

Digital Health Technologies and Implications for Developing Country Media and Health Communication

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Abstract

This article examines the relationship that exists among the media, the development of digital health technologies, and the implications of the trend on Africa. Reviewing four articles published on digital health technology-related issues, it is found that media, particularly social media which complement conventional media, tend to be influential in the aspect of digital health. The social communication devices such as mobile phones and tablets PCs enable social networks to promote healthcare through platforms for interaction. Similarly, mobile applications help in offering other medical services. The conventional media hence appear to be useful mainly in creating awareness about such developments. This trend however, is found to be of implication to Africa, particularly Nigeria where the level of development in technology is still low and conventional media coverage of digital health technology appears to be a new ground. Thus, this article recommends to journalists and social media users to intensify the promotion of digital health to enable both health providers and the public harness the potentials of these technologies.

Keywords: Digital health technologies, social media, conventional media, e-Health, mHealth

1. Introduction

The emergence of digital technologies particularly in the 21st Century has permeated virtually all human sectors. These technologies are being utilised largely to contribute to humanity. Human development and sustainability are central to the invention, utilisation and the effectiveness of these technologies. Since the realisation of the efficiency and effectiveness of computer and Internet facilities as social technologies, so many others are being developed to complement the process of digitisation of the society. The health sector: a visible arena of social change, is obviously taking a centre-stage of digital technology development which appears to shape and enhance health care services. The terms used to describe this development come in different forms; mHealth, e-Health, telecare, etc. According to Tucker and Goodings (2005), technologies work to bring forth a form of cultural information that provides a particular way of knowing the body, and that technology produces new resources through which the body could be known.

However, the technologies come in different forms ranging from digital devices (mobile phones, tablets PCs, laptops, etc) to mediated spaces such as the social networks and software applications. Batta and Iwokwagh (2014), in their work on the utilisation of new/social media by Nigerian teaching hospitals to optimise digital health found out that the major use to which the hospitals put the new and social media are to get feedback from clients (100%), present their vision and mission statements (60%), post administrative and personal structure information (65%) and give details of bids and contracts (60%). The study equally found out that these media were less used for health promotion (25%), financial transactions (100%) and interactive engagements with clients (0%). These digital technologies in healthcare could be classified based on their purpose for utilisation, as information technologies or medical technologies.

The fact is that these technologies are seen to perform functions as health devices or information devices. Today, there are applications on mobile phones that are used to detect illnesses and prescribe therapy in addition to the primary function of the mobile phones in providing communication, which includes giving a platform for interaction (social networking) and learning various activities that are beneficial to health. Mobile health (mHealth) or telecare is the use of phones such as smart phones, tablet PCs and other sophisticated gadgets to prevent disease and promote health, whereas e-health is more related to other electronic devices and means of enhancing health care such as Electronic Health Records (EHRs), Health Information Exchange (HIE), etc.

Thus, for a further understanding and identification of these technologies, Bajwa (2014) notes the following: Smart phones, Tablet PCs, Touch Screens, Digital Ink, Voice Recognition, Health Information Records (HIRs), Health Information Exchange (HIE), Nationwide Health Information Network (NwHIN), Personal Health Records (PHRs), Patient Portals, and Nanomedicine. Others include, Genome-based Personalised Medicine, Geographical Positioning System, Radio Frequency Identification (RFI), Telemedicine, Clinical Decision Support, Mobile Home Health Care, Cloud Computing, and Social media, etc.

