

A literature review on the challenges of eHealth implementation in developing countries among rural folks: A case of Ghana

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<p>ABSTRACT:</p> <p>AIM: The aim of this research study is to investigate the challenges of eHealth implementation in developing countries among rural folks, a case of Ghana.</p> <p>BACKGROUND: The usage of technology in delivering and providing healthcare is ubiquitous worldwide. In spite of the potential advantages of eHealth, implementation of these systems is frequently reported as challenging. The health care system of several developing countries, like the present situation in Ghana, is so beset with numerous challenges and issues. Ghana is still in its nascent stages of achieving meaningful use of the technology in the rural areas of the country.</p> <p>METHOD: The chosen research method is descriptive literature review. The Inductive Content Analysis and Normalization Process Theory Coding Framework was used to analyse the data.</p> <p>FINDINGS: Lack of ICT infrastructure, electric power supply and basic ICT knowledge or skills has been some of the challenges facing eHealth implementation in developing countries using Ghana as the case study. Lack of infrastructure in the rural areas makes the rural folks not able to access the internet, besides electric power supply is not available this makes it even difficult to fix ICT infrastructure which relies on electric power to operate due to this ICT knowledge and skills is low among the rural folks.</p> <p>CONCLUSIONS: When these challenges concerning eHealth implementation in the rural communities have been resolved, will the rural areas be able to appreciate the enormous remunerations that eHealth solutions provide.</p>	
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FORWARD

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1. INTRODUCTION

Health information and health care has been transformed by the introduction of the Internet (Rippen, 2000). Currently all public service providers, comprising health care providers, are anticipated and pressured to develop their processes and reduce their operational costs. Minimizing of duplicate processes, reaction time and advanced decision making are part of the integral progress (Oyomno et al., 2009). eHealth delivers new procedures for using health resources such as information, manpower, facilities, revenue, equipment, and supplies to produce requisite health care and services. It is anticipated that in time eHealth should assist to improve effectual use of these resources (World Health Organization, 2012).

Eysenbach (2001) elaborates that the word eHealth does not only illustrate technical development, but then also a state of mind, a manner of thinking and an attitude as well as commitment for network. The central idea of eHealth is to advance health care locally, regionally and globally by means of information and communications technology (Eysenbach, 2001).

eHealth applications are vital resource in sparsely populated regions where spaces between towns are extensive and all health care services are not accessible on the spot. For instance in Finland involvements of using telemedicine remained encouraging (Laurikkala, 2004). Developing eHealth applications facilitates people to be treated or nursed in their indigenous environment, or in their homes, by means of digital information technology to transmit patient information amongst hospitals and other health care centers (Eysenbach, 2001).

The knowledge of providing equivalent health services for all patients and clients in sparsely populated countries, regions, towns and rural areas where distances to the nearest hospital, health care centers or medical expert are far away is the main reason why eHealth has been embraced in many places of the world (Bergstrøm and Heimly, 2004).eHealth has numerous applications and telemedicine is most likely the well-known of them (Stanberry, 2000). Expressions such as telecare, telehealth, and tele-practice are used when communicating of applications that utilize Information and

Communication Technology (Bischoff, 2004). The term eHealth application is used in this view as an umbrella term for these diverse kinds of applications (Lorentz, 2008).

In today's world, there is no further space for paperwork as the countries in the world are trying to change completely to the digital systems where the health care sector can share information and patients' data online, easily and more effectively, amid physicians and medical institutions, as well as recording and bring up to date every patients' health history, reports and analyses (Mayfield, 2004).

According to Azubuiké and Ehiri (1999), eHealth means everything concerning patients or clients information will be done and accessible online for patients and doctors which brings an end to the tons and oceans of paperwork, records and files that swallow large space of medical centers. This means greater monetary returns to the country's healthcare sector that comes under the pressure of building infrastructure for records keeping which can be done by one computer (Martínez et al., 2005).

eHealth is powerful in monitoring the outbreak and spread of disease, disseminating health information about health-promoting and disease-preventing, training and long-distance support to health care practitioners. A specific challenge for developing countries is ensuring that Information and Communication Technologies are effectively mobilized to develop health outcomes and combat disease amongst the poorest and most isolated populations (Tanner, 2005).

Figure 1: The face of eHealth



Source: Mario Kovac, 2014

2. BACKGROUND

The usage of technology in delivering and providing healthcare is ubiquitous worldwide (Currie and Seddon, 2014). There are several of websites giving health information of varying importance used by health professionals and ordinary persons (Lewis et al., 2012). Online health information has grown into one of the most essential information sources for persons seeking health information in current years (Xiao et al., 2014).

The European Commission declares that eHealth will play a vital role in structural reforms that are desirable to guarantee the sustainability of health systems while obtaining access to health services for all citizens (European Commission. eHealth Action Plan, 2012). A survey by the Office for National Statistics accounts that 43% of surveyed United Kingdom internet users have gain access to health information online and this figure increases to 59% amongst those aged 24–35 (Office for National Statistics, 2013).

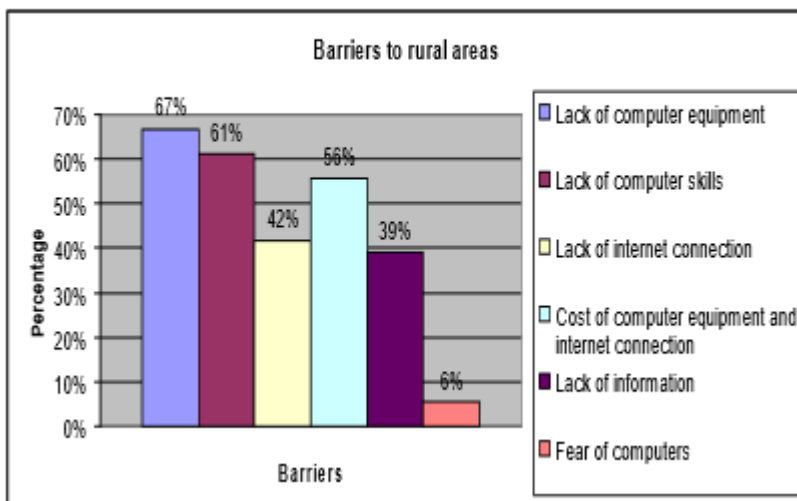
In 2002, comprehensive national initiatives planned to coordinate eHealth implementation were underway across the globe and this development is likely to escalate in the future (Waterson, 2014). Examples of eHealth technologies becoming extensively used include: management systems, such as the electronic health record (EHR) which permits for the acquisition, transmission and storage of patient data; communication systems such as telecommunication; computerized decision support systems comprising diagnostic support, alerts and reminder systems; and information resources like the internet has perceived the on-going introduction of many innovative eHealth systems for instance: broadband networks; the creation of an integrated EHR system; systems to electronically share X-rays; and website, which make available health information to the public by means of the internet (Waterson, 2014).

In spite of the potential advantages of eHealth, implementation of these systems is frequently reported as challenging. Implementation of EHR and electronic prescribing systems has lag behind in most European nations as well as in the USA (Ben-Assuli, 2015), costs related with implementing eHealth regularly spiral and time delays are recounted (Lau, 2014). Barriers to implementation of innovations inside the healthcare setting may come about at the individual, organizational, nationals, continent and other

wider levels of the healthcare systems, in addition to interact in complex and variable ways (Sugarhood et al., 2013).

The factors may similarly be context-specific and innovation-specific. Research have described financial, social, legal and ethical barriers to implementation, coming up at the individual and organizational level, comprising users' lack of awareness of the benefits, low eHealth literacy, interoperability and a deficiency of evidence of cost-effectiveness as well as security concerns (Currie and Seddon, 2014). Recognizing and understanding barriers facing eHealth implementation becomes crucial for facilitators devising strategies and interventions to develop the extensive effective use of eHealth, in addition to addressing blockages to implementation (Stroetmann et al., 2012).

Figure 2: Participants perception on barriers that affect the use of ICT within the rural areas



Source: Ouma et al. 2009.

According to Ouma et al. (2009), lack of computer equipment, lack of computer skills, lack of internet connection, cost of computer equipment and internet connection, lack of information and fears of computers are some of the barriers stated by folks living in the rural areas.

