

Chapter 4

Improving Global Health With Smartphone Technology: A Decade in Review of mHealth Initiatives

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ABSTRACT

The widespread use of smartphones makes them a popular platform for healthcare applications. This article reveals the global trends and overarching goals of mHealth initiatives that seek to enhance health-care quality, increase access to health services, and improve global health communication. Three main themes emerged from this study: a) the impact of mHealth on international public health, b) overcoming mhealth barriers, and c) emerging mHealth technologies. The costs of developing mHealth apps and handling related data security concerns are the key barriers which need to be addressed to successfully implement global mHealth campaigns. Future directions of mHealth research are discussed, including the integration of new technologies, development of innovative healthcare systems, and overall improvement of global healthcare.

INTRODUCTION

Mobile health, widely known as mHealth, encompasses a diverse range of mobile technologies with goals of enhancing health care quality, improving patient outcomes, increasing accessibility of health services, and further strengthening the field of health communication (Chang et al., 2012; Massachusetts Institute of Technology, 2016; World Health Organization, 2011). mHealth has been originally defined as the “emerging mobile communications and network technologies for healthcare systems” (Istepanian, Laxminarayan, & Pattichis, 2007, p. 3). It employs mobile internet access, software applications (apps), global positioning systems (GPS), text messaging, and Bluetooth for the connection of multiple devices (Speciale & Fretysis, 2013). The existing and emerging technology of mHealth is used by pa-

DOI: 10.4018/978-1-5225-7909-0.ch004

tients, health providers, public health personnel, and researchers across the globe. According to a recent report, more than 100,000 mHealth apps have been developed across the health, fitness, and medical fields (Research2Guidance, as cited in Xu & Liu, 2015). Globally, mHealth apps have been used for a innovative health services and applications, which vary in scale, scope, and duration. The U.S., Canada, Norway are among the top international supporters of mHealth technology (Schuchman, 2014). This paper presents a thorough review of current literature focusing on the last decade of research conducted on mHealth applications and global trends since the introduction of the smartphone in 2007. This exploration of a decade's worth of mHealth smartphone applications addresses gaps in the existing literature by contributing to the evolving body of knowledge in the following areas:

- International mHealth projects that impact public health, health communications, and global health promotion;
- Barriers in mHealth projects;
- Research on emerging mHealth trends and technologies.

On a global scale, mHealth has been applied to a broad spectrum of health topics in a range of countries. The projects in which mHealth has been used vary in scale, scope, and duration. Some of the many applications of mHealth in global projects include: the FoodSwitch app for nutrition information in Australia (Dunford et al., 2014); a communication tool between AIDS patients and peer health workers in rural Uganda (Chang et al., 2011); a Cambodian program to increase contraceptive use among post-abortion women (Smith et al., 2013); the basis for a smoking cessation mHealth program in New Zealand (Whittaker, Merry, Dorey, & Maddison, 2012); and the primary tool in an information campaign to foster safer sexual practices in Uganda (Jamison, Karlan, & Raffer, 2013).

Global Diffusion of Mobile Technologies

The modern smartphone, a device introduced in 2007, is a ubiquitous technology with a universal reach. Half of all adults worldwide own smartphones, and this number is predicted to reach 80% by 2020 (The Economist, 2015). Just under 350 million smartphones were shipped across the world in the first quarter of 2016, and 78% of all of those cell phones shipped were smartphones (Gartner, 2016). This increase in smartphone sales, which was 59% of total cellphone sales in 2013 (Drubin, 2013), is putting powerful technology into the hands of more patients and practitioners. Of particular attraction for healthcare workers in rural or lower-income regions is the heavy penetration of cellular technologies, even when print or internet service is lacking (McCartney, 2012). In the persistently growing older adult population, mHealth solutions have predominantly impacted self-healthcare, assisted healthcare, supervised healthcare and elderly care monitoring (Chiarini, Ray, Akter, Masella, & Ganz, 2013). The findings of the study have major implications for information management and policy development in the context of the Millennium Development Goals (MDGs) related to healthcare in the world.

Health Communication and Public Health

Health communication research is intended to advance health on a local and global scale by improving the communicative process. It involves tailoring messages to target particular audiences, facilitating the exchange of accurate and understandable information, increasing health literacy, understanding health

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