These health technologies listed above and related ones have over the years assisted both health providers and consumers or patients in improving their well being directly or indirectly. However, perhaps, unfortunately not many people are aware of the existence, availability and operation of these technologies due to

poor enlightenment particularly on the side of our traditional media which, before the introduction of social or new media, took the primary responsibility of creating awareness about health matters. Today, the new media technologies have become effective, despite the role being played by our newspapers, radio, television, and film in terms of reaching larger audience with messages concerning health, and this is more visible in developed nations where these technological products/services are manufactured and appropriately put to use for healthcare development. Han and Wiley (2013) note:

Today, more than 1.5 billion people around the globe have an account on a social networking site. According to a study conducted by McKinsey Global Institute, almost one in five online hours is spent on social networks - increasingly via mobile devices (Chui *et al.*, 2012). Undoubtedly social networking has transformed how information is accessed and shared, and social technologies have greatly impacted the popular culture and are being adopted across industries.

They further observe that though issues concerning use of social media in healthcare communication in the United States (US) is still debatable by manufacturers, consumers and regulatory bodies (Popovic, Smith and Hellebusch, 2013), yet social networks continue to develop and reshape how stakeholders in healthcare communicate with one another. Similarly, Lupton (2014) has observed that:

The digital technologies that have emerged in the past decade (now often referred to collectively as “Web 2.0”, or “the social web”) have expanded the opportunities for people to access and, in particular, share health and medical information with each other in digital forums. Patients and caregivers can write about their experiences, create and upload images or videos and rate healthcare providers and medical treatments using social media platforms and blogs and wireless mobile devices that can connect to the Internet from almost anywhere. In this age of digital “prosumption” (combining production and consumption of Internet content), the ideal of the “digitally engaged patient” (otherwise referred to as the “e-patient”) has become dominant. This ideal represents digital technologies as offering patients and lay people the opportunity to ‘take control’ over their health via contributing to and harnessing online information and engaging in self-monitoring and self-care practices using digital technologies.

Thus, weaknesses in the old media (conventional print and broadcast media) could be attributed to many factors, among which are the low levels of understanding science and technology and limited platforms for audience interaction. Dutta and Batta in Wilson and Batta (2013) cited Kennedy and Overholser (2010) reflecting that scientific illiteracy has serious and broad implications for public policy around the world; and that if few people in a democratic society are knowledgeable about science and technology, the level of public discourse becomes low and policy making poor. Thus, this article argues that mobile communications and social media constitute the digital technologies for advancement in healthcare as against the old media; and in turn present the implications for developing societies such as countries in Africa where health care facilities are poor and inadequate. Generally speaking, digital technologies particularly mobile technologies do have the implicit capacity to improve health care. Roney (2012) identifies four ways this can occur. These are increase in medication compliance, improvement in post-treatment understanding, optimising patient access to health information, and lifting the propensity to aggregate data and improve popular health care. In line with this submission, Toure (2012) conclude that cellphones are becoming a key cornerstone of health programmes in a growing number of African countries. This is so because simple SMS are used as reminders for vaccination or antiretroviral treatment, grassroots information gathering systems deployed for demographics and diseases, and mobile information repositories for personal health records. Similarly, Novak (2012) sees a remarkable role for mobile technologies as a healthcare helper because they are changing the landscape of healthcare delivery across the developing world by giving people in remote locations the ability to connect with doctors, nurses, etc.

In developed nations, mobile technologies continue to find expansion in uses. According to *NIH News* (2012) combining mobile technology and remote coaching holds promise in encouraging healthier eating and physical activity behaviour in adults. Consequently, in order to explicate the development and dimensions of these digital health technologies and their relation to media (communication technologies), four selected articles were reviewed which reveal a tilt to the use of mobile health and social networks. This analysis would logically indicate implications of the emergence of these digital technologies on developing nations with prevailing health problems.

2. Application of Digital Technologies in Health Care

Digital technologies which are the various devices, applications and mediated spaces identified earlier in this article have different methods of application in health care. The common concepts such as e-health and mHealth

have been explained as put forward by other scholars for further understanding of the context of this discourse. Juma *et al.* (2012) in their attempt to define e-health cite some definitions by different scholars which include Alvarez's (2002) definition that, "e-Health is a consumer-centred model of health care where stakeholders collaborate, utilising ICTs, including Internet technologies to manage health, arrange, deliver and account for care, and manage the health care system." Eng (2014) also defines it as, "... the use of emerging information and communications technology, especially the Internet, to improve or enable health and healthcare." Both definitions point to Internet technologies and other ICTs in healthcare. Therefore, e-health is a digital phenomenon that is receiving serious attention by stakeholders in the health sector.