In developing countries, eHealth technologies have enhanced health results for chronic disease conditions such as diabetes, hypertension and heart disease (Sahu et al., 2014). The usage of eHealth, a term that defines the application of information, communication

technology or computer to some part of health or healthcare, is regarded as integral to solving problems facing healthcare systems (van Gemert-Pijnen et al., 2012).

eHealth has an abundant significance in the management of health care services. There is no misgiving concerning the advantages of information technology useful to health (Lasker et al., 2014), but in most developing countries there are severe barriers to its operational implementation (Jones et al., 2014).

Information technology (the usage of eHealth) may allow substantial improvements across numerous aspects in the health sector and has the potential to profit both developed and developing countries. The World Health Organization (WHO) acknowledged the practice of eHealth as a priority skill in the improvement of human resources in health. Human resources in eHealth have need of people with knowledge in medical informatics and standard terminology which is increasingly recognized as a critical piece to advance health systems to accomplish the WHO Millennium Development Goals (Merrell, 2013).

Inadequate eHealth strategic planning and a deficiency of international standards consume countries government budgets without attainment of good results. The beginning to the development of systems without ensuring a defined framework implies that implementations might fall into serious fundamental mistakes (Sluijs et al., 2006).

According to Merrell (2013), eHealth in the health care sector is a challenge that every countries face today, irrespective of the country development status. Some aspects of eHealth that threaten system implementation in the health sector consist of economic resources (Chinnock, 2005), exorbitant costs of usage fees, income disparities, excessive costs for even primary health information systems (Ashraf, 2005), shortage of human trained resources (Oak, 2007), inadequate governmental policies which address a well-defined health system that incorporates eHealth (Ahern et al., 2006), cultural aspects and some conflict to the usage of computers for health care processes (Lee, 2014).

Furthermore, standards policies have the potential and major role to play in system interoperability. Guaranteeing standards, producing guidelines, and introducing essential policies established on effective as well as efficient evidence that could be necessary (Mandl and Kohane, 2008).

The health care system of several developing countries, like the present situation in Ghana, is so beset with numerous challenges and issues. The average cost of Ghana's healthcare has risen exponentially over the previous few years. The percentage of health care expenditure in Ghana increased from 29.54% in the year 2011 to 48.97% in the year 2012, signifying about 65.8 percentage increments. While Ghana's health care system is relatively well-thought-out as one of the utmost robust and very competitive systems in West African sub-region, it is far behind other developing countries in delivering timely and effective quality health care (Boohene et al., 2013).

It is regularly difficult to discover specialists for most medical conditions demanding the relocation of patients from a hospital to another supposedly bigger one. Conditions of patients caught in this scenario become complicated, with many of the patients or clients dying before getting to their destination (Chaundhry et al., 2005). Ambulances are only seen in urban areas as well as national emergency telephone lines are not operating in the rural areas of Ghana. Even though National Health Insurance Scheme is intended to provide universal basic access to health care delivery, most people living in Ghana find it very challenging to pay the registration fee and pay for the renewals due to extreme poverty among people living in the country (Patrick and Laar, 2012).

eHealth care is extensively asserted to be one of the ways for improving the quality of healthcare in Ghana and potentially reducing cost in the health care sector (Korshy, 2005). However, in an effort to improve the quality and standard of health care delivery services provided to the citizens of the country, brought about the introduction of the electronic healthcare known as (eHealth care) system in Ghana (Acheampong, 2012).

Demands for electronic health records and other forms of health Information Technology improvement have existed for quite a long time in both previous and current government manifestos (Dey et al., 2007). However, merely recently has that call been regarded to with considerable financial incentive from current government coffers. This call for the use of information technology (eHealth care) in health care systems has long been embraced in many countries, but Ghana is still in its nascent stages of achieving meaningful use of the technology in the rural areas of the country (Acheampong, 2012).

2.1 Evolution of eHealth implementation

The evolution of Information Communication Technology (ICT) has had a remarkable change in society, not just in its manner of conducting business or networking people together but also similarly in its mode of contributing to healthcare services. According to the Rockefeller Foundation (2010), the ubiquity of eHealth is demonstrated by breakthroughs in e-pharmacy projects in Malaysia, Telemedicine networks in Bangladesh and web-based communication system to reduce maternal and child deaths in Peru amongst others. For real-world reasons, eHealth is implemented in several hospitals due to the sheer quantum of information produced by the healthcare institutions (Khoja and Fahim, 2008).

Though eHealth is defined by many authors in different ways, suffice to indicate that the concept commonly refers to the usage of information and communication technologies (ICT) in health care (Khoja and Fahim, 2008). Similar to the extensive spectrum and multiplicity in the use of ICT, eHealth has numerous facets. According to Khoja and Fahim (2008), its application can be synthesized through the following:

- ✚ eHealth in the delivery of health services at a distance (tele-health)
- ✚ Management of administrative and clinical information (health informatics)
- ✚ Distributing information and knowledge through health care providers, patients, and communities (eLearning).

A brief look at these three classification or components reveals that there could be quite a lot of sub-components that can be categorized underneath each main component. For instance, telehealth has e-medicine or telemedicine, e-care and e-pharmacy, among others. These classifications of application of the concept are comprehensively discussed under nature of eHealth implementation (Khoja and Fahim, 2008).

Tracing the path of eHealth evolution, the United States National Economic Council is of the opinion that eHealth established its paramount boost in 2004 after the then US President George Walker Bush broadcast an enormous strategic initiative to profoundly increase the adoption of Electronic Health Record System in the United States by 2014. Following this announcement, the President selected a national health IT person to lead

the procedure, with the complete support of the US Congress (Rockefeller Foundation, 2010).

2.2 Nature of eHealth Implementation

eHealth refers to the healthcare services that are assisted by electronic means (Busagala and Kawono, 2013). Its application in the health sector comprises all medical healthcare services and technologies that depend on modern information and communication technology (Busagala and Kawono, 2013). A classic example of it is the implementation of telemedicine in Health Care Delivery (eHCD) programme as a resource of bringing specialist health care to rural communities through the internet and another specific example is the implementation of electronic health records (EHR) as resource of improving the healthcare of patients (Li et al., 2013).

According to Das (2010), the nature of eHealth is summarized in the following:

- ✚ Healthcare information networks and electronic record systems comprising of information systems for healthcare professionals and hospitals, online services (databases used for patient care, electronic prescriptions, health portals , research and public health records,) and online health promotion services
- ✚ Telemedicine systems as well as other similar services
- ✚ Specialized tools for healthcare professionals and researchers such as robots used for diagnosis and surgery; healthcare grids and equipment for training; simulation and modeling equipment.

However, MOH (2010) argues that computing equipment, multimedia systems, networking devices, imaging devices and internet systems, mobile telephony and communication is the basis of ICT infrastructure in eHealth. This argument point out that eHealth goes further than the simple automation of health records and teleconsulting to all-inclusive automation of the healthcare system for effectual productivity. According to the International Communication Union (2008), eHealth extensively covers the areas of:

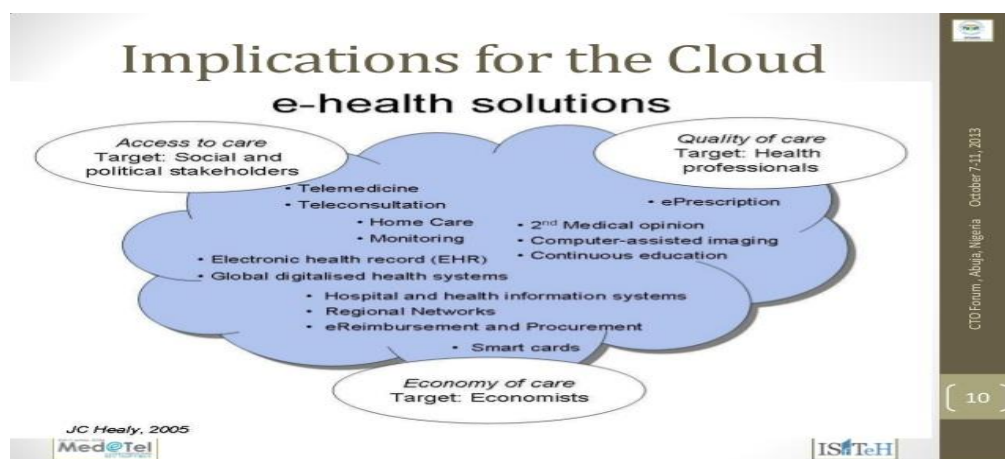
- ✚ Products: such as instruments to guarantee the persistent monitoring of blood pressure in ambulatory patients.

