

mHealth as a Tool for Health Information Dissemination In Developing Countries.

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Abstract

Electronic mobile devices are being adopted as a medium of health information dissemination. The ever increasing number of mobile phone users in developing countries has made its use for mhealth very attractive. This paper examined the concept of mobile health (mhealth), including the products and methods used for its operations. The current areas of mhealth application in the health system were reviewed. The paper noted the challenges and limitations of mhealth in developing countries. The expected roles of health librarians in the mhealth arena were highlighted and a list of some core health resources provided for libraries. It concluded that the opportunity exposed by mhealth should be exploited by the working together of all stakeholders including librarians and the legal integration of mhealth in health systems by governments in developing countries.

Keywords: mHealth; Health information; Health information dissemination; Mobile health; eHealth.

Introduction

The use of mobile and wireless technologies to support the achievement of health objectives (mHealth) has the potential to transform the face of health service delivery across the globe (World Health Organization). This is more so in developing countries like Nigeria where poor funding, low health literacy and other barriers had been impeding effective healthcare delivery. The use of mhealth as a tool for health information dissemination had been in practice in developed nations for many years now. Results from WHO 2009 global health survey indicate that underdeveloped infrastructure among others is responsible for the low up take of mhealth in the African region. Yet mhealth practices are needed to quicken the pace of healthcare delivery in developing countries. It then becomes necessary to review the new concept of mhealth, its uses, its peculiar advantages for developing countries, the challenges and implications for medical librarians. This is to ascertain the status of mhealth practices and make recommendations for faster advancement of the sector for the much desired better health of the people in developing nations.

Definitions and concept of mhealth (mobile health)

Mhealth is an abbreviation for mobile health and is also written as m-health. It is a term coined by Robert Istepanian. The World Health Organization (2011) defines mobile health as “*medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices.*” Eysenbach (2013) describes mobile health as “*the use of portable electronic devices with software*

applications to provide health services and manage patient information. It can also be defined as “*emerging mobile communications and network technologies used to address the health needs of individuals, communities, and societies* (Istepanian, Laxminarayan, & Pattichis, 2006), or “*the delivery of healthcare services via mobile communication devices*” (Torgan, 2009). Essentially, mhealth provides healthcare access through mobile telecommunication and multimedia technologies. Thus the core elements of mobile health consistent with these definitions are: health information ----- electronic mobile devices ----- communication.

MHealth is an off

shoot of e-health (electronic health). “e-Health” is an umbrella term, “to describe the combined use of electronic communication and information technology in the health sector... the use in the health sector of digital data - transmitted, stored and retrieved electronically - for clinical, educational and administrative purposes, both at the local site and at distance” (Mitchell, 1999). In effect, while health is more of the technology that supports the functions and delivery of healthcare, mhealth rests largely on providing healthcare access (Torgan, 2009). For example, an mhealth project that uses mobile phones to access data would require an ehealth system in order to manage, store, and assess the data (Vital Wave Consulting, 2009). Thus, ehealth projects many times operate as the backbone of mhealth projects. mHealth is also related in part to digital-healthcare, health 2.0 and telehealth which are briefly described here for a complete view of their interwoven operations.

Generally, digital healthcare is concerned about the

development of interconnected health systems so as to improve the use of computational technologies, smart devices, computational analysis techniques and communication media to aid healthcare professionals and patients manage illnesses and health risks, as well as promote health and wellbeing (Institute of Digital Healthcare, 2013). It provides technical solutions (both hardware and software) to help address the health problems and challenges faced by patients. The lexicon of digital health is extensive and includes all or elements of mhealth (aka mobile health), wireless health, health 2.0, ehealth, e-patient(s), healthcare it / health it (information technology), big data, health data, cloud computing, quantified self, wearable computing, gamification, telehealth / telemedicine, precision and personalized medicine, plus connected health (Sonnier, 2014).

Health 2.0 involves the use of a specific set of web tools including blogs, podcasts, tagging, search, wikis, online communities, email list-servs, videos, twitter, and more by actors in health care including doctors, patients, and scientists, using principles of open source and generation of content by users, and the power of networks in order to personalize health care, collaborate, and promote health education (Hughes et al., 2008).

Telehealth- (a broader version of telemedicine) is the transmission of health-related services or information over the telecommunications infrastructure. It involves both providing clinical services remotely, and non-clinical elements of the healthcare system, such as education (Whatls.com, 2014).

