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**“Mobile Healthcare Benefits
and the Health Threat Posed
by Mobile Health Technologies
in Africa”**

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Outline

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- 2. Purpose of study**
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Introduction

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- ✓ **Mobile health (mHealth) uses mobile technologies specifically mobile devices such as mobile phones, laptops, tablet computers and any handheld device with internet connectivity to support long term health and wellbeing .**
 - ✓ **Examples include the use of sms, social media, emails and so on.**
 - ✓ **For the purpose of this paper mHealth means any public or private health activities made possible by mobile device(s).**

mHealth

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- ✓ **has the potential to transform health care [2].**
- ✓ **is key to modern healthcare solutions [3].**
- ✓ **Mobile devices portability and ability to operate with minimal infrastructure**
 - ✓ **regarded as better option to deliver health services in the developing countries.**

Healthcare in developing countries:

African context

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- ✓ **characterised by**
 - ✓ **limited access,**
 - ✓ **high costs,**
 - ✓ **low quality**
 - ✓ **and delay to meet the needs of the clients.**
- ✓ **crippled by**
 - ✓ **poverty,**
 - ✓ **ever-increasing population growth,**
 - ✓ **loaded with high cases of diseases**
 - ✓ **and inadequate health workers [4].**

Healthcare players in the developing countries

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- ✓ separated by vast distances
- ✓ further constrained by poor communication infrastructure,
- ✓ obsolete IT solutions that impede their potential
 - ✓ to collect and disseminate information [4].
- ✓ mHealth has been identified as a viable solution
 - ✓ to improve healthcare delivery systems in their regions [3].
 - ✓ especially when considering minimal mHealth gadget necessary to make this a reality i.e. mobile phone [3, 4].

Statistics

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- ✓ **In 1998 Africa had less than 4 million mobile phones [4].**
- ✓ **At the end of 2015 about 46% of African population subscribed to mobile services.**
- ✓ **Africa is expected to have more than 725 million unique subscribers by the year 2020.**
- ✓ **According to African Health Observatory [5], penetration of mobile phones and associated mobile networks in developing regions such as Africa makes mHealth legitimate and possible.**
 - ✓ **this is good news**

Purpose of this study

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- ✓ **To analyse possible hazards and benefits of mobile phones**
 - ✓ **as mobile health equipment to the environment and wellbeing**

Methods

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- ✓ A review of the literature assisted by Atlas.ti software on mHealth benefits was undertaken.
- ✓ Formal searches were done using the following databases to identify literature;
 - ✓ Elsevier,
 - ✓ PubMed,
 - ✓ Google scholar
- ✓ The search was restricted to
 - ✓ research articles,
 - ✓ date of publication (2014 to 2017)
 - ✓ and publication language (English).

Methods

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- ✓ **Information on the benefits of mHealth was taken using keywords**
 - ✓ **‘mobile health’,**
 - ✓ **‘mHealth benefits’.**
- ✓ **Within selected articles,**
 - ✓ **we went further deep into those that addresses the benefits of mHealth worldwide**
 - ✓ **and funnel the search results to articles that talk mHealth benefits in Africa.**

Methods

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- ✓ **A second literature search which focused on the effects of mHealth obsolete devices on the environment and health included;**
 - ✓ **grey literature,**
 - ✓ **Google, scholar**
 - ✓ **and Elsevier databases**
- ✓ **A combination of the following search terms were used:**
 - ✓ **‘mobile health devices and environment friendliness’,**
 - ✓ **‘green mobile health ‘ ,**
 - ✓ **‘electronic waste and environment’**
 - ✓ **and ‘e-waste and health’.**

Results

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The following results were presented;

- 1. A relatively brief examination of the various benefits of mHealth**
- 2. An extensive review of the potential environmental risks and wellbeing hazards associated with discarded or unwanted mHealth waste.**

Benefits of mobile phones

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- ✓ **mHealth transformative power of healthcare services in Africa.**
 - ✓ **enhances communities both rural and urban with up-to-date knowledge and information,**
 - ✓ **improved service delivery**
 - ✓ **and reduced reaction time during emergencies [5].**
- ✓ **Amid all these benefits,**
 - ✓ **mHealth is also prone to human errors.**
 - ✓ **Mobile phone can be lost or stolen.**
 - ✓ **Smartphones and tablets are also vulnerable to hacking, viruses and malware especially when these devices use unsecured internet connections.**