- ✚ Systems: such as computer-assisted surgery systems in health care.
- ✚ Services: such as computer-assisted prescription services, where the software checks for incompatible drugs, contraindications and dosage levels; operating surgical and intensive care units with interconnected instruments and surveillance services warranting continuous patient monitoring; information services for patients and consumers comprising individual electronic health records

Though Das (2010) and the MOH (2010) mention dissimilar aspect of eHealth composition, the entirety of their exposition constitutes the coverage of eHealth systems. Thus, none of the two authors sufficiently covers eHealth, without the complementing efforts of the other (Busagala and Kawono, 2013).

Healy (2005) considered eHealth as a cross-functional system comprising of human resource capacity, information technology and online procurement. Healy's (2005) outcomes considerably differed from Busagala and Kawono (2013), which they expressed that eHealth is the presentation of information technology in the activities of a particular healthcare center. Investigating eHealth in a holistic manner shows Healy's findings more applicable and, hence, would seem extremely expedient if factors such as IT system, human resource and online procurement are seriously deliberated in the implementation of eHealth at all healthcare set-up.

Figure 3 eHealth solutions



Source: J.C. Healy 2005

Ford (2006) claims that effective eHealth implementation does not happen simply from the institution of Information Communication Technology infrastructure but reasonably may also necessitate remodeling of the job design of interrelated health professionals to effectively and efficiently integrate technology. In opinion of these Lehman et al. (2006) remarks that deprived of the presence of motivational force (health care providers' displeasure with the status quo), it is doubtful that the innovation of eHealth implementation process would be initiated. Furthermore, if health care workers resist change or do not have attributes required for change (adaptability and growth-orientation), the change process is less possible to proceed efficiently and effectively (Lehman et al., 2006).

2.3 Factors that drive eHealth Implementation

Ganesh (2004) observe that the implementation of eHealth in health care services is regulated by five main factors: performance expectancy, social influence, facilitating conditions, effort expectancy and threat appraisals. However, the effect of customers as well as technical and operational issues that might command to the alteration of efficient eHealth platform was not mentioned (Ganesh, 2004).

Ganesh (2004) indicates that eHealth to an enormous extent is motivated by consumer preferences, health system policy, technical capabilities and economic considerations while Li et al. (2013) does not classify competition in consumer preferences in the health care industry as one main facilitator of eHealth implementation. The increased amount of healthcare institutions has directed to the need to distinguish one's product from the other and to improve speed in service provision. This need is one main facilitator in eHealth implementation (Li et al., 2013).

WHO (2012) indicates that constraints to the implementation of eHealth in Africa and developing countries include the low Information Communication Technology budgets, poor infrastructure in maintenance of health services, unreliable electricity supply and insufficient human resource capacity. WHO (2013) noted again another major barrier to eHealth implementation concerning the failure of healthcare information systems (HISs) to interoperate in order to distribute information concerning eHealth standards among the institutions in the health care sector.

Busagala and Kawono (2013), however, argues that the increase cost of acquisition of Information Technology facilities particularly at the preliminary stage, lack of technical skills and resistance to change on the part of healthcare professionals are the main limitations to the implementation of eHealth technologies.

According to Adebessin et al. (2013), eHealth implementation is the key to make certain that healthcare information systems are actually exchanged and shared among health care institutions for continuity of care. However, there are substantial challenges that thwart widespread implementation of eHealth, especially by developing countries which Ghana falls within (Anon, 2013). The major barriers enumerate by Adebessin and colleagues includes the lack of understanding of the significance of eHealth, lack of initial Information Communication Technology infrastructures, limited involvement in eHealth standards development and limited human resource capacity for e-Health standard development (Adebessina et al. 2013: Truffer et al. 2010).

2.4 eHealth in Ghana

There have been limited studies conducted concerning eHealth in Ghana. A few studies have looked at the preparedness for eHealth in developing countries (Yusif & Soar, 2014); determinants of eHealth in developing countries (Mugo & Nzuki, 2014) which covered a little bit of eHealth implementation in Ghana as part of a wider developing countries context. Later, Acquah-Swanzy (2015) evaluated eHealth record systems in Ghana where she briefly touched on the factors that promote eHealth implementation at Efia Nkwanta Hospital.

Also, there has been the National eHealth Strategy which was enacted by the government of Ghana to guide eHealth implementation in Ghana (www.isfteh.org/files/media/ghana). There is therefore the lack of adequate or thorough studies that have focused on the factors that challenge eHealth implementation in Ghana, thus presenting a critical research gap that this study wants to explore and fill.

3. THEORETICAL FRAMEWORK

Health care sector has some complex interventions which concern multiple technological, organizational and behavioral components that are general and essential as a feature of health care practice and study. However, these components pose and position distinctive evaluation encounters that may possibly act independently or interdependently as it becomes very much difficult to separate out the relationships between the components (MRC framework, 2000). This is directed at documented problems in evaluating such interventions (Blackwood, 2006).

The processes of complex interventions evaluation have developed a vital focus of interest among trials designers and health services researchers (Campbell et al., 2007). Although hospital trials and other results of studies from the health care sector concentrate on scientific outcomes, cost effectiveness of complex interventions is worthy to understand and how these outcomes are achieved, as well as the factors that promote or inhibit these outcomes (Oakley et al., 2006).

The process which is used in executing new complex interventions in the healthcare sector faces the challenges of implementation and diffusion of innovations such as eHealth (Rogers, 1995). However, operative implementation refers to the situation in that complex interventions are made workable and mostly included in everyday health care practice (Greenhalgh et al., 2004).

The Normalization Process Model proposes a theoretical framework for accommodating new complex interventions. It further offers clear and convenient clarifications for phenomena revealed by observed investigation. It permits researchers to appraise generalizability of explanations to other situations and explain the similarity as well as differences between predicted and observed phenomena (Hechter and Horne, 2003).

According to May (2006), the Normalization Process Model theoretical framework gives a device that supports the evaluation process in two areas. Firstly, the model discovers and defines elements revealed to be vital in promoting the implementing complex interventions. Secondly, the model provides a source to evaluate the likelihood of a cumbersome intervention which develop routinely incorporated practices (May et al., 2007).

The Normalization Process Model advocates that assessing complex interventions necessitates consideration more on the degree of results effectiveness, but in the same way to the social relations and procedures linking to the work results. It exclusively guides attention to the techniques by which complex interventions are workable and incorporated in daily practice among people. (Treweek, 2005).

The phenomena of Normalization Process Model

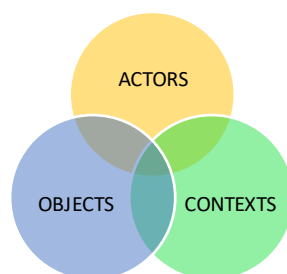
The process of the Normalization Model places stresses on ideas which are as a result of co-operative and unified activities but then they are practiced and examined by individuals as well as group (Rogers, 2004). This Model deals with clarifying the elements that enhance or impede the effective implementation of cumbersome interventions with regards to combined social action that draws comprehensively on sociological research (Gorski, 2004). The part of analysis of the model is thus, assembly processes leading to combined action (Grol, 2007).

Normalization Process Model in this retrospect is viewed as a cumbersome intervention which is well-defined as a planned initiated effort to bring new or alter present patterns of collective action in health care sector. Deliberate or planned initiation is means that an intervention is: institutionally oriented; consciously planned; defined in the context of formal and informal; and it is intended to lead to a changed outcome. Those who initiate complex intervention have a notion of pursuing change of ideology of people, act and organize in health care (Michie, 2007).

Normalization Process Model three core components of interventions

The Normalization Process Model is made up of three main elements which are the actors, the objects and the contexts and this is illustrated below:

Figure 4: Core components of interventions



The Actors

Actors comprise individuals and groups that meet each other in health care settings such as health professionals, hospital managers and patients. Complex interventions implemented for individuals or groups are oriented towards the modification of the behavior pattern of the people (Kennedy et al., 2003), and also different ways of defining, classifying, and speaking concerning a problem (Eccleston et al., 2003). This intervention administered is intended to transform people's behavior (Berg, 1998).

