ABSTRACT
Mobile technology for Health, Its Practicability and Cost Effectiveness in Improving Health Service Delivery in Nigeria: A Study of Potiskum Local Government. This study was guided by the following research objectives: i) to establish the practical use of mobile technology in the health sector of Potiskum Local Government; ii) to examine the effectiveness of mobile technology in improving health service delivery in Potiskum Local Government; iii) to identify barriers to mobile technology implementation in the health sector of Potiskum Local Government and iv) to determine the relationship between mobile technology and service delivery in the health sector of Potiskum Local Government, Nigeria. The study employed cross-sectional survey design and data was collected using both open and closed ended questionnaires from a sample size of 377 respondents comprising of the patients, health workers and health system managers. The study established that the practical use of mHealth in the Health Sector of Potiskum Local Government included among others healthcare telephone helpline, emergency toll free telephone services and mobile phone technology for recording patient information. The study also revealed that mHealth is an efficient platform in improving healthcare service delivery. However, its potential is not yet fully explored in Potiskum Local Government. There were also a number of barriers such as operational cost, lack of knowledge and policies that hindered the smooth implementation of mHealth technology. Furthermore, the study indicated a significant correlation between mhealth technology and service delivery in Potiskum Local Government (r=0.985, r<0.000).

The study concluded that there is a growing body of evidence for what works within mHealth and where the underlying barriers to and gaps in scale and sustainability are at present. Ultimately, mobile healthcare services and devices are only effective if adopted by healthcare professionals and patients. The study recommended that Healthcare solution providers must therefore focus on developing products and services that are easy to use, without additional layers of complexity. Healthcare professionals must see clear and immediate benefits from any new device before adding it to an already bulging doctor or nurse’s bag.

Key words: Mobile technology (mhealth), Health services, Potiskum

Introduction and Background of the Study
The effectiveness of a country’s health care delivery system is central in meeting its health goals (WHO, 2013). This introduces some aspects of the Nigeria’s health care system with respect to service delivery and effective patient monitoring. The performance of Nigeria’s health care system was seriously undermined by the nearly two decades of military rule. For example, between 1985 and 1993 per capita investment in health had stagnated at about $100 per person compared to the international recommended level of $34 per person (WHO, 2013).

There are five different levels involved in Nigeria’s health care system which are; The federal level, more especially the Federal Ministry of Health (FMoH) which is responsible for policy and technical support to the overall health system, The state level, The State Ministries of Health (SMoH) which are responsible for the secondary hospitals and for the regulation and technical support for primary health care services, Primary health care is the responsibility of the local government where health services are organized through the wards. The community is probably the most important link in health care delivery. It forms the support structure for the implementation of primary health care services. Agencies/Parastatals/Departments were set up within the FMoH and the SMoH, because as policy changes it is common to create new units without reflecting on the moribund departments/agencies that exist.

Despite Nigerian's strategic position in Africa, the country is greatly underserved in the health care sphere. Health facilities (health centers, personnel, and medical equipment) are inadequate in this country, especially in rural areas (NPHCP, 2010) While various reforms have been put forward by the Nigerian government to address the wide ranging issues in the health care system, they are yet to be implemented at the state and local government area levels. According to the 2009 communique of the Nigerian national health conference, health care system remains weak as evidenced by lack of coordination, fragmentation of services, dearth of resources, including drug and supplies, inadequate and decaying infrastructure, inequity in resource distribution, and access to care and very deplorable quality of care. The communique further outlined the lack of clarity of roles and responsibilities among the different levels of government to have compounded the situation.

The northeastern part of the country has been experiencing some cripples in health care delivery in both rural and urban areas of the region. Due to the undergoing insurgency, there is proved reduction in health service delivery due to the fact that people who live in the rural areas do not freely move to urban areas to reduce the care service as they used to do it before.

Mobile technology for health is the use of mobile technology to facilitate communication and improve productivity in the health sector such as reporting.
irregularities and corruption, creating awareness and informing about diseases as well as reminding patients about health visits, vaccinations and treatments (Unwin, 2009).

