 41% of the world's poverty rate. Sadly, this is Africa's reality, especially the Sub-Saharan Africa (Tom, 2015; The World Bank, 2018). Figure 1

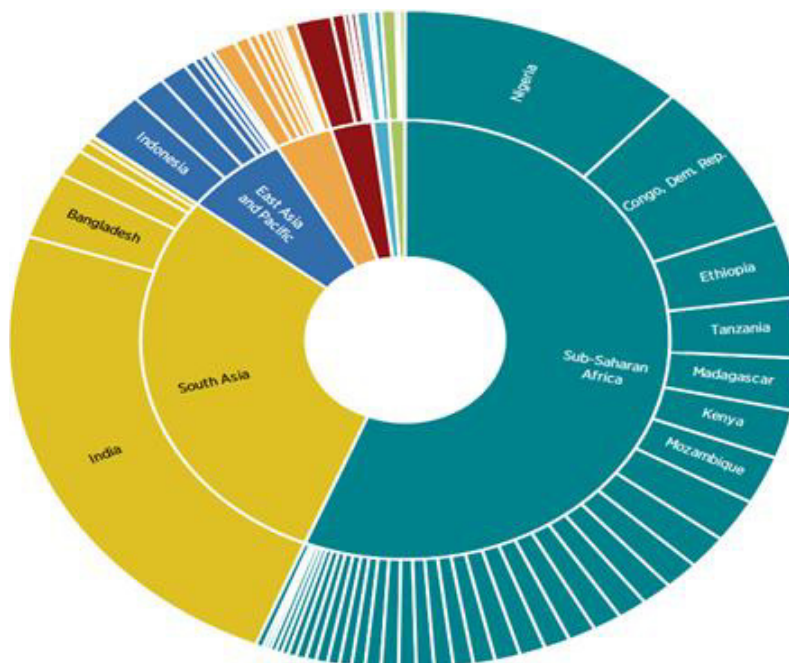
### Paradox

This can be defined as one who lives at the bank of the sea suffering from water scarcity and another who lives in the desert lacking sufficient sand to fill his sacks.

This may also contextually be defined as a continent depending on foreign drug companies for drugs whose synthetic sources are in abundance within its shores, so as not to be wiped out by endemic diseases.

Or with the vibrant human resources in Africans, we still lack skilled hands in healthcare? One may be forced to call this an oxymoron.

Neither the Irony nor the Paradox of the indigenous Africa's situation makes health care seeking or delivery effective. Even minimally. The almost sharp chiasm between people of the urban and rural (or remote)



**Figure 1.** Shows in proportionate percentage, the 10 countries with the poorest people in the world (PocalNet)

regions of Africa have created two different Major Medical realities in these regions.

### Major Health Challenges in Africa

1. Communicable Diseases (CD) – Majorly a pathology of the rural and remote regions.
2. Non-Communicable Diseases (NCD) – Majorly a pathology of the Urban regions.

A lot of efforts have gone into the curbing and controlling of the dynamic health challenges that threatens the indigenous people of Africa. Amidst challenges ranging from lack of knowledge, to insufficient man power and dwindling funding; the African reality remains the biggest challenge.

### The (So Far) Non-Modifiable Factors (Africa's Reality)

#### A. Poverty and Lack of basic amenities

The basic needs of man are Clothing, shelter and food. However, these needs are not satisfactorily met in the lives of many Africans. The Lack of clothing and shelter exposes them to a lot of parasitic and communicable diseases, and the food, hyponutrient malnutrition (World health Organization Newsletter, 2019).

A complex interaction between the absence of amenities and the way Africans substitutes this need creates an aetiological avenue for more diseases and