The Objects

This looks at the institutional through which knowledge and activities are built. Influential among them are Conventional drug therapies, guidelines in clinical procedures and medical records in electronic formats. Interventions of this nature that link to objects comprise of medical tools, therapeutic agents and technology for decision making and guidelines in the clinical procedure (May et al., 2003). The aims of this kind of interventions are to bring newness in the skills and actions of the people (Berg, 1998).

The Contexts

Contexts refer to the visible factors which are institutional, organizational and other legislative elements that play significant role in helping or restricting the resource that people and procedures understand. The interventions which are viewed as cumbersome in this area takes the form of roles performed by professionals in the field, channels that mediate health care organizations and the entire structures of the organization (Eccleston et al., 2003). When implemented, the outcome of the intervention result in effective and efficient methods of building procedures in health care (Berg, 1998).

Assumptions of Normalization Process Theory

The model is inhibited by its prominence on work as collective action over a period of time in health care settings. It is established on three assumptions (Campbell et al., 2000).

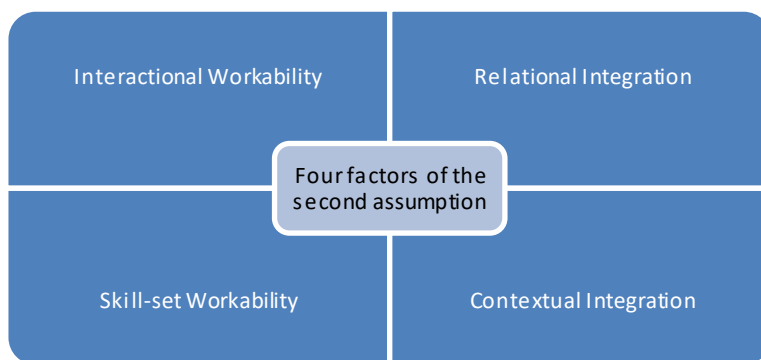
Firstly, the NPT model adopts implementation. This is described as an arrangement of organized, vigorous and dependent interactions where individuals and groups work with

a complex intervention in a defined context or health system over a period of time (Campbell et al., 2000).

Secondly, the model adopts a set of factors that is empirically proven to affect the result of the process. The four elements illustrated in Figure 5 and shown in (Appendix 1) are used for the construction of the model with each having two dimensions (Campbell et al., 2000):

- ✚ Integrated and joint features that are geared towards taking the intervention through dialogue among people, organizations and other interested stakeholders in developing the context within which they work (Campbell et al., 2000).
- ✚ Executive attributes that are concentrated on an attempts to develop passing intervention outwards in time and space (Campbell et al., 2000).

Figure 5: Four factors in NPT



Ultimately, the model embraces the variations in the outcome of an implementation process which can be interrelated to variations in the factors that disrupts its course. It is conceivable to analyze the extent to which a complex intervention is finally normalized or not normalized, as well as to explain the possibility of how exact factors affect results (Campbell et al., 2000).

The Normalization Process Model and research topic

Normalization theory is an appropriate theory for the research topic “challenges facing eHealth implementation in developing countries, a case of Ghana” because, it analyzes the challenges in the implementation of new technology in the health sector as well as propose ways of mitigating the situation thus, the appropriate intervention (House of Commons Health Committee, 2005).

4. THE AIM OF THE STUDY AND RESEARCH QUESTION

This chapter introduces us to the aim of the research study and the research question used which then helps us in selecting the literature reviewed articles to be reviewed in writing the research work on the challenges of eHealth implementation in developing countries among rural folks, a case of Ghana.

According to Creswell (2009), the term research aim generally refers to the main goal or predominant purpose of a research work and this aim are usually relatively brief and to the point. The ultimate aim written in a research work is to generate measurable and testable data, increasingly adding to the accrual of human knowledge (Popper, 2002).

In some circumstances rather than writing research objectives, researchers will desire to use research questions (Punch 2005). A research question is the fundamental aim of a research work, study, or review of literature (Alvesson and Jörgen, 2011). It focuses the study, defines the methodology, and directs all stages of inquiry, analysis and reporting on the conclusion of the research work (Bryman, 2007).

Aim of this research work

The aim of this research study is to investigate the challenges of eHealth implementation in developing countries among rural folks, a case of Ghana.

Research question

What are the challenges of eHealth implementation in developing countries among rural folks, a case of Ghana?

5. METHODOLOGY

This research is done as a literature review. The purpose of a literature review is to objectively report the current knowledge on a topic and base this summary on previously published research (Green, 2006).

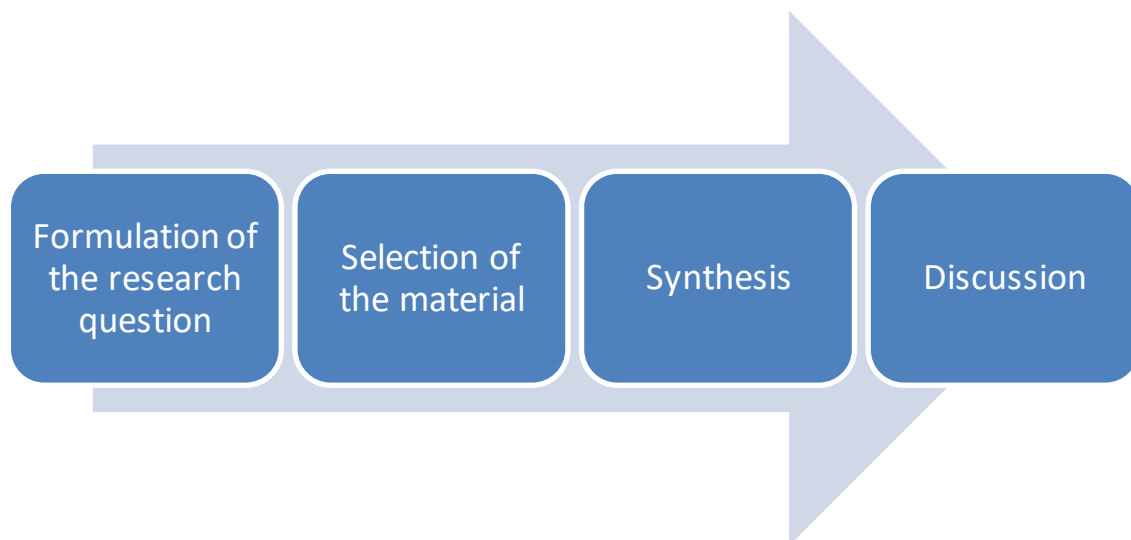
5.1 Descriptive literature review

The chosen research method is descriptive literature review which is also acknowledged as narrative literature review (Kangasniemi, 2013), that is a comprehensive narrative synthesis of formerly published information (Green, 2006).

There are numerous good reasons to put pen to paper on a descriptive overview of literature and these are - pull many bits of information collected into a readable format, useful in presenting an extensive perspective on a topic, bring experts up to date with definite clinical protocols and frequently describe the development of a problem or management (Green, 2006).

Kangasniemi (2013) categorized the descriptive literature method into four phases: formulation of the research question, selection of the material, synthesis and discussion which can be seen below in Figure 6.

Figure 6: Phases of descriptive literature method



Formulation of the research question: The course and attention of the descriptive literature review is well-defined by the research question. The research question should be clear and focused on the phenomenon that can be examined in totality (Kangasniemi, 2013).

Selection of the material: A comprehensive search of the literature writings are based upon an intensive research question (Kangasniemi, 2013; Green, 2006). The utmost efficient way to commence a literature exploration is to use electronic databases (Kangasniemi, 2013; Green 2006). The limitations set in this step must be inclusive enough to insure that the researcher may recover all important studies, but narrow the search enough to concentrate the effort on the important articles (Green, 2006). At this point, it is important to concisely describe what selection criteria were used to include or exclude a study material from the review (Kangasniemi, 2013; Green, 2006).

Synthesis: The facts from the literature reviewed search are synthesized into evidence of information into tables or comprehensive paragraphs, in order to derive the differences in the outcomes of different studies (Kangasniemi, 2013; Green, 2006). Each portion of evidence should be dig-out in the similar fashion to help lessen the bias of the review (Kangasniemi, 2013; Green, 2006). There is no particular way to compose this section consequently it is essential to think evidently about what is being conveyed agreeing to the objective of the research overview (Kangasniemi, 2013; Green, 2006).