Mobile technology platforms operate on the premise that technology integration with the health sector has the potential to improve health outcomes. Today, countries such as Ethiopia, Kenya, Nigeria and South Africa are leading the way in using mobile solutions for health service delivery, and this is driven by the convergence of a myriad of factors – expanding penetration of mobile networks in rural communities, reduced costs of mobile handsets, general increase in non-food expenditure and innovative technologies that integrate mobile applications with traditional health service delivery models. Mobile technology for health has found applications in treatment compliance, data collection and disease surveillance, health information dissemination, point-of-care support for health workers, health promotion, emergency medical response, as well as drug supply-chain management. (Shields T et al 2005)

In contrast, developing economies often struggle to provide adequate healthcare to all of their citizens, especially in rural areas. Another aspect of the challenge developing countries face is their need to meet the health-related targets of the Millennium Development Goals (MDGs) by 2015. In Pakistan, for example, this will mean reducing by some 53 percent both the number of deaths per 1,000 live births of children under the age of five and the number of maternal deaths per 100,000 live births (BCG Report, 2012).

The mobile phone has many advantages when deployed as a healthcare tool. First, even the simplest models can become powerful pieces of equipment: text messages and phone calls can deliver real-time, critical information quickly and easily, which means those living in remote areas can reduce unnecessary travel to health centers to consult with doctors and nurses (BCG, 2012).

Among the major barriers to comprehensive healthcare services and better quality of care in Nigeria are long distances from services, lack of transportation, cost of services, and discriminatory treatment of users. More than 72.2% of Nigerians live in rural and semi-urban areas and face the challenges of poor/nonexistent access to health care services. In fact, many qualified physicians practice in urban areas (index Mundi, 2011).

ICT plays a significant role in the healthcare industries by ensuring that the right health information is provided to the right person at the right place and time in a secure, electronic form for the purpose of optimizing the quality and efficiency of health care delivery (Faheem, 2013).

Mobile technology for health is a segment of electronic health (eHealth). According to Faheem, 2013, eHealth is “The cost-effective and secure use of Information Communication Technology (ICT) in support of health and health-related fields including healthcare services, health surveillance, health literature, and health education, knowledge and research” (WHO, 2014) mHealth (also written as m-health) is an abbreviation for mobile health, a term used for the practice of medicine and public health supported by mobile devices. The term is most commonly used in reference to using mobile communication devices, such as mobile phones, tablet computers and Personal Digital Assistants (PDAs), for health services and information, but also to affect emotional states (Cipresso, 2012).

The mHealth field has emerged as a sub-segment of eHealth, the use of information and communication technology (ICT), such as computers, mobile phones, communications satellites, patient monitors, etc., for health services and information (VWC, 2009).

mHealth applications include the use of mobile devices in 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).

**Purpose of the Study:** This study focused on determining the Practicability and Cost effectiveness of mHealth in improving health service delivery in Potiskum Local Government, Nigeria.

It has been observed that the incessant bombings and gun attacks in the Northern parts of Nigeria by the Boko Haram fundamentalists, have seriously affected the economic lives of individuals in the areas. For instance, commercial banks and other private corporate institutes have been forced to review their operational hours to begin from 9.00am to 12.00 noon as against the normal operational period of 8.00am to 5.00pm ,this also contribute to most patient they don’t want to go to hospitals.

Despite Nigerian government’s effort to harnessing the gaps in the health care sectors, for example; building more remote health service centres in rural areas, renovation of hospitals and acquiring more hospital beds, organizing some series of trainings for health workers and increase in salary of the workers, the country’s health service delivery still faces a number of problems each of which has to be addressed in order to attain effectiveness in and improved health service delivery.

Lack of information management and communication: This gap can lead to lack to a situation where by an outbreak in a village would not communicated to the health service providers on time or preventive measures about an epidemic would not be conveyed to the rural community on time.