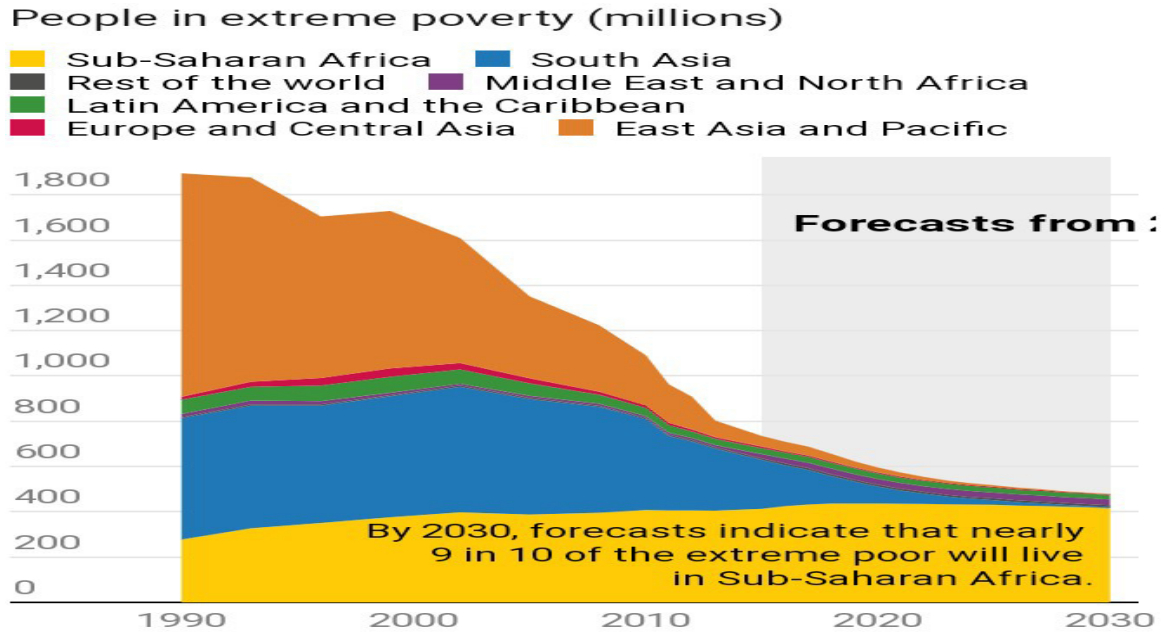
health challenges to ensue, such as cooking with the same water sources they dump their biologic and domestic wastes. A lot of these can be traced to lack of basic amenities and poverty, yet the gradient on poverty does not seem to get better anytime soon (Figure 2).

#### B. Over Population

Boasting of the world's fastest growing population, Africa has an estimate of around 1.3 billion people. It is the world's most populous black continent. However, it is also the second most populated continent, and like Asia (the most populated continent) Africa suffers from the brunt of overpopulation, one of which is health insecurity and epidemic crisis (Global Issues, Population. The United Nations).

A closer look at the rising over population crisis will give credence to the fact that with over population comes poverty, with poverty comes lack of basic amenities, with lack of basic amenities, comes health pathologies and when sickness comes, treatment is not cheap. In Africa, the most populated countries also hold the poorest people; with Nigeria having the most population and also the poorest population (Simona, 2020; PocalNet).

Violence has also become a protagonist of really populated, low educated and remote areas in Africa. We can see it in Ethiopia and Nigeria, the two most populated countries in Africa. These rural and remote areas thus pose a twofold barrier to quality health care delivery to



**Figure 2.** A world bank projection of the poverty gradient in the world's 7 poorest regions. The Sub-Saharan Africa's gradient is on a slow but steady increase (World Bank PovCal Net and Poverty and equity data portal).

those regions (BBC News, 2020; ALJAEERA; Chris, 2016; Erika, provide year).

### C. Religion and Cultural practices

Although due to colonization Christianity and Islam have joined the still indigenous traditional religions, Africa has within 3,000 tribes and 2,000 languages and dialects (BBC News, 2002). As diversely fascinating as this may seem, we should note that this has posed more barriers than medium in the propagation of modern health approaches and reforms, as they are either misunderstood or seen as an assault to the culture or religion of their four fathers. Just like Immunization, in-hospital labour care, surgeries, and many more (D Knapp and Ogunbanjo, 2013; Richard, 1990; Mokgobi, 2014; World Health Organization, 2020).

The numerous cultures and peoples of Africa also have a lot of untouched resources and terrains. We do not know what possible parasites, infections or diseases lie in wait in those regions. These are often in remote and rural villages and communities. When such unknown environments cause novo pathologies, these regions often lack the means to communicate with the scientifically advancing world. Until such a time when it becomes epidemic or pandemic. A classic example is the case of Ebola and the Democratic Republic of Congo. Till date, the DR Congo still boasts of one of the most unexplored forest and riverine heritages (BBC News, 2020; World Health Organization).