Products and methods used for mhealth

A lot of technologies and specialized health related software applications are being used in the mhealth field and a lot more are being designed and pushed into the market every day to enhance performance. For now some of the products in use include: mobile phones, smart phones, patient monitoring devices, mobile players, telemedicine/tableware devices, MP3 form Learning, microcomputers, data collection software, mobile operating system technology and other mobile applications such as gamified / social wellness solutions (Wikipedia). The operating systems that control these emerging classes of devices include Google's android, Apple's iPhone OS, Microsoft's windows mobile, Nokia symbian OS and RIM's blackberry OS (Wikipedia). Mobile phones and smartphones are essentially the dominant products used for mhealth especially in developing countries.

mHealth is most easily incorporated into processes and services that historically use voice communication through conventional telephone networks (WHO,

2011). Basic short message (SMS) functions and real-time voice communication serve as the backbone and the current most common use of mobile phone technology (Michael, 2006). The main domain of mhealth is bulk SMS and rob calls which may be in 1-way, 2-way or 3-way direction. Research shows that the most commonly documented use of mHealth was 1-way text-message and phone reminders to encourage follow-up appointments, healthy behaviors, and data gathering (Eysenbach, 2013).

The emergence of mhealth for health information dissemination

The current global clamour for use of mobile technologies as a tool for health information dissemination is inspired by the rising number of the users of these devices especially the mobile phones. There are approximately 6.8 billion mobile phone users globally, and it was predicted that by 2014 there would be more mobile phone plans than there are people in the world (Dais,

2014). Not only is the number of phones growing, but the amount of time people spend with them is increasing as well. A 2013 Facebook report indicated that 4 out of 5 Smartphone users reach for their phone within 15 minutes of waking up and 79% have their phones on or near them for all but 2 hours of their waking day (Dais, 2014). Nokia revealed that the average person looks at his or her phone 150 times a day, which is about once every 9.6 minutes! This is far more than they use a computer or a TV (Dais, 2014). It then means that for most people their mobile phones are their closest possessions or companions. It is becoming the most powerful means of connection in a person's daily life (Dais, 2014). Apart from availability and portability, mobile devices offer increased access to healthcare and health-related information (particularly for hard-to-reach populations); improved ability to diagnose and track diseases; timelier, more actionable public health information; and expanded access to medical education and training for health practitioners (Vital Wave Consulting, 2009). Leveraging on these to meet health information communication challenges seems an exciting opportunity to exploit. This explains why global health agencies are beginning to advocate the prudent use of mhealth solutions, guided by evidence demonstrating their usability, functionality, reliability, and impact under real-world conditions (Labrique et al., 2013).

Uses and applications of mhealth in health information dissemination

Combining technological advances with medical expertise has led to the use of mobile phones in all healthcare areas including diagnostics, telemedicine, research, reference libraries and interventions (Bastawrous and Armstrong, 2013). mHealth applications can now be used for collecting community

and clinical health data, delivery of healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vital signs, and direct provision of care via mobile telemedicine (Germanakos, et al., 2005). However, the United Nations Foundation and Vodafone Foundation report presents seven application categories within the mHealth field. According to the report mhealth can be used for education and awareness, helpline, diagnostic and treatment support. It can also be used for communication and training for healthcare workers. mHealth can also be used to improve disease and epidemic outbreak tracking, remote monitoring and remote data collection (Vital Wave Consulting, 2009). This shows that mhealth is applicable in health information dissemination to the two main segments of health care - the patients or consumers and the healthcare providers.

mHealth in health information dissemination in developing nations

mHealth certainly had greater applications in developed nations. In United States and European Union for instance, many patients and consumers routinely use their cell phones and tablets to access health information and look for healthcare services, while healthcare practitioners use mobile devices to access patient information and other databases and resources (Wikipedia). Over the last decade however, mobile phones have made a rapid entrance into many parts of the low- and middle- income countries, with the global mobile phone penetration rate drastically increasing in these areas much more than other parts of the world (ITU, 2003). Between 1999 and 2008, mobile phone coverage among the African population leaped from 10% to 60% (Aker and Mbiti, 2010). Nigeria for instance, was ranked 7th among countries of the world by the number of mobile phones in use. The data evaluated February 2014 based on statistics from the Nigerian Telecommunications Commission (2013) showed that with an estimated population of 177,155,754, mobile phones in use in Nigeria numbered 167,371,945. Improvements in telecommunications technology infrastructure, reduced costs of mobile handsets, and a general increase in non-food expenditure have influenced this trend (Wikipedia). Mobile phones have now allowed many developing countries, even those with relatively poor infrastructure, to bypass 20th century fixed-line technology and jump to modern mobile technology (Economist, 2008). mHealth is now emerging as largely an application for developing countries, providing greater access to large segments of the population, as well as improving the capacity of health systems in to provide quality healthcare (Wikipedia). The main concentration of mhealth in developing countries for now is health information dissemination to patients, the public, lay careers and health professionals. Health

experts and communities are thrilled by this development because it promises to break the enormous barriers in the healthcare system including: poverty, disease burden, large population, low health literacy rate, poor infrastructure, and untrained human resources.