Moreover, mHealth as Garai (2011) views it, is the application of various areas of mobile telephony in health programmes. Thus, these two concepts have covered the context in which these technologies would be explained. Some relevant technologies have been selected and explained as Bajwa (2014), outlines as follows:

- **Smart Phones:** These are phones with ability to perform a number of computing activities in addition to the regular phone functions. In fact, smart phones e.g. iPhone and BlackBerry are microcomputers that can access and process a host of data and have camera, interfaces, Internet browsing, emailing, text and instant messaging, Wi-Fi, and Geographical Positioning System (GPS) capabilities.
- **Tablet Personal Computers (Tablet PCs):** While Tablet PCs have been around for quite awhile, healthcare IT applications are relatively recent developments. The use of slate-type tablets such as iPad is now becoming very popular in all walks of life including healthcare. Their larger size and wireless capabilities, give the Tablets PCs a balance between screen size and portability. Traditionally, Electronic Medical Records (EMR) has been limited to office tables, but with Tablet PCs, users have the ability to access medical records from anywhere.
- **Touch Screens:** Touch screens have existed for quite a while in one or the other form but the *resistive* and *capacitive* touch detection has flourished recently allowing pressure sensitivity, multi-touch and gesturing. A touch screen is more instinctive to use than the mouse. Hence, EMRs/EHRs can benefit from this technology where they can offer:
 - *Enhanced usability in hospital settings* where clinicians use gloves or other protective apparel (ER, surgery) or where small number of repetitive tasks needs to be done quickly (ER admittance).
 - *Innovative user interface* provides rich user experience by touching the icon for the function.
 - *Easy navigation and 3D diagnostic models* (cardiac CTscan) can be manipulated with multi-touch rotations.
 - *Use at all levels* as the touch screens can be used by even less computer literate persons for some medical functionality, such as accessing EMR/EHR, lab results, etc.
- **Digital Ink:** This technology allows writing on a screen just like on a piece of paper and has been integrated into EMR/EHR. *Microsoft Ink* is one such technology. A charting system can accept stylus input and convert it into text. Its uses in healthcare arena encompass:
 - *Drawing images* such as in surgery to communicate between the doctor and the patient.
 - *Annotating diagnostic images* such as X-ray and MRI scans to indicate important features.
 - *Inputting text manually*, especially when the patient is unable to communicate and can write a note to the doctor to explain his/her situation.
 - *Authenticating reports* quickly and easily by placing signatures just like with wet ink.

In addition to the above mentioned technologies however, there are various software applications that are utilised in healthcare for communication, diagnosis and treatment. They are medical technologies by virtue of functions which both health providers and consumers use to cater for everyday health needs. These are commonly mobile applications, though they are others that are used on other devices. These mobile software apps are important contemporary digital technologies. Millions of such applications were designed for smart phones, computer tablets and other mobile devices which were published since their first appearance in 2008. According to Lupton (2014):

Apple announced in mid-2014 that it had over 1.2 million in its App Store catalogue alone and that 75 billion apps had been downloaded by users. The other major app provider, the Google Play store, provides a similar number of apps to consumers. Market research has found that mobile device users spend more time each year on using the apps they have downloaded. One survey of adult Smartphone users in the USA found that the average number of hours, respondents spent per month on using apps exceeded 30 hours, and that the respondents used an average of 26 apps each.