Discussion: In this stage the important findings of the literature review are put together and summarized into one idea (Kangasniemi, 2013). Major findings of agreement and disagreement in the reviewed literature ought to be discussed (Kangasniemi, 2013; Green, 2006). The discussion should relate the study into a current body of literature, offer its clinical impact, and make coherent interpretations from the literature reviewed (Kangasniemi, 2013; Green, 2006). The flaws of the review should be addressed and indicate areas for improvement (Kangasniemi, 2013; Green, 2006).

5.2 Data collection and search strategy for the articles

The articles used for this research work were ten in number. The search strategy was completed using EBSCO, PubMed, Science Direct and Google Scholar. The search was

completed using the Arcada University of Applied Sciences Library portal. The Arcada Finna portal page was used as well as other portals in health care, occupational therapy, physiotherapy and sports programs.

Firstly, the search words used in the searching for the articles can be seen below in Table 1. Search words have an insightful impact on search outcomes. Using the precise words will speed-up the research process, whereas the wrong search words can bring the search results to a painfully screeching end (Day and Gastel, 2006).

Search engines, journals, indexing and abstracting services categorize papers using keywords. Thus, a precise list of keywords will guarantee correct indexing and assist showcasing your research to interested groups. This opportunity will increase the probabilities of your paper being cited (Taylor and Francis, 2011).

Table1. Search words used in data collection

- | |
|---|
| <ol style="list-style-type: none">1.Challenges, eHealth, implementation and Ghana2.Challenges, eHealth, implementation and developing countries3. Challenges, eHealth, implementation ,developing countries and Ghana |
|---|

Secondly, in a research work, the researcher must state inclusion and exclusion criteria for used in the study. Inclusion criteria are features that the prospective subjects or literatures must have if to be included in the study, while exclusion criteria are those features that exclude prospective subjects or literatures from inclusion in the study (Van, 2007).

Inclusion and exclusion criteria may comprise factors such as age, race, sex, ethnicity, kind and stage of disease, the subject's earlier treatment history, and the presence or absence of other medical, psychosocial as well as emotional conditions (Helfand et al., 2009).

In a clinical study, inclusion and exclusion criteria are intended to ensure patients safety through the study, provide data of subject suitability for the study, reduce withdrawal and guarantee that primary end-points of study are touched (Van, 2007).

Table 2: Inclusion and exclusion criteria

INCLUSION CRITARIA	EXCLUSION CRITARIA
<input type="checkbox"/> Articles published in English Language <input type="checkbox"/> Free articles. <input type="checkbox"/> Articles with abstract. <input type="checkbox"/> Scholarly written articles. <input type="checkbox"/> Full articles. <input type="checkbox"/> Related articles.	<input type="checkbox"/> Articles publish in other languages but not English. <input type="checkbox"/> Articles without abstract <input type="checkbox"/> Non-scientific articles <input type="checkbox"/> Older articles for the limitation year 2000 and below. <input type="checkbox"/> Articles not related especially from psychiatric point of view.

Finally, was the search of the data bases which can be seen below using the search words as well as the inclusion and exclusion criteria above:

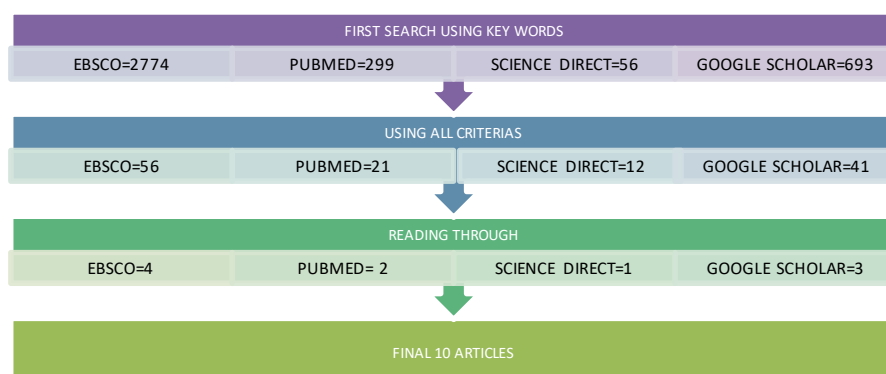
The data base search was made in the academic search (EBSCO) elite .The key words used in the search for the articles can be seen above in (Table 1).The total articles that appeared were 2,774 altogether. These articles were limited using peer review, year range from 2007-2017. In all 4 articles were selected randomly from this search engine for the literature review.

Another search was made using PubMed data base with the same key words above in (Table 1). In this search hits, the number of articles that appeared altogether were 299 and 2 articles were chosen. The articles chosen were peer reviewed articles and the year ranges from 2007-2017.

A third search was made using Science Direct with the same key words above. During the hit process of the three groups of key words, 56 articles appeared altogether and only one article was chosen since the others were in EBSCO and PubMed for this work.

The last search of articles was done in Google Scholar search engine with the same three groups of key words above. The number of articles that appeared altogether were 693, and 3 articles were chosen randomly using the years range from 2007- 2017.

Figure 7: Search strategy of articles



Summary of ten articles for the literature review

After searching through the search engines of EBSCO elite, PubMed, Science direct and Google Scholar with the three groups of key words as well as inclusion and exclusion criteria, the following articles below were chosen for the literature review of the research work.

Table 3: Articles for the literature review

No	Authors, year, title and journal
1	Kiberu et al. (2017), Barriers and opportunities to implementation of sustainable eHealth programmes in Uganda: A literature review,
2	Malunga and Simon (2017), Implementation of E-health in Developing Countries Challenges and Opportunities: A Case of Zambia,
3	Funmi et al. (2013) Barriers and challenges to the adoption of eHealth standards in Africa
4	David et al. 2014, Determinants of Electronic Health in Developing Countries
5	Achampong Emmanuel Kusi(2014), The state of information and communication technology and health informatics in Ghana
6	Afarikumah Ebenezer (2014), Electronic health in Ghana :Current and future prospects
7	Rudolph et al. (2014), A study of the issues of eHealth care in developing countries: The case of Ghana
8	Mandirola et al. (2016), Challenges and hurdles of eHealth implementation in developing countries
9	Ouma et al. (2009), Implementing successful eHealth implementations within developing countries
10	Salifu et al. (2014), Preparedness for e-Health in developing countries: the case of Ghana

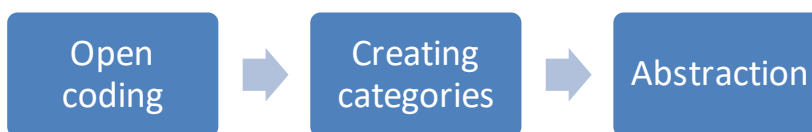
5.3 Data analysis of the research work

The data analysis for this research work was extracted in two stages. First was content analysis using an inductive approach known as the Inductive Content Analysis and secondly was the use of Normalization Process Theory Coding Framework.

5.3.1 Inductive content analysis

Inductive content analysis is a qualitative method of content analysis that researchers apply to develop theories and identify themes by reading documents, recordings, printed and verbal material. Inductive content analysis depends on inductive reasoning. Inductive content analysis is well-suited for research where limited or no earlier studies of the phenomenon in question exist (Elo and Kyngäs, 2008).

Figure 8: Inductive content analysis process



Open coding

Inductive content analysis commences with establishing the raw data through a process identified as open coding. Through open coding, researchers review the material; make notes and headings in the text as they read. This process often necessitates repeated reading of the material, after which the researcher writes down the notes and headings onto a coding sheet (Elo and Kyngäs, 2008).

Creating categories

The next step includes grouping the data, decreasing the number of categories by combining related headings into extensive categories and forming higher order

categories. Through this process, researchers produce knowledge and acquire more understanding of the material (Elo and Kyngäs, 2008).

Abstraction

Abstraction means expressing a common description of the research topic through creating of categories. Each category is termed using content-characteristic words. Subcategories with similar events and incidents are gathered together as one category and categories are grouped as main categories and subcategories (Elo and Kyngäs, 2008).

5.3.2 Normalization process theory coding framework

Secondly, as the literature under study concentrate on implementation processes and results. The data was extracted and analyzed qualitatively using normalization process theory coding framework, which has four concepts such as coherence –sense making work, cognitive participation –relationship work, collective action –enacting work and reflexive monitoring –appraisal work which are the design of the coding framework (May and Finch , 2009)

According to Elwyn et al. (2008), the model offers a theoretical framework to clarify the processes by which innovative health equipment and other multifaceted interventions are recurrently operationalized in repetitive work and sustained in practice. This theoretical framework supports data analysis in qualitative research methods (May et al., 2010).