Examples of how a simple SMS service can help in diseases control and prevention

- ✓ **In Kenya,**
 - ✓ **short message service (SMS) is benefiting users to get up-to-date list of health professionals and centres starting with the closest ones.**
 - ✓ **Locating healthcare service quickly can save lives.**
- ✓ **In Mozambique,**
 - ✓ **the SMS is used to relay much needed information to people with human immunodeficiency virus (HIV).**
 - ✓ **The educational information help infected people on how to adhere to treatment and prevent mother to child transmission of HIV.**
- ✓ **In South Africa,**
 - ✓ **the SMS is used to provide pregnancy, postnatal and baby care information to women in their preferred language. The service is called MAMA SMS service.**
- ✓ **In Rwanda,**
 - ✓ **an SMS service called Rapid SMS and mUbuzima is used to track pregnant women and newly born babies,**
 - ✓ **and promote early detection of life threatening emergencies [5].**

Benefits of mobile phones

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- ✓ **Worldwide evidence underpins the utilisation of SMS as a service to improve adherence to medicine and participation to scheduled appointments [11, 12].**
- ✓ **However according to Househ [13] there is a paucity (fewness) of evidence on the benefits of SMS service interventions for**
 - ✓ **appointment updates,**
 - ✓ **advancing wellbeing in developing countries**
 - ✓ **and preventive healthcare.**

Environmental risks and wellbeing hazards of mobile health devices

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- ✓ **The next concerning issue is what happens to these mobile phones when they are no longer wanted by their users.**
- ✓ **What are environmental and wellbeing threats contained by these retired equipment?**
- ✓ **Literature shows that when these obsolete equipment are not managed properly they become health and environment hazards.**

Electronic waste (e-waste) definition

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- ✓ **no standard definition of e-waste**
 - ✓ **E-waste comes with different definitions given by literature [8,14]**
- ✓ **For the purpose of this paper e-waste will be defined as: any mobile health equipment unwanted by its owner or users regardless of equipment functional state.**

Characteristics of e-waste

- ✓ **Complex problem;**
- ✓ **Non-decomposable waste**
- ✓ **No single method to properly manage it**
- ✓ **E-waste includes both valuable and toxic metals[8].**

Components of e-waste

- ✓ **Value metals include and not limited to**
 - ✓ **gold, silver, copper and aluminium [14].**
- ✓ **Toxic metals include**
 - ✓ **cadmium, mercury, bromine and lead [8].**

E-waste toxicity

- ✓ **Contaminants released by e-waste were associated with cases of**
 - ✓ **liver cancer,**
 - ✓ **lower birth weight,**
 - ✓ **asthma**
 - ✓ **and other health problems [16].**

E-waste management

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- ✓ **Improper management**
 - ✓ **has been found to result in adverse effects on the environment and health.**
 - ✓ **Julander, Lundgren [15] found elevated exposure to e-waste toxic metals from a formal recycling facility.**
 - ✓ **may leach into soil or water and tap into household water sources or contaminate food chain.**
- ✓ **A study conducted in Ghana suggests that contaminated water has the potential to kill aquatic life [17].**

E-waste management in developing countries

- ✓ **Particularly African countries were found to manage e-waste in an environmentally unfriendly manner.**
- ✓ **Findings are disturbing given the dangers of e-waste on the environment and wellbeing [18, 19].**

Factors of improper management in African countries.

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- ✓ **E-waste regulation is absent and if any, is laxer.**
- ✓ **The legislation issue is also characterised by failure of the International regulation—
Basel Convention**
 - ✓ **to be not binding and allowing loopholes for illegal e-waste trade [20].**
 - ✓ **Babatunde [21] argues that illegal trade is motivated by poverty and corruption.**

Discussion

- 1. A relatively brief examination of the various benefits of mHealth was presented.**
- 2. An extensive review of the potential environmental and wellbeing hazards associated with discarded or unwanted mHealth waste.**
- 3. Electronic waste generated by these mHealth devices could result into adverse health and ecological consequences if not managed properly.**

Conclusion

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- ✓ **The transformative power of mHealth cannot be ignored.**
- ✓ **There is more evidence-based work needed on how mHealth advances the healthcare in developing nations, especially in the African region.**
- ✓ **mHealth has been found instrumental in educating and informing both rural and urban communities in health-related matters.**
- ✓ **SMS service has been identified as significant in reshaping how healthcare is seen in African context.**
- ✓ **The downside is the management of obsolete mHealth equipment.**
- ✓ **In the African region management of e-waste is inadequate.**
- ✓ **E-waste is both valuable as well as being toxic and harmful.**
- ✓ **This paper suggests awareness about the detrimental effects of e-waste on health and ecology**

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