Interestingly, among the selected articles reviewed here, are discussions on the use of Stress Free App (Tucker and Goodings, 2015) and CaringBridge Social Network (Han and Wiley, 2013). These two software

applications give insights into how digital technologies continue to enhance healthcare which, by implication leave behind many developing nations in the struggle to overcome contemporary health challenges.

2.1 Stress Free Mobile Application

This type of telecare app is designed to lessen stress; however, it is both a psychological and physiological application of a technology to bring about relaxation. Tucker and Goodings in their examination of this application emphasise that their concern was to explore the relevance of this particular application designed to manage, organise and potentially improve psychological well being by reducing stress. The application is called Stress Free: one of the many technologies designed to promote psychological well being. There are others such as mood tracking apps, remote access to health services, GPS-based location services, waist trainer, etc. which certainly gave birth to mobile health (mHealth). These technologies are produced in line with the idea that technologies have the power to intervene in people's psychological activity.

Free Stress App guides the user in reducing stress through calm breathing, self-hypnosis, meditation and deep muscles relaxation exercises. Users initially have the feelings that using or being in company of anything such as a device may not reduce stress since one probably has to carry the device along but only to find out that it does not matter having the device but concentrating on the instructions which are usually provided stage by stage for a user. Tucker and Goodings (2015) further explain that,

Users can move their way around the entire app, with each of the icons representing a different activity within the app. On choosing to complete one of the relaxation sessions the user is taken to a similar screen in which each of the icons represents one of the different forms of relaxation. Users are required to work through each of the sessions in turn and in doing so 'unlock' future sessions, beginning with calm breathing and developing to deep muscle relaxation. In each session, Dr Freeman explains how to complete each of the relaxation techniques and gives the user time to complete each of the exercises (which is often accompanied by soothing music).

This Free Stress app is a technology that provides users with different techniques of reducing stress. According to some users Tucker and Gooding interviewed, the app enabled them to feel psychologically relaxed and the device could be put aside while undertaking the exercise. This means the user could just be listening to the instructions and not necessarily viewing the screen.

This sort of application has ample implication for developing countries such as Nigeria where the living conditions spawn quite some stressful situations – loss of jobs, unemployment, family troubles, employee/employer squabbles, political turmoil, economic hardship religious strife, bombings, hostage taking, kidnappings, armed robbery and terrorist attacks. These stressful conditions, if not attended to can bring on emotional stresses, psychological upheavals, mental imbalances and physiological maladies. Thus access to this sort of app in the Third world where stressful conditions caused by poverty and other political, social, cultural, and economic problems, may be of tremendous help. A widespread application may help minimise cases of diabetes, hypertension, anxiety states, depression, peptic ulcer or even derangement of the mind.

2.2 CaringBridge Social Network

In view of the current trend in digital health, some social networks have emerged to facilitate healthcare. People become connected to one another on social network through dialogues and conversations over health-related matters. Thus it creates a platform where patients, physicians, caregivers can disseminate and share information and interact on matters concerning health. Han and Willey (2013) however, note that certain medical services are possibly offered on such networks. They further explain that programmes such as virtual sessions of online therapy offering various modules that provide anxiety and depression assistance are now available (Kotenko, 2013). A small primary care medical practice, Hello Health, has been practicing "cyber-visit" whereby patients of this clinic can video chat with a particular doctor to describe their symptoms and ask the doctor for advice (Hawn, 2013). These are good examples of how such social networks are utilised.

Han and Willey (2013), in their attempt to explain the relevance of social network in healthcare, examined the network called CaringBridge: a platform for patients, physicians and other people, who could use it for posting and uploading messages and images particularly in respect to their health condition so that others can share the information with them. According to these researchers, CaringBridge is a non-profit web-based service created in 1997 by Sona Mehring, a programme designer who wanted to help a friend cope with a life-threatening pregnancy. It was a simple website set up to keep family and friends informed and updated on the health situation, but later transformed into a well-established social network that caters for a large number of people. Today, the first single webpage of CaringBridge organisation has grown considerably to over 3 million members, logging with half a billion website visits and 13 million messages (Clemence, 2008). Over 1,800 hospitals and healthcare facilities partner with CaringBridge and recommend the service to their patients.