The literatures derived from the search engines are judged whether they are relevant. The four constructs of NPT are present in the coding framework shown in Table 4 below. As the other method is an inductive content analysis (Ritchie and Lewis, 2003), weight was not put on any one NPT construct in a given literature review (Mair et al., 2009). Individual statement in the research work relating to findings concerning challenges to eHealth implementation was treated as characteristic statement (Liberati et al., 2009).

If any characteristic statement could not be coded to the NPT framework, the statement is stated in such a way to guarantee that, issues external to the scope of the theory would still be taken into consideration (May et al., 2009; Murray et al., 2011).

Table 4: Normalization process theory coding

Coherence (Sense-making work)	Cognitive participation (Relationship work)	Collective action (Enacting work)	Reflexive monitoring (Appraisal work)
Differentiation Is there a clear understanding of how a new e-health service differs from existing practice?	Enrolment Do individuals "buy into" the idea of the e-health service?	Skill set workability How does the innovation affect roles and responsibilities or training needs?	Reconfiguration Do individuals try to alter the new service?
Communal specification Do individuals have a shared understanding of the aims, objectives and expected benefits of the e-health service?	Activation Can individuals sustain involvement?	Contextual Integration Is there organizational support?	Communal appraisal How do groups judge the value of the e-health service?
Individual specification Do individuals have a clear understanding of their specific tasks and responsibilities in the implementation of an e-health service?	Initiation Are key individuals willing to drive the implementation?	Interactional workability Does the e-health service make people's work easier?	Individual appraisal How do individuals appraise the effects on them and their work environment?
Internalization Do individuals understand the value, benefits and importance of the e-health service?	Legitimation Do individuals believe it is right for them to be involved?	Relational integration Do individuals have confidence in the new system?	Systematization How are benefits or problems identified or measured?

Source: Bull World Health Organ. 2012 May 1; 90(5): 357–364.

5.4 Ethical consideration

Arcada University of Applied science has a decent framework and assistance for research work. This research study followed the framework of Arcada in approach to research work. Reviewed articles used have been appropriately referenced to avoid plagiarism (Punch, 1994). The use of scientific article was also done by the researcher (Truscott, 2004).

Ethics is a Greek word which simple means ones character or moral right (Richards and Schwartz, 2002).Ethics in research study currently refers to a branch of philosophy that is apprehensive with how people ought to behave, act and conduct themselves in a research study (Orb et al., 2001). It involves given ruling about the actions for using someone's work whether right or wrong and creating rules to defend these actions (Kicthener, 2000: Guillemin and Gillam, 2004).

The researcher followed the procedure for doing research by writing and submitting to his supervisor for approval. The supervisor read the research done by the researcher and guided as well as corrected the work in accordance with ethical rules and regulations (Morrow, 2001).It is in the researcher's view; this work has been prepared in line with the rules and regulation that oversees research work at the Arcada University of applied science (Hoeyer et al., 2005).

6.RESEARCH FINDINGS

Literature review is a situation whereby the researcher reads through some academic literatures and is able to pick out the main ideas written in those literatures. After carefully reading through the 10 articles, the following ideas became evident concerning the challenges facing eHealth implementation among rural folks living in developing countries, a case of Ghana. These are Lack of ICT Infrastructure; Electric Power Supply; Basic ICT Knowledge or Skills; Resistance to New Technology; Internet; Financial and Sustainability Issues; Privacy, Security, Data Protection and Confidentiality; Regulatory legal and policy framework; and Socioeconomic Constraints and Development.

6.1. Lack of Information and Communication Technology (ICT) Infrastructure

Lack of ICT infrastructure is the most important eHealth system issues which stand as a barrier to its implementation according to consumers and clinicians working in the rural areas. Information and Communication Technology infrastructure which fundamentally comprise of computers and other communication devices like (smart phones, iPad, and the rest) are essential to any computerized health information system. However, the acquisition of these fundamental electronic artifacts continue to be a major challenge not merely to the average Ghanaian living on a low income wage in the rural communities, but also government and privately run institutions comprising of hospitals and clinics. (Rudolph et al., 2014)

6.1.1 Computing equipment

Mostly every health facility in the developed countries has computing apparatus, multimedia facilities, imaging plus printing system, communication as well as internet system. The existing ICT infrastructure have not been totally incorporated and networked in a mode to assist the electronic healthcare delivery system in the developing countries as well as routine planned preventive maintenance is not carried

out due to budgetary constraints as service level agreement are not used to describe the nature and excellence of ICT services outsourced (Achampong , 2012).

Computing equipment (desktops, laptops, servers), multimedia systems (Television sets, VCD and DVD players, camera's and camcorders), networking devices (switches, routers, wireless access points, firewalls, local area networks (LANs) and wide area networks (WANs)), imaging (desktop and network printers) mobile telephony and communication (Personal Digital Assistants (PDAs), cell phone, landlines, fax machines etc.), and internet systems (GPRS, ADSL, VSAT and modems) form the foundation for Information and Communication Technology (ICT) infrastructure (Kiberu et al., 2017)

Apart from few hospitals in the urban cities which has a fully functional local area network (LAN) in the developing countries, most of the healthcare facilities like the clinics among the rural folks have limited their LANs to the receptions, records departments and pharmacy departments of the clinics. The LANs are generally used to assist the flow of information between records department and the pharmacy department as well as reception where the patient registers (Kiberu et al., 2017).

6.1.2 Initial stages

The new eHealth system being implemented in the developing countries which Ghana falls under is quiet at the initial stages with lots of fundamental challenges to be addressed. The Information and Communication Technology (ICT) infrastructures that are presently in place are not adequate to support the new system. Not all the hospitals and the clinics are furnished with computers in good condition, internet services, and other relevant IT accessories that are fundamental element for positive implementation of the electronic system in health care. Moreover, hospital information systems and electronic health records are not yet fully implemented so there is lack of connection between hospitals and clinics. (Rudolph et al., 2014)

Telecommunication infrastructure plays a significant role in public health transmission of health information among health institutions; health institutions and patients; health institution, patients and third parties such as insurance companies. Patients and health

institutions relationship is negatively affected if telecommunication and internet penetration is low (Mugo and Nzuki, 2014).

Many doctors in the developing countries are willing to conduct electronic searches in order to access and transmit health information with their contemporaries in others parts of the country and the world at large. However, an insufficient ICT resource prevents them in performing the electronic searches. eHealth infrastructure relevantly affects implementation of eHealth as internet connectivity is vital for effective implementation of eHealth amongst hospitals in the rural areas (Rudolph et al., 2014).

6.2. Electric Power Supply

Another major challenge to some developing countries is uninterrupted electricity power supply. Ghana has a moderately steady power supply as likened with other neighbouring countries. A country that has difficulty to provide uninterrupted power supply to its people will certainly have difficulties with deployment of good Information and Communication Technology (ICT) services (Achampong, 2012).

In Ghana and especially in the rural areas, one cannot fully rely on the electric power actually supplied by the Electricity Company of Ghana since at any time devoid of notice power can go off and some clinics in rural areas do not have electricity at all but depends on generators which can also break down during the course of usage. ICT equipment was manufactured to operate with other infrastructure such as electric power supply under stable and constant controlled conditions (Achampong, 2012).

6.3. Basic ICT Knowledge and Skills

Majority of health care professionals and consumers that is the rural folks using the new eHealth system lack basic Information and Communication Technology (ICT) knowledge or skills needed for effectively use of the system. The Information and Communication Technology system is not being fully exploited by the rural folks and the healthcare professionals. The level of ICT knowledge and skills amongst both healthcare providers and consumers is so little that it disheartens these stakeholders from accepting the eHealth system (Rudolph et al., 2014).

Majority of the present generation of Ghanaians grew up in the rural areas without computers or unfluctuating common electricity and these attributes to the low implementation of eHealth among rural folks and the clinicians. In developing countries that have integrated ICT training for clinicians, recognition and acceptance of eHealth as well as actual usage is relatively high (Rudolph et al., 2014).

