

# Harnessing Information Communication Technology to Promote Healthcare Access by Women Living in Rural Areas : Opportunities and Challenges

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## ABSTRACT

In today's world, Information and Communication Technology (ICT) is the driving force behind all economic, financial, technological and social developments. It is a tool that has reached and impacted individuals, organizations and nations globally. In the last couple of decades, ICT has revolutionized the medical field in a tremendous way. ICTs have impacted healthcare sector through sharing of public health information, diagnosis and treatment, facilitation of collaboration and cooperation among healthcare workers, remote consultation, effective health research, monitoring health incidences and improving overall efficiency of healthcare facilities. In this paper, desktop exploratory study was conducted to find out how ICT can be harnessed to promote healthcare access by women in rural areas considering associated opportunities and challenges. It looks at uptake of ICT in healthcare in developed countries versus developing nations. It concludes by outlining the opportunities and challenges associated with the application and use of ICTs by women living in rural areas.

Keywords: Information and communication technologies; Healthcare; Rural areas; Healthcare access; Developing countries

## I. INTRODUCTION

In the past decades, ICT has permeated and affected all sectors of developments across the world. It is a tool that has reached and impacted individuals, organizations and nations globally. ICT is defined as set of diverse services, goods and applications used to produce, process, distribute and transform information. It's technologies are rapidly changing the way in which knowledge and information are shared globally. ICT use is applied in all sectors including medicine,

agriculture, defense, education, government, transport, commerce, banking, manufacturing among others [1]

In the last couple of decades, ICT has revolutionized the medical field in a tremendous way. Advancement in the knowledge and practice in medical field has been attributed to the advent of ICT. In this field, ICT is used for research, communication, medical equipment, keeping patient records, web based diagnosis among others. Electronic health (E-Health), is an emerging branch in medical field that refers to the use of digital technologies and telecommunications,

such as computers, the Internet, and mobile devices, to enable health improvement and health care services.

According to Jayita et al., (2017), majority of the people in developing nations reside in rural areas where there is overall under- development compared to urban areas and technological adoption by the population in rural areas is still a matter of concern. [2], noted that the main challenges of ICTs and rural development in developing nations are issues of access and non-inclusivity. The rural population is still struggling with access to ICTs and in most cases it is not included in matters concerning ICT implementation, adoption and use. Women living in rural areas when compared to urban women do not have the capacity to access healthcare services and in rural areas healthcare services are not as advanced as in urban areas. ICT in healthcare adoption and use by women living in rural areas especially the remote rural setting is still very low. This is attributed to poverty, limited access to information, illiteracy among others [2].

## II. LITERATURE REVIEW

### **Information and Communications Technology (ICT)**

ICT is viewed as the backbone and the catalyst of all major developments in the world today. It has enabled people from all over the world to share and disseminate information across the globe. Information and Communications Technology is defined as tools that facilitate, process and transmit communication of information by electronic means. According to [3] ICT is characterized as the intermingling of PC, general media, phone and PC networks through a connection framework. It can likewise be viewed as a bunch of different merchandise, applications and administrations used to produce, process, distribute and transform information. ICT enables people to access, share and add value to information through communication technologies. Information and Communications Technology is applied in all sectors including medicine, agriculture, defense, education,

government, commerce, banking, transport, manufacturing among others [1]. Embracing the utilization of ICTs achieves significant effects in working on the wellbeing and prosperity of poor and minimized populaces, battling neediness, and empowering maintainable turn of events and administration. Also, powerful utilization of ICTs have tremendous potential as apparatuses to increment data streams and the dispersal of proof based information and to enable citizens. [4]

### **ICT in healthcare access and provision**

In the medical field, there have been tremendous developments in the past few decades which are attributed to ICT. It has been a catalyst and enabler of medical education and practice thereby is expected to improve greatly due to ICT technological advancements in the field of medicine. According to [5], ICT is a vital component in achieving development goals of poverty reduction and health improvement of the most poor and vulnerable people. Generally, ICTs have impacted healthcare sector through sharing of public health information, remote consultation, diagnosis and treatment, facilitation of collaboration and cooperation among healthcare workers, effective health research, monitoring health incidences and improving overall efficiency of healthcare facilities.

In developed countries, the uptake and use of ICTs is growing rapidly and it is in advanced stages compared to developing nations. For example, [6] outlined the following ICT developments in developed countries like United States of America, Germany, and France;

### **Artificial intelligence (AI)**

**AI is increasingly walk toward doing what humans can do in an efficient, fast and cheaper way. In healthcare AI has shown to have great potential in diagnostics, treatment, training, and research among others.** According to [7], application of AI in healthcare include support in clinical decisions, enhancing primary care and triage through Chatbots, aiding in

virtual nursing assistants, robotic surgeries, and aiding in the accurate diagnosis.

### Virtual Reality (VR)

VR is a technology that enables a user to simulate a situation or experience of interest, using a VR headset, within an interactive but computer-generated environment. In healthcare VR is used in several areas including patient treatment, training, educating people about a disease or medical condition or process and medical marketing [8]

### Healthcare Trackers, Wearables and Sensors

According to [9], these are used in healthcare for patient management, treatment management and disease management. Some *wearable* devices are equipped with *sensors* that can detect human physiology status, such as heartbeat, blood pressure, body temperature eg Fitbit Ionic to monitor sleep, Polar H10 for tracking workouts among others.

### Medical Tricorder

It is a handheld portable scanning device to be used by users to self-diagnose medical conditions within seconds and take basic vital measurements. According to [6], it is utilized to analyze and break down illnesses for example The Viatom CheckMe Pro is a palm-sized device which can quantify ECG, pulse, oxygen immersion, temperature and blood pressure.