Similarly, several other social networks such as Facebook, Twitter, YouTube and blogs were identified to be very effective in healthcare. Social networks help bring about interaction among participants. Han and Willey (2013) identify four major characteristics of social networks as follows: User-generated content, Community, Rapid distribution and openness, and Two-way dialogue.

Critically examining CaringBridge Social Network, the researchers concluded that it possessed all the characteristics, saying that the patient/user-generated content has become a platform for patients to write about their health and feelings, thus making their journey easier, and the two-way dialogue through visitors' signing the guestbook builds an online social community that connects people in authentic and meaningful ways. What distinguishes this social network from others such as Facebook is its format of writing which is conversational and provides ground for interaction with patients. It is more protective, and adds value to everyone involved.

2.3 Areas of Application of Digital Technologies in Health Management

Health programmes utilise digital technologies in different areas. According to Garai (2011), the areas primarily include:

- **Delivery** that involves the medical practitioners and health workers to conduct diagnosis and provide care, etc.;
- **Promotion** to create awareness among target audience and help them adopt healthy behaviour;
- **Monitoring and Evaluation** to improve delivery and promotion functions.

In view of this framework, the technologies as independent variables and the media (new and old media) as other variables could be seen in an interwoven relationship of developing and enhancing a viable health care system. With regard to the delivery aspect of health programming, the technologies become primary tools used by medical practitioners and health workers to carry out their professional duties. Doctors and health workers need certain technologies to diagnose ailments by way of testing, X-raying or scanning. Modern digital technologies have over the years been developed to carry out these functions with less stress and effort. Interestingly, even mobile phones today can have applications that help in carrying out many functions in relation to medical services. Some smart phones today are used for diagnosing HIV or for scanning.

Furthermore, not only do mobile phones offer medical functions, they are as well capable of rendering other medical services such as the earlier mentioned Stress Free App and the CaringBridge Social Network that create a platform for patients, medical practitioners to interact on various health issues. The social networks bring patients close to their doctors to get prescription and medical advice without meeting them physically. Thus the use of mobile phones is seen here as an independent variable with all their applications and software that make them capable of performing the mentioned services.

However, promotion which is another aspect of health programming has recognised the utilisation of the media (new and old media) in reaching target audience who are members of the society. People need to be aware of certain developments in the health sector. These developments may be in the area of technology or a discovery of a particular health issue which is very important to the public. Social networks play a vital role in promoting healthcare by bringing people to interact on certain health issues. Heldman, Schindelar and Weaver (2013) note in a *Journal of public health review* that:

Just as some audiences may prefer to receive health information via print materials, or from their peers, some audiences prefer to receive health information and communicate with public health organisations online. Indeed, 59 percent of US adults who use the internet reported that they have looked online for health information in the past year, with 35 percent indicating they had gone online specifically to understand an emerging health condition. With the number of social media users steadily growing, social media present an opportunity to reach audiences who may prefer to receive health information through these channels.

Print media and broadcast media form the conventional media, and part of their responsibility is to create awareness and educate the public on certain matters that affect them. Several health programmes go on our broadcast media and news and articles are presented on the pages of our newspapers and magazines on health matters but these conventional channels do not seem to be adequate for health communication and as such, the social media seem to advance in enlightening people about health matters online, through various social networks. Notably, social networks give opportunities to specific health matters that need intervention and in some cases are engaged actively not only in providing information but in rendering the actual medical services required as seen in the use of certain mobile applications. Thus, it implies that both social media and conventional media play a vital role in health communication.