6.3.1 Waste of time

The correlation between ICT skills and implementation of eHealth is also discussed as inadequate ICT skills in the health sector in rural areas explain the low implementation of eHealth systems. There is a view that the health care professionals who have deficiency in ICT skills of management the online health data end up using too much time. Therefore, without adequate ICT knowledge and skills makes user contribution in selection and development of ICTs becomes difficult. This might lead to having eHealth technologies not widely accepted adequately in rural areas. (Mugo and Nzuki, 2014)

6.3.2 Training of human

Training of human resources in eHealth implementation is critical because it is one of the encouraging steps of high impact not merely from a technical standpoint. However, as a change management tool in eHealth. It is motivating to note that eHealth improvement will necessitate more universal eHealth interoperability standards as well as plans to overcome technical infrastructure obstacles and address security, privacy, and other legal requirements. Training of human personnel have helped developed countries to optimize strategies to achieve this goal and this is what the developing countries should also do especially clinics in the rural areas (Mandirola et al., 2016).

6.3.3 Skilled workforce

One of the challenges of implementing eHealth is the need for a skilled workforce that understands health care, information, communication technology, people and organizational structures. This is one of the most frequent challenges among eHealth projects in Africa (developing countries) .The lack of information technology (IT) skills

in some cases lead to low acceptance rate of eHealth projects by health professionals, administrators as well as rural folks living in developing countries which Ghana is not an exception (Salifu et al., 2014).

6.4. Resistance to New Technology

People are fundamental in the value-added creation of eHealth products, services and implementation as an organization's human resource is the key to achievement. Technologies are designed in a mode that permits it to complete certain functions. Present forms of ICTs, particularly internet-based facilities are knowledge-intensive, thus certain levels of formal education and literacy are essential before one could efficiently appreciate ICTs potency to assist business (eHealth) activities in an environment (Salifu et al., 2014).

The presentation of new technology is linked to the consumer of the technology which may either be positive or negative. Most Ghanaians will resist new technological developments which might intimidate their job. Workers anticipate training on exactly how to use new technology and an equivalent increase in their revenue, while the organization introducing new technology anticipation may be to decrease staff strength as well as cost of operation. Frequently in Ghana, downsizing is the subject to be raised up before the announcement of new technology as this constantly leads to resistance by the workers for the fear of losing their job (Achampong, 2012).

6.4.1 Perceptions

Users' perceptions about technology can affect exactly how a new information technology is conceptualized, will be accepted and further used in the community in which it will be operationalized. It was established that most users' are only frightened by the use of ICT in health sector established on their perceptions about it (Achampong, 2012).

For instance, some physicians thought that using an electronic health record (HER) would demand additional time consuming, which would adversely influence the duration they might spend with patients. This point out that, for a successful

implementation of eHealth implementation to be witnessed in developing countries at the hospitals or clinics in the rural areas demands that various stakeholders to change their attitudes towards eHealth (Achampong, 2012)

6.4.2 Voluntary verse mandatory

Voluntariness has been revealed to determine the use of information technology. For instance, the use of eHealth is expected to be mandatory due to its benefits it brings to the society. If use of a technology is mandatory, probabilities that the technology will be used are greater than when consumers are left to select whether to use or not to. In organizations that have made the usage of technologies mandatory, personnel are left with no choice unless they resolve to resign (Achampong, 2012).

This is not merely a situation in developing countries but has similarly been witnessed in developed countries. In developed countries such as Norway and Denmark where high rates of electronic prescription were achieved, the government had to make e-prescribing mandatory for primary care providers (Mugo and Nzuki, 2014).

6.5. Internet

One of the most general functions of the internet is that it offers all kinds of health related information by the usage of diverse websites. However, an Internet service is a major challenge in Ghana as well as other developing countries (Rudolph et al. 2014).The Internet support in regulating cost and more significantly it transform the movement of information in health sector (Achampong, 2012).

The rate of low Internet penetration and low bandwidth are some of the challenges to eHealth implementation in developing countries. As long as Internet penetration as well as bandwidth remains low in developing countries and especially in the rural areas, implementation of eHealth will remain to lag behind likened to countries with high implementation rates such as Denmark (Rudolph et al., 2014).

To fully appreciate the importance of the Internet to gain access to healthcare information, there are a couple of issues that needs to be addressed. Poor Internet skills

prevent healthcare professionals to understand the difference between biased and unbiased information, distinguish evidence-based claims, and interpret information meant for health professionals (Mugo and Nzuki, 2014)

These challenges request for the necessity of participatory models of research and evaluation that involve local stakeholders in developing countries through the design development, and implementation stages of contextual meaningful research questions, processes, as well as outcomes in ICT and eHealth (Salifu et al., 2014).

6.6. Financial and Sustainability Issues

Financially, the implementation of the new eHealth system from the view point of stakeholders in the various developing countries is rather going to be a financial burden than it is expected. To these stakeholders, implementation of the new eHealth system means the health care professionals and the rural folks in the villages must own some high-speed laptop or desktop computer, smartphones (iPhone, Android), or iPad (Achampong, 2012).

In addition, they will have to subscribe for Internet service and remunerate monthly subscription fee. It also means that, the rural folks have to purchase software and other technological supports. A huge financial responsibility and commitment is needed which is going to worsen their current financial predicament. The common opinion about the system is intended to better aid the need for the rich than the poor since it is cost effective (Rudolph et al., 2014).

6.6.1 Funding

Source of funding of eHealth care system is critical for its maintenance and prevention of failures (Rudolph et al., 2014). Larger hospitals in size achieve economies of scale in mainly information and resources needed across the organization. Numerous studies show positive relationship between ICT implementation and organization size since there is more funds in the big hospitals compared to smaller institutions like clinics. (Mugo and Nzuki, 2014)

Due to low source of funding in the health sector, it is challenging to allocate much funds for acquisition of ICT resources needed. Implementation of electronic health infrastructure is exorbitant and this demand for increased funding in the health care sectors of various developing countries. The increased funding in health care sector is intensely correlated with implementation of eHealth. It is worth noticing that public funding is secured to individual institutions where the amount of money allocated to a particular health institution is proportional to its size (Rudolph et al., 2014).

6.6.2 Sustainability

Lack of maintenance culture is another problem facing eHealth implementation in the rural areas due to the fact that the area does not attract skilled workers to live. Both corrective and preventive maintenance is very significant for any ICT equipment. The financial policies for acquisitions of any equipment should incorporate the maintenance of such equipment and give allowances for depreciation in value which is not the situation in many organizations in Ghana. The government of Ghana could enforce an ICT policy banning any organization from importing, supplying and installing some ICT equipment without maintenance agreement (Mugo and Nzuki, 2014).

6.7. Privacy, Security, Data Protection and Confidentiality

Privacy, security, data protection and confidentiality are also challenges of eHealth implementation at rural areas in developing countries.

6.7.1 Privacy

Privacy is the right of persons to define for themselves when, how, and to what extent their information can be communicated to others. Privacy and security concerns of stakeholders' personal records and information also appear as a major challenge to a successful implementation of Ghana's eHealth system. With the recent rapid proliferation of cyber-fraud in the country, the people in rural areas are mostly uncomfortable about their information going public (Rudolph et al., 2014)

Although, some form of laws and policies are being put in place to guarantee the safety and security of their information, the rural folks simply do not trust in these systems since they think the government laws are not enforceable. Health records regularly contain extremely sensitive personal information. Stakeholders are quite not pleased with the policies, measures and laws lay in place to ensure the safety of their personal health information. As a result, they do not give the impression to be enthusiastic about the eHealth implementation system (Rudolph et al., 2014).

6.7.2 Security

On the other hand, security can be defined as the extent to which personal information can be stored and transmitted such that access to the information is limited to authorized parties. Information Communication Technologies are vulnerable to security and privacy breaches which negatively affect their implementation in health sector. Issues of privacy, security and confidentiality are not limited to developing countries alone. Lack of clear legislation in regard to security, privacy, confidentiality and accountability are critical issues facing eHealth implementation in rural settings (Achampong, 2012; Mugo and Nzuki, 2014).

6.7.3 Data protection

There is presently no policy guideline with regards to electronic information data interchanges as well as patient identifiable information in the health care sector in Ghana. A right of electronic data and information within the health care sector is not well-defined. Privacy, confidentiality and security issues have not been considerably addressed in research; these issues affect implementation of eHealth. Users of eHealth such as clinicians and patients want to be sure that their confidentiality is safe if eHealth is to be accepted by them. Privacy and security of electronic health care data are of relevant importance in developing countries if eHealth is to gain confidence among health care stakeholders (Achampong, 2012).

