Chapter 1

mHealth: A Low-Cost Approach for Effective Disease Diagnosis, Prediction, Monitoring and Management – Effective Disease Diagnosis

Gloria Ejehiohen Iyawa
Namibia University of Science and Technology, Namibia

Collins Oduor Ondiek
United States International University, Kenya

Jude Odiakaosa Osakwe
Namibia University of Science and Technology, Namibia

ABSTRACT

Mobile health (mHealth), the application of mobile technologies for healthcare services, has been the driving force in healthcare in the last few decades; from healthcare service delivery to low-cost tools for effective disease diagnosis, prediction, monitoring, and management. The main purpose of this chapter was to identify the scope and range of studies on mHealth used as low-cost tools for effective disease diagnosis, prediction, monitoring, and management. The authors identified 55 papers that met the inclusion and exclusion criteria after searching different academic databases. The findings revealed that low-cost mHealth approaches such as text messaging and mobile applications developed using artificial intelligence algorithms have been used for disease diagnosis, prediction, monitoring, and management. The findings of this scoping review present information regarding different mHealth approaches that can be used by researchers and practitioners interested in the application of low-cost mHealth solutions in low-resource settings.

DOI: 10.4018/978-1-7998-0261-7.ch001
INTRODUCTION

According to Iyawa, Herselman and Botha (2016, p.246), digital health can be defined as “an improvement in the way healthcare provision is conceived and delivered by healthcare providers through the use of information and communication technologies to monitor and improve the wellbeing and health of patients and to empower patients in the management of their health and that of their families.” This definition suggests that digital health goes beyond the traditional approach of providing care with the use of certain technologies, but encompasses the outcome of the use of these digital technologies for healthcare. As such, there must be an improvement in health outcomes after adopting these technologies for the management of patients’ health. Mesko et al. (2017, p.1) define digital health as “the cultural transformation of how disruptive technologies that provide digital and objective data accessible to both caregivers and patients leads to an equal level doctor-patient relationship with shared decision-making and the democratization of care.” This definition suggests that technologies can enable patients to take part in the healthcare delivery process. Some of these digital health technologies include mobile technologies for healthcare, also referred to as mobile health (mHealth), wearables and sensors (Iyawa, Botha and Herselman, 2016). The literature adequately captures how these technologies have been used for improved health outcomes (Teng et al., 2019; Shabut et al., 2018; Seppala et al., 2019).

mHealth

mHealth has gained attention recently because of its capabilities and applicability in low-resource settings (Heimerl et al., 2015). The World Health Organisation (2011, p. 6) describes mHealth as a “component of e-health”. Electronic health (e-health) presents a broader view on the use of computer technologies as Oh et al. (2005) emphasizes that e-health supports activities relating to providing healthcare services. Chakraborty (2019, p. 99) explains that e-health services are “driven by computers.” mHealth, thus, relates to supporting activities relating to providing healthcare services through the use of mobile technologies (Park, 2016). Some studies have been specific about what constitutes mobile technologies. For example, Singh and Panjwani (2016) describe wearable technologies as a type of mobile technology. According to Wilson and Liang (2018, p.1), a wearable technology consists of “items (often with electronic capabilities) worn with acceptable function and aesthetic properties, consisting of a simple interface to perform set tasks to satisfy needs of a specific group.” In addition, Kamisalic et al. (2018) suggest that wearable technologies can be linked to mobile phones to support engagement with the user. Wearable technologies are usually linked to sensors to gather data about the patients’ health (Wilson and Liang, 2018). This suggests that mHealth does not only support healthcare processes but can also be used to gather information related to patients’ health.

mHealth, Sensors and Internet-of-Things (IoT)

Wireless sensor networks (WSNs) can be defined as “a network of devices, denoted as nodes, which can sense the environment and communicate the information gathered from the monitored field” (Burrati et al., 2009). Manisha and Nandal (2015) also suggest that mobile devices are part of WSNs. The
Related Content

Computer Aided Diagnosis System for Breast Cancer Detection
[www.igi-global.com/chapter/computer-aided-diagnosis-system-for-breast-cancer-detection/159749?camid=4v1a](www.igi-global.com/chapter/computer-aided-diagnosis-system-for-breast-cancer-detection/159749?camid=4v1a)

Neuropsychological Assessment from Traditional to ICT-Based Instruments
[www.igi-global.com/chapter/neuropsychological-assessment-from-traditional-to-ict-based-instruments/151996?camid=4v1a](www.igi-global.com/chapter/neuropsychological-assessment-from-traditional-to-ict-based-instruments/151996?camid=4v1a)

Verification and Validation of Medical Cyber-Physical Systems
[www.igi-global.com/chapter/verification-and-validation-of-medical-cyber-physical-systems/152030?camid=4v1a](www.igi-global.com/chapter/verification-and-validation-of-medical-cyber-physical-systems/152030?camid=4v1a)

Surface Segmentation: The Case of Bronchus Anatomical Structure
[www.igi-global.com/chapter/surface-segmentation/169548?camid=4v1a](www.igi-global.com/chapter/surface-segmentation/169548?camid=4v1a)