A lot of factors have placed developing nations at advantage position of benefiting immensely from mhealth. It is location independent, allowing individuals to contact each other irrespective of time and place (Agar, 2003; Ling, 2004). It is designed to reach a large number of people at the same time. mHealth operations are time efficient. The messages get to the audience at the targeted time and as well gets prompt attention of the receivers as people normally love to read their messages within minutes of receiving it. It also allows direct access to information. mHealth devices are portable and relatively cheap. They work without electricity and can also be used by people with minimal or even no literacy.

Challenges and limitations of mhealth operations in developing countries.

Despite the advantages and the promise of better health via mhealth in developing countries, problems are emerging that may deter a sustained upward trend if left unchecked. The World Health Organisation (2011) identified high operating costs, lack of infrastructure, lack of knowledge and absence of policy as the top four barriers to mhealth development and operations in the African region. Therefore stake holders including librarians, health professional, mobile service providers, health ministries, non-governmental organisations and financiers need to be coordinated in a standard way for optimal performance of each sector and more effective general outcome. The absence of legal structure to back policies and operations is yet another challenge. Governments in developing countries should waste no more time in domesticating mhealth through the needed legislative processes and policies and integrating it into the routine health system. Low literacy still remains a deterrent in the mhealth communication especially when it is sms dominated. Low literacy may also translate to low health literacy which makes the understanding of the text messages by the target population difficult. Governments' low interest and investments in modern library development compounds this problem as the promotion of literacy is a cardinal objective of the library. The near absence and underdevelopment of public and school libraries in developing countries greatly contributes to their low literacy rates, which negatively impacts on mhealth operations. Poor funding of health sciences libraries and untrained personnel make them unequipped for their emerging roles for the new mhealth environment. This helps to slow down the whole processes. Limitations may also be posed by language and cultural issues. These make the

assimilation and practical use of the relayed health message difficult. Adequate funding is needed to initiate, operate and sustain the infrastructure needed for the mhealth network. Inadequate network coverage and poor network capacity persist in many regions. Apathy on the side of some health workers, resulting in their reluctance to adapt to the new technology and make effective use of the mobile devices hinders progress.

Medical libraries in mhealth environment in developing nations.

Medical libraries are the abode of health information and the medical librarians are the custodians. The emergence of mhealth in the health information arena is yet another challenge for health librarians. mHealth is a tool that librarians need to learn, handle, master and teach others how to use. This may start by collection development, to first build the knowledge base and data for the new subject area. The World Health Organisation reports and other documents are available to form the backbone for the reference section (some are listed in the appendix). The library community should be alerted on the available literature, while the attention and interest of the management should also be gotten to inform budget and policies.

Health Librarians in developing countries may also consider constructing and maintaining online reference health libraries to domesticate health information to suite the peculiar health needs of their citizenry. This will enable the populace access needed health information via their mobile devices as and when needed. They can also use the same mode to reach health professionals with needed information for their practice. Assorted consumer online health information forum can also be hosted by the librarians to bridge the language and cultural barriers. Collaboration with other stakeholders is a necessary part of the whole process. Public libraries in these countries should be more versatile in adopting ICT in their operations targeted at enhancing literacy skills of the citizenry.

Recommendation and Conclusion

The emergence of mobile devices as tools in health information dissemination is a welcome development that librarians should embrace to enhance their job. Medical librarians should quickly familiarise themselves in the new terrain and take the lead. This should be fully exploited in solving the obvious health problems in developing countries. All stakeholders in the health sector should work as a team to advance mhealth practices for the better health of all.

Governments in developing countries should also speed up necessary actions to legally incorporate mhealth into all tiers of their health systems. They should also vigorously pursue public and school library development as a permanent platform for higher literacy rates to flourish. With these, advantage will be

taken of the full range of mhealth opportunity in health information dissemination for better health in developing countries.

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