**Objectives of the Study**

i. To establish the practical use of mobile technology (mHealth) in improving health service delivery in Potiskum Local Government.

ii. To examine the effectiveness of mobile technology (mHealth) in improving health service delivery in Potiskum Local Government.
iii. To identify barriers to mobile technology implementation in the health sector of Potiskum Local Government.
iv. To determine the relationship between mobile technology (mHealth) and service delivery in the health sector of Potiskum Local Government.

Description of Problem Analyzed:
The Relationship between Mobile Technology and Service Delivery

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<th>Mobile Health Technology</th>
<th>Effectiveness of mHealth in health Service Delivery</th>
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<td>• Emergency toll-free telephone services</td>
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Cost Effectiveness of Mobile Health Technology

METHODOLOGY: This study used cross sectional descriptive survey design using quantitative research method. The design is characterized with numerical representation and manipulation of observations, patients, health workers and health system managers were interacted with for the purpose of describing and explaining the phenomena that the observations reflect.

Research Findings: The study established that Potiskum local government health facilities still do not have adequate mHealth to support their patients. This is the reason the medical workers said they do not use mobile health technology to remind patients to take their medications. The scope of mHealth for treatment compliance is limited in areas where access to health services and drug supplies is poor or inconsistent. Programs are most effective when patients are able to access treatment when needed. Health systems strengthening as a whole may be important to the success of mHealth for treatment compliance as reminders to attend clinics without reliable services and a steady drug supply is meaningless. In addition to that, the medical workers revealed that digital medical records delivered using mobile application reduces their errors during diagnosis. Lastly, the study revealed that some of the medical workers use mobile phone platform to get timely information regarding disease prevalence. However, though mobile phones can have dramatic effects on monitoring disease prevalence and onset, this demonstrates that disease surveillance using mobile phones is still in its infancy, with little integration into local, regional, and national health systems and Potiskum Local Government is no exception.

DISCUSSION OF FINDING: The study established the presence of a telephone help line which was charged at a fee and yet often not reliable. According to Ivatury, Moore and Bloch (2009), there is a growing interest in capitalizing on the ubiquity of mobile technology infrastructure to develop health call centres that can increase accessibility of health advice and information to patients and the public in low developed countries. For example Project Masiluleke in South Africa uses “Call Me Back” SMS to advertise an HIV/AIDS helpline. Text To Change (TTC) in Uganda developed an SMS-based quiz that aims to educate participants about basic facts related to HIV/AIDS. Pyramid Research’s (2010) survey of mobile users in Nigeria found that 20% of respondents use their mobile phones for health related needs. Within the group that uses mobile technology for health services, the most common activity is to make calls in emergency situations by either reaching out to friends or family or by calling emergency services. A small percentage of respondents indicated that they receive health monitoring assistance or public health alerts on their mobile phones, suggesting there is room for further information services related to health. The Nigerian government is increasingly involved in initiatives to inform and respond to major illness such as malaria, TB, cancer and most proactively HIV/AIDS.

There was a revelation that the health workers do not monitor patients to establish their compliance to their medication. Varshney (2007) asserts that mobile patient monitoring requires diagnostic sensor technology, which is not yet available at the low costs that would make it accessible in developing countries. Since health data are transmitted via the telecommunication network, patients are required to have access to a mobile phone and/or wireless device, to which diagnostic sensors can easily connect. However this is possible in Potiskum Local Government since there is a government that can be able to cater for the funding that can support this platform.

CONCLUSION: There is a growing body of evidence for what works within mHealth and where the underlying barriers to and gaps in scale and sustainability are at present. Mobile technologies when applied to addressing health issues. Many of the systems have been implemented and evaluated as stand-alone initiatives are too small scale to ascertain health impacts and value for investment. For mHealth programs to succeed in Potiskum Local Government, an enabling well-informed policy and business environment that engages all relevant public and private health and IT stakeholders to drive scale and sustainability is needed. Potiskum Local Government needs to develop a strategic eHealth framework in which mHealth is an integral component in order to provide mHealth implementers in the NGO and private for profit sectors more guidance when implementing projects to ensure alignment with their
Government, health information systems, and other relevant policies and aims to leverage technology for public good.

Reference