### Genome sequencing

Kathryn et al., (2015) noticed that genomic sequencing advances empower the rapid investigation of various qualities all the while, remembering those for an individual's genome. It gives valuable information about drug sensitivity, multifactorial or monogenic medical conditions and even family history eg a machine by Illumina Company [6]

### Nanotechnology

Nanotechnology manages the designing of frameworks at the nuclear and sub-atomic level. It can control

matters at nuclear levels, nanotechnology can possibly upset heap parts of clinical consideration, including diagnostics, disease monitoring, surgical devices, regenerative medicine, vaccine development, and drug delivery [10].

### Robotics

Health Robotics empower an elevated degree of patient consideration, proficient cycles in clinical settings, and a protected climate for the two patients and wellbeing laborers. As per (GobalData, 2020) robots in the clinical field are changing the way that medical procedures are performed, smoothing out supply conveyance and sterilization, and saving time for suppliers to draw in with patients.

### 3D-printing

3D printing in medicine is part of the innovative process called additive manufacturing, which means producing three-dimensional solid objects from a digital file. According to [11] 3D printing is used for the development of new surgical cutting and drill guides, prosthetics as well as the creation of patient-specific replicas of bones, organs, and blood vessels.

In developing countries like Kenya, the majority of human population reside in rural areas where it is normally underdeveloped compared to urban areas. These developments include economic betterment of people as well as greater social transformation to eliminate poverty, ignorance and inequality of opportunities. ICT if adopted fully, is an instrumental tool in achieving rural development in developing countries. [4] assert that collective use of ICT with the appropriate guidance steers a country to be information sufficient and in the long run improves livelihoods of the people.

According to [12], rural areas in developing nations still have low uptake of ICTs due to rural challenges like poverty, poor infrastructure, technological illiteracy, high costs of ICTs among others. In addition, widespread gaps in basic digital skills still limit wider

usage and application of digital tools and services and gaps in advanced digital skills limit business [5]. According to World Bank economic report 2019, Kenya faces a critical advanced partition, with 44% of the metropolitan populace approaching the web contrasted with 17% in rustic regions. The fact that telecommunications makes in any case, it actually significant has continued to register positive growth, with increased uptake and usage of mobile phone services due to increase in mobile network coverage [13].

#### **Use of ICT in healthcare access by women living in rural areas**

In Kenya, 68.9% of the population live in rural areas therefore there is need for inclusion of this population in digital revolution [12]. Included in this population are women who play a major role in economic development despite numerous challenges the go through, hence empowering them is key to rural development. The fundamental job that ladies and young ladies play in guaranteeing the maintainability of rustic families and networks, working on country vocations and generally prosperity, has been progressively perceived [14]. In developing nations like Kenya, women from rural areas especially in arid and semi-arid lands face numerous challenges which intensify their health issues. These challenges include gender inequity, poverty, economic exclusion, limited access to credit services, health care, education, sexual and gender-based violence including female genital mutilation [15] and [14].

In developing countries like Kenya, ICT use in healthcare is steadily picking up despite the challenges that hinder its adoption and it is used to address critical parts of ladies' lives which is the accessibility of pertinent and opportune data about their wellbeing and infection anticipation. Among the different sorts of ICTs, the cell/cell phone and TV, radio and commercials have arrived at a critical populace of the rustic people by giving information, monetary

autonomy, government managed retirement, interpersonal organizations and self-confidence to rural women [16]. Women in Western Kenya use mobile phones in their day to day lives including SMS to get alerts on health related issues [17]. Therefore, it is evident that mobile phone is the most widely adopted ICT device by rural women and it empowers women to participate in socioeconomic services, report violence, consult family planning agencies, access education and health care [17].

#### **Opportunities for women living in rural areas in the use of ICT's**

The following section discusses the opportunities available that help in the uptake of ICTs in rural areas especially by women

- Widespread and growing adoption of ICTs in Kenya that provides information on agriculture, education, healthcare brings hope to people living in rural areas especially women
- Increased access to mobile phones by Kenyan population as well as the internet growth in the country
- Integrating new ICT tools such as mobile-phone SMS with old ICTs such as radio or TV has helped extend the reach to greater Kenyan population
- Science and technological innovations and socio-economic changes that has been witnessed in the recent past in Kenya
- The steady decrease in the cost of ICT devices like mobile phones, radios and Television which have seen Kenyan rural women afford
- Development of government policies like Kenya ICT policy
- Advancements and popularization of ICTs, especially mobile phones, text messages and emails, have opened up new opportunities to upgrade the level and quality of information for marginalized Kenyan women

### Challenges faced by women in the use of ICT's

According to [16], the following are barriers to adoption and usage of ICTs for women in rural areas

- Lack of clear National Policy for promoting ICT for women's development
- Poor ICT infrastructure, frequent power cuts, lack of electricity in many remote, inefficient telephone services, and far-flung areas.
- Lack of efficient computer knowledge on various areas including hardware and software installation and maintenance, internet and non-internet based skills such as telnet, FTP, mailing etc.
- Limited online information in languages other than English.
- Information overload and the time consumed in searching for useful and practical information.
- Social and cultural barriers

### III. CONCLUSION

From the findings in the above discussion, it is evident that ICT, if harnessed well has a huge potential in revolutionizing any sector. Health care sector especially in rural areas can be huge beneficiary of ICT if adopted and used appropriately for it has the ability to change the lives of women living in rural areas for the better.

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