The issue of Poverty, overpopulation, religious and

Culture either propagating unhealthy practices or denying accessible knowledge and care to scientifically proven health services and solutions to endemic challenges is almost non-modifiable in Africa. Hence, Africa surely needs a new approach to battling the novo and endemic health crisis.

A good majority of the obstacles to delivery of quality healthcare are burdens bore by the rural communities of Africa. These are the Non-Modifiable (discussed above) and some of the modifiable:

#### Modifiable Factors

1. Inaccessible roads.
2. Lack of or insufficient healthcare facilities.
3. Lack of or insufficient properly equipped healthcare locomotives.
4. Lack of knowledge of available health care services.
5. An ever-widening gap between basic health-care knowledge and the people who need it. Etc.

The porosity of the African healthcare approach and delivery system was put to the test when the HIV pandemic came into Africa. To this, the then minister of Health of Nigeria, Prof. Ransom Kuti, proposed and implemented – in Nigeria, and soon the rest of Africa- the idea of the Primary Health Care system earlier proposed at the declaration of Alma-Ata in 1978 (WHO, 1978). This developed the three (3) tiers of healthcare delivery and their components.



**Figure 3.** Demonstrates the patient centered integrated health plan incorporating PHC.

### The Three (3) Tier Healthcare System

1. Primary Health care – located at rural and remote areas
2. Secondary health care - General Hospitals, located around the towns
3. Tertiary Health Care Facility - Teaching and Specialist hospitals, located at urban areas

Understanding the basic architecture of this triple tiers system of healthcare delivery, you would understand that the primary healthcare facilities which are often understaffed and underequipped are the closest health centres to those in the remote regions. Also, the rural remote areas of Africa suffer from both Communicable and NON-Communicable disease pathologies, especially severe malaria and, Diabetes Mellitus and Hypertension, respectively. The Primary healthcare facilities are often neither equipped with the appropriate staff nor equipment to handle the emergencies of the rural endemic pathologies.

To improve the healthcare delivery system in the remote areas of Africa we will have to improve the Primary Health Care System.

### Definition of Primary Healthcare (PHC) by WHO

Primary Health Care is essential health care made accessible at a cost country and community can afford, with methods that are practical, scientifically sound and socially acceptable (The Commonwealth Health Hub). Figure 3

### What is Telemedicine?

Telemedicine involves the diagnosis and treatment of

patients through telecommunications technology. It is a subset of a broader concept known as Telehealth ([www.who.int/publications](http://www.who.int/publications)). Telemedicine uses ICTs to overcome geographical barriers, and increase access to health care services. It is particularly beneficial for follow ups and rural communities with inaccessible roads and long hours to a health facility (Telemedicine- World Health Organization).

Telemedicine has not only provided an alternate source of employment to physicians and healthcare providers; it has also become a utilizable option in routine patients' management (Telemedicine- World Health Organization).

### Types of Telemedicine

1. Real-time audiovisual encounters (synchronous telemedicine)
2. Store-it-forward visits (asynchronous telemedicine)

### Some Misconceptions about Telemedicine

1. Patients do not have the technology for telemedicine.
2. Harm in continuity of care'
3. It is only for some specialties
4. It cannot be used to prescribe
5. Telemedicine visits are impersonal

### Aim of the Article

The Aim of this article is to discuss Telemedicine as a key to improve healthcare delivery in remote areas in Africa. The magic bullet needed to improving the delivery of improved healthcare via the Primary healthcare facility.

In fact, it was primarily for this reason telemedicine

was initially conceived ([www.who.int/publications](http://www.who.int/publications)).

## DISCUSSION

### Benefits of Telemedicine

#### To the Health practitioner

Telemedicine has reduced the overt mobility risks of health professionals to remote areas while still delivering proper and effective healthcare services. Due to the ease of use of Telemedicine the number of physicians with access to and utilizing the technologies of telemedicine doubled between 2015 and 2018 from 15.8% to 30% of doctors. However, these statistics are not African (Telemedicine- World Health Organization).