Hivon, Lehoux, Rock and Denis (2012) in their study of "Health Technology Assessment and the Media" found out that the media particularly print, through their report, educate the audience on how technology

works; how effective it is and for who does it work and the risks and benefits associated with it. Also, depending on the health innovation being covered, social and ethical considerations may not be addressed fully in the media and as such they (media) need to be assisted in situating health innovations in their social contexts. They therefore, concluded that while the media are effective in providing information about illnesses, they are not thorough in their coverage of healthcare contexts within which health innovations are used.

Also, the last of the areas of application is the monitoring and evaluation aspect of health programming which involves health workers including medical practitioners and media institutions. Garai (2011) in explaining monitoring and evaluation in healthcare system in India note that ICTs were the traditional devices or channels for collecting and analysing data by Health Management Information System (HMIS). The ICTs are nothing more than the digital technologies identified earlier. However, the effort being made by conventional media in reaching the audience with messages about health issues and the feedback generated also contribute in the monitoring and evaluation processes of healthcare management.

Several programmes on health are featured on broadcast media and a number of columns in magazines and newspapers are designed to educate the audience on health matters and feedbacks are received. With respect to the social media, media workers in fact, as learnt earlier in the use of CaringBridge Social Network help medical practitioners keep track of developments concerning their patients. This is true of other social networks that could be used by public healthcare to monitor and evaluate levels of progress and achievements in health management. The media, whether new or old, are deemed imperative in this process of health monitoring and evaluation.

3. Other e-Health and m-Health Applications

Healthcare has benefitted in very significant ways from electronic and mobile technologies. Considering mobiles and medicine, Hume (2012) describes them as constituting the brave new world of mHealth. He points out that, communication technologies could by 2017 become integral to healthcare as more than 300 medical applications are currently in use creating a global market worth about \$23billion. He adds that mobile monitoring of the elderly and the chronically ill can ease the strain on health systems and that in the developing world where there is a dearth of health services, portable, accessible medical services could play a major part in taking healthcare to remote, underserved areas.

Exploring this brave new world, Simon (2011) writing for the *World Street Journal*; and Hume 2012 have identified some of the most innovative mHealth initiatives as follows:

- **Portable Ultrasound:** The size of a cellphone, this device allows both doctors and patient to evaluate the heart –its muscle, the valves, rhythm and blood flow.
- **The Mobile MIM System:** This permits doctors to use their iPhones to view images from sophisticated hospital tests such as MRI and CT scans with enough clarity, resolution and fidelity that make diagnosis possible through smart phones.
- **The Airstrip OB:** With this device, the obstetrician can use his iPhone to bring up data on foetal heart beat, oxygen levels, and mother's contractions from a sensor strapped to her abdomen distances away from the birthing woman. The doctor may use such data to order for a caesarean section while she makes her way to the patient.
- **Everon:** This is a sensor-rich mat put beneath the patient's mattress to alert nurses if the patient's vital signs drop to a troubling level by wirelessly transmitting an alarm to the nurses' station or their smart phones and pagers. The mat can equally alert nurses at intervals to turn the patient in order to prevent bed sores.
- **Wristband Sensor:** The purpose of this is to track the patient's vital signs (i.e. temperature, pulse, respiratory rate, blood pressure heart rhythm and activity level) and send wireless alerts to the doctor at first sign of distress.
- **Smart slippers:** These are studded with sensors to detect any alteration in the user's gait which may indicate a health problem or a high risk of fall. Detected changes are transmitted as notification to the doctor.
- **AT & T Vitality Glow Caps:** These are pill bottles that alert when it is medication time. At such times, the caps glow, produce a ring tone, call or text the patient's mobile phone as reminders. The bottle also records each cap opening and transmits the same to a designated health staff or relative to ensure compliance.
- **Intelligent Personal Alert Monitoring System:** This provides Alzheimer disease sufferers some confidence to live without support. The mobile device is equipped with GPS receiver which logs its position every three minutes and can trigger an alert if the patient moves outside a predetermined area.
- **Dexcom Seven Plus Continuous Glucose Monitoring System:** This gadget has a sensor implanted under the patient's skin to provide a continuous reading of glucose level – monitoring the response to

drugs and activities. Blood sugar levels are transmitted to cellphone size receiver every five minutes. The sensor can be worn up to seven days at ago and can give off an alert when the glucose level falls to a dangerous level.

It is evident that this indeed is a brave new world. For Third World countries especially in Africa and Nigeria where the health situation is dire, most people who require health care live in rural/remote areas where access to healthcare staff and facilities is poor, and illiteracy high. In spite of these and other constraints which could also be political, social, and cultural, Burney, Mahmood, and Abbas (2010) see prospects for developing countries such as Pakistan in terms of ICT in healthcare management system. They challenge developing countries to provide rapid response to critical medical care regardless of geographic barriers, establish interactive medical consultation and communication links of medical images and video data, and invest in a strong ICT infrastructure that is capable of catering to the bandwidth and availability requirements.

Similarly, Bukachi and Pakenham-Walsh (2008) note that the implementation of health ICTs in developing countries and in Sub-Saharan Africa has been hampered by what they summarise as four “Cs” namely: connectivity, cost, capacity, and culture. They also note that the problem of improving healthcare delivery in developing countries, “is more about the equitable distribution of available resources to all areas of the health system than about technology,” that, current resource allocation in the health sector almost always excludes health information,” (p.1627), and that, “the increasing use of wireless technologies has begun to surmount the persistent obstacles to the implementation of ICTs but their capacity to carry information remains to be enhanced” (p.1628). To reap more benefits, the authors recommend, “a better understanding of local conditions, better training of health workers, and appropriate choice of ICT tools” (p.1629).

A question arises: do eHealth technologies have demonstrated impact in developing countries? Blaya, Fraser, and Holt (2010), document that they do. In a study involving Africa, Latin America, Eastern Europe, and central or South eastern Asia, they found out that, “systems that improve communication between institutions, assist in ordering and managing medications, and help monitor and detect patients who might abandon care” show promise (p.244).

In a similar vein, Carrol and Kirkpatrick (2011) in their study of the impact of social media on adolescent behavioural health in California found that most teens use online networks to extend friendships, find a supportive environment to explore romance, friendship, and social status, as a key source of information and advice, and to gain answers to many of their health concerns through online search engines. In terms of using the social media to promote participatory medicine, Gallant, Irizarry, Boone and Kreps (2011) conducted an inductive content analysis on websites of 14 top-ranked US hospitals to look at how hospitals provide web-based health information to patients. They observed that all the hospitals used social media platforms; most offered web-based broadcasting of health information and used online health tools such as Body Mass Index (BMI), calculators, and health dictionaries. However, the hospitals employed less of mobile applications, hospital-patient interaction tools and health blogs. Their study implied that the convergence of interactive media formats with web-based communication tools are likely to boost e-patient education and promote patient involvement in ways that reconfigure the usual health care interaction leading eventually to improved status of participatory medicine.

4. Implications of Digital Health Technologies on Media in African Societies

Development in the area of technology is what is seriously lacking in Africa. There is over dependence on the developed world for technologies that improve humanity. Digital health technologies which are meant to facilitate and manage healthcare are not manufactured in Africa, neither are they sufficiently acquired for use. The technologies available are not properly put to use, largely due to poor education, information and innovation. These three mentioned factors could seriously be taken care of through media campaigns and enlightenment. African societies are known to be associated with various problems ranging from poverty to health-related problems. The media capture in their reports most of the aspects that relate to social problems in the society but issues related to development in health technologies are hardly presented to the audience.