#### Application in an African remote context

- Risk of road travels to remote areas to deliver health services will be reduced
- It can serve as a training platform from community Nurses, Community Health Officers (CHO), Community Health Workers (CHEW), and Traditional Birth Attendants (TBA)
- It prevents needless loss of lives of health workers in remote areas with endemic violence and terrorism
- It avails the Health provider an opportunity to have a conference consultation in complex cases
- It elevates the standard of health care services being delivered.
- It avails the healthcare provider the opportunity to send a recorded drug counselling feed to the patients without fear of patients forgetting or misinterpretation.
- At any point in time the health provider intends to follow up, he can always make an asynchronous telemedical inquiry.
- It reduces the amount of physical patients on-duty hospital-based physicians have to see daily, thus reducing health worker's burnout.
- Serves as an alternate means of employment for public health practitioners and physicians who cannot readily access their patients in some remote areas.

#### To the Health Facility

Overcrowded hospitals were and still is one of the demoralizing factors in health care seeking behaviors in hospital facilities. This is worse in the Primary Health Care settings in the rural and remote environment, as it is meant to be the first source of health service. Just like the decongesting solutions the Automated Teller Machines (ATMs) offer in banking services; utilization of telemedicine can help in decongestion of the healthcare

facilities in the remote areas. Thus, only the urgent, emergency and in-patient care cases will basically come to the hospital facility. This will finally make the triage system work more effectively.

#### Application in an African Remote context

- Antenatal and post Clinics can have their sessions on audiovisual records, and patients listen to them from home. These patients can afterwards, document and send back their questions.
- Recovery follow ups of stable and almost completely stable patients in the internal medicine departments can be held from home via synchronous telemedicine.
- Specialties such as dermatology, pathology and radiology not readily available in some remote areas can finally be accessed via telemedicine (Telemedicine- World Health Organization).
- Decongestion of healthcare facilities will also help reduce the overuse of some limited fragile equipment helping them last longer.
- Some remote areas of Africa have no single PHC structures, telemedicine can help citizens in such regions access quality medical services from the comfort of their homes.

#### Benefit to the Patient

The people of Africa are divided into three; those with good health seeking behaviors, those with poor health seeking behaviors, and those that are in between. Individuals in rural areas are often either in-between nor have poor health seeking behaviors. Reasons for these range from inaccessible healthcare facilities, to finances and even language barriers. Telemedicine can solve these issues.

#### Application in an African Setting

- The patients no longer have to risk their lives on dangerous African roads.
- The patients may have their consultation and follow up sessions from nearer health facilities.
- The patients experiencing language barriers to health can be connected to trained health practitioners who speak their languages.
- The patients may have a stored audiovisual clip of their session and thus the medicine counselling.
- The patients will develop better health seeking behaviors and transportation and some finances will no longer be an issue.
- Tuberculosis and HIV patients are able to access quality healthcare without travelling miles to tertiary and

- secondary healthcare facilities to see specialists and consultants.

### Some Difficulties Telemedicine May Face in Remote African Settings and their Solutions

1. Accessible and available ICT devices – the hospitals will be the ones equipped with the facilities.
2. Skills to operate the devices- there are telemedicine assistants on standby to help the patients with this
3. Electric energy- the devices with which telemedicine can be utilized do not consume much energy hence a generator can be used in absence from the energy companies
4. Care of the equipment- there are technicians that will be trained in computer care and servicing.

### Some Challenges People in Rural Areas May Face with Telemedicine

1. Internet connectivity
2. Availability of gadgets that will facilitate telemedicine
3. Little/no technical know-how in operating gadgets

### Some Disadvantages Telemedicine

1. Difficulty getting medical help in emergencies
2. Reduced Doctor-Patient Interaction
3. Misdiagnosis

NB: In future, these disadvantages can be tackled by creating better Emergency response teams that can be reached using telemedicine. While Standards of Operations (SOP) guiding case profiling and diagnosis like are seen in known syndromes and triads could be applied to prevent misdiagnosis.

### CONCLUSION

The promise telemedicine holds in rewriting the healthcare structure and history in Africa are Numerous. It transcends the religious, cultural, Languages, finance and over population boundaries. It shows great promise by helping patients keep their appointments, adhere to doctors' advice, and refill their prescriptions, to name a few benefits. It is indeed a magic bullet to improve healthcare delivery in remote areas of Africa.

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