In view of the nature of the African society, particularly a country such as Nigeria, the role of the media in educating, informing and being the watchdog of the society (Wright, 1960), can bring home the knowledge of these technological innovations. Newspapers and magazines can intensify that through their professional technique of setting agenda, framing and priming which may effectively make impact on peoples’ understanding of the use of digital health technologies. mHealth and e-healthcare are becoming influential in the field of healthcare. We suspect a significant knowledge deficit of these in Nigeria. The effort to bring about advancement in technology, particularly in a country like Nigeria, will not be possible if such innovations are not brought to the knowledge of the public. First of all, media professionals, managers, editors, publishers, correspondents and reporters have to educate themselves and arm themselves with the requisite knowledge. A thorough research in this area of technology can bring attention of so many stakeholders. Lupton (2014) notes that:

... Social researchers have yet to devote significant attention to the role played by health

and medical apps as contributors to these digitised landscapes and ecologies. Yet these apps have proliferated in recent years as part of a constellation of new digital health technologies that include telehealth and telemedicine, digital gaming technologies, digitised medical education and health promotion materials, wearable devices to monitor and measure bodily functions and activities, electronic patient records and booking systems and the use of large digital data sets (“big data”) to generate knowledge about healthcare, health behaviours and disease patterns.

Mobile communication devices are those largely used for mHealth, and in Nigeria more people are becoming conversant with the use of smart phones that offer opportunities for learning about important matters relating to health. Informed messages are all people need to harness the potentials of these devices to improve their well being. News reports on development of new mobile health applications or articles educating people on how to get and use a particular mobile application will certainly be useful in promoting healthcare.

Furthermore, e-health technology deals largely with those emerging devices that help in healthcare management. In this case, medical facilities are those technologies that are becoming digital. Thus, if media focus on these emerging trends in the medical sciences, it will go a long way in improving healthcare. In Nigeria, there may be a number of medical practitioners who need to know about developments in certain medical technologies so as to enhance their practice as well as technical know-how of operating certain devices but with the media bringing the knowledge close, they would not be out of date. They would always be informed about the state of the art in healthcare and would more likely be willing to transform the healthcare system in the country.

5. Conclusion

Digital health has come to stay because we live in a digital world. However, as Simon (2011) warns, overemphasis on digitisation does have its downsides! It can create a culture of cyberchondriacs (excessive worries about health and the place of cyberspace in it when there is really no need for such worries), the likelihood of virtual touch replacing actual touch and face to face interaction as well as the unnecessary creation of anxiety. Howbeit, Hostetter, Klein, and McCarthy (2014) write on taking digital health to the next level through the promotion of technologies that empower consumers and drive health system transformation. They insist that, “digital health technologies – ranging from wearable sensors and portable diagnostic technologies to telemedicine tools and mobile healthcare apps – have potential to transform the healthcare delivery system by empowering consumers to play active role in their care and define what services are important to them” (p.7).

In view of the emergence of digital health technologies and their application in healthcare, the media (both social and conventional) are found to be interrelated in the development. The media of communications play a crucial role in both innovation and communication contexts of healthcare. Media devices are found to be used both for information and medical services. mHealth is a typical example of such development that shows how mobile communication devices like smart phones are used for diagnosing diseases, scanning and testing of various ailments. These phones nowadays can have applications that enable users to perform such activities. Similarly, social networks are becoming platforms for interaction on health-related matters. On the other hand, conventional media which include our popular newspapers, magazines, radio and television also have roles to play in enlightening the public through news reports and articles on developments in digital health technologies.

However, the implication of this development in Africa is the low level of development in terms of technology, but even the available and simple technologies in Africa and Nigeria in particular could be harnessed if the media offer useful messages on how to put them into use. Digital health technology is a new development and as such, members of the public need to know its potential, application and benefits for healthcare. Journalists in the conventional media, thus have the responsibility to report developments in digital health technologies to enable both health care providers and the members of the public harness the opportunities that come with these technologies. It is recommended here that journalists, including citizens could engage in knowledge-searching about digital technology and share with others through their effective medium. This, if considered may accelerate health innovations in Africa and Nigeria in particular.

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