6.7.4 Confidentiality

Medical records can hold abundant amount of sensitive information, such as emotional problems, sexual behaviors and diseases, fertility and abortions, substance abuse, as well as physical abuse. Uncontrolled right to use this kind of data can be detrimental to the patient confidentiality. Rural folks are of the fear that these information about them could be made public in developing countries where law enforcement is low especially Ghana (Rudolph et al., 2014).

6.8. Regulatory of legal and policy framework

Regulatory of legal and policy framework is difficult in most developing countries to discover clear policies and coordination between governmental agencies and eHealth initiatives. This is a huge obstacle to the implementation of eHealth in developing countries. Political instability issues make it actually difficult to find government policies for long-term projects. In many developing countries there are no state policies, and if there are, they often change when there is a change of government (Mandirola et al., 2016)

In Ghana, there are a number of Information Communication Technology policies that have been put in place to facilitate the quick implementation of ICT projects in the country but these policies keeps on changing due to poor political will of continuing another government projects (Achampong, 2012).

6.9. Socioeconomic Constraints and Development

In developing and developed societies, the health sector has two demands: firstly, to reduce and control the increasing cost of healthcare as well as secondly, to offer expanded and reasonable access to quality health care services. When the poor folks become ill, their whole household can become confined in a downward curved of lost revenue and high healthcare cost. Immediate imbursement at health care facilities can be catastrophic for poor people economic situation and may cause severe constraints of crucial means for daily needs (Salifu et al., 2014).

There is growing evidence of households faced with socioeconomic challenges such as forced into deeper poverty when faced with large amount of medical expenses particularly when joined with a loss of household income due to ill-health. The national healthcare insurance scheme (NHIS) in Ghana requires the individual to pay a premium which the rich in society are able to pay but the poor living in the rural areas are not able to afford and this have a significant effect on eHealth implementation due to poverty (Salifu et al., 2014)

7. RESEARCH DISCUSSIONS

eHealth is the transmission of health resources and health care by electronic means. It comprises three central parts: the transfer of health information, for health professionals as well as health consumers and through the Internet or telecommunications. It is by using the influence of information technology and ecommerce to advance public and private health services through the education and training of health workers (Mandirola et al., 2016).

eHealth has countless importance in the administration of health care services. There is no doubt about the benefits of information technology usefulness to health (Lasker et al., 2014), but in many developing countries there are severe barriers to effective eHealth implementation (Jones et al., 2014). Information technology may well allow substantial improvements across numerous aspects as well as has the potential to profit both developed and developing countries (Mandirola et al., 2016).

The findings outlined above shows that many of the functions within the hospital or clinics in the rural areas are manually done as there are very few information and communication technology in place, consequently a lot remains to be completed. Additionally the use of information and communication technology in the rural areas are currently characterized by the following as an outcome of the existing challenges facing eHealth implementation (Ouma et al., 2009).

Unavailability - Presently hospitals in the rural parts of Ghana which are known as clinics do not have adequate information technologies in place. The rural clinics do not have telephone landlines in place as most of the staff use personal mobile phones. Each of these clinics has only a few computers. These few computers can only be observed in the matron's office. This is as a result limited availability of funds to put these information technologies in place at the clinics (Ouma et al., 2009).

Unreliability - Furthermore the telephones, computers and eHealth equipment in place at the rural areas experience very recurrent break downs due to its obsolete nature forcing members of staff to move from point to point in order to communicate or save information leading to a lot of time wastages. This situation has been predominant at the

clinics in the rural areas as internet service does not function at the clinics in the rural areas due to no connectivity (Ouma et al., 2009).

Inaccessibility - Moreover many of the staff members in the clinics at the rural areas do not have access to the information and communication technologies in place especially accessibility to the internet connectivity as well as accessibility to the few available computers. This is due to the insufficiency in the amount of the facilities in place in the rural areas to be used by the health care professionals and the people in the community (Ouma et al., 2009).

Lack of skills – Majority of the staff members in the rural areas are not trained or well equipped with elementary computer operations skills. Consequently they may well not be able to hold on the use of information and communication technology. Except these challenges are taking into consideration, the clinics will remain not to implement eHealth solutions due to the challenges of inaccessibility, unavailability, unreliable and above all unsustainable due to lack of skills among workers and the people living in the rural areas as is the case currently. This calls for a method to deal with these challenges which have been a barrier to the implementations of eHealth among the developing countries. (Ouma et al., 2009)

It is imperative that eHealth solutions are functional over a period of time to agree for a smooth incorporation and transition bearing in mind the fact that not all the challenges can be solved at once by the developing countries but be executed in stages. By undertaking these, the governments within the developing countries will be capable to plan and smoothly measure the results as the implementation process proceeds in the various phases. The proposed phases are as outlined below:

Phase one - also known as the initial stage requires different stakeholders in eHealth solutions to work together in the direction of the implementation of eHealth. In the course of this phase the government and hospital administrators should be in the process of procuring various information and communication technologies equipment needed within the hospitals and clinics in the rural areas. This should include computers, its accessories and networking equipment. In addition to purchasing the information and

communication technology equipment, software development should begin at this stage (Ouma et al., 2009).

The government may well work with several researchers to develop prototypes of open source software for usage within the dispensaries, health centers, clinics, sub-district hospitals, the district hospitals, provincial hospitals and the national hospitals at large. This is a cheaper option likened to purchasing of on the shelf software which necessitates licensing for a particular number of machines thus limiting its use within the rural clinics. Besides, the numerous staff members in the clinics such as the doctors and nurses should be trained throughout these phase in order to assist eHealth implementations (Ouma et al., 2009).

Phase two – referred to as the deployment stage requires Local Area Networks and Wide Area Networks which should be mounted at this stage to expedite the communication among the various clinics in the rural areas and the few central hospitals in the country. The various software templates developed in phase one for the health information systems should be customized for use at the different hospitals and clinics. In addition, policies governing the usage of eHealth solutions should be set up and possibly there should be cross-sector linkages among various government ministries to assist in the implementation of eHealth systems (Ouma et al., 2009).

Phase three - implementation stage requires the hospitals and clinics should have information and communication technology structures in place such as the usage of health information systems, telemedicine and the internet that can then be implemented in each hospital or clinics to increase the quality of services delivered to the patients (Ouma et al., 2009).

Phase four – the evaluation stage requires the usage of various eHealth solutions which are in place ought to be reviewed at this stage in order to define the way forward for the hospitals and clinics in the rural areas. In agreement to the findings, modifications should be made where possible and also a way forward should also be proposed after investigation of the findings (Ouma et al., 2009)

A critical quantity of professional and community users of information and communication technologies in health care has not yet remained reached in developing

countries. Majority of the methods being used are quiet at a relatively initial stage of implementation, with inadequate studies to establish their significance, appropriateness or cost effectiveness (Omotosho et al., 2006).

It is difficult for governments in developing countries or nations to determine their investment priorities (Omotosho et al., 2006). However, there are an amount of pilot projects that have shown improvement in the eHealth implementation in some developing countries, such as a 50 percent reduction in mortality and 25-50 percent increases in productivity within the healthcare system in Ghana (Afarikumah, 2014). Some of these pilot projects have wind up whiles others are still being implemented as a result that most of the pilot projects have been donor initiated (Afarikumah, 2014). eHealth projects offer enormous opportunities that should be shared with the neediest persons living in the rural areas. (Afarikumah, 2014)

8. CONCLUSION, LIMITATION AND RECOMMENDATION

The principal purpose of the eHealth is to deliver a documented record of care that assists present and future care by clinicians and other supporting agencies in the clinical environment. This documentation offers a means of communication between clinicians contributing to the patient's care. The main beneficiaries are the patient who visits the clinics or hospitals and the clinicians (ISO/TC 215 Technical Report, 2003).

Demands for reasonable and quality healthcare are far from been achieved in developing countries, specifically in the face of inadequate resources for both human and financial. Ghana, a developing country is no exclusion and still struggles with the problem of offering reasonable and quality healthcare to its citizens. With a high population of around 23 million compared to the size of the country, access to healthcare, particularly for those in the rural communities is too limited. In most rural communities where there are clinics, the healthcare professionals to work in these facilities are generally inadequate in number and inadequately trained to perform these duties (Afarikumah, 2014)

Implementing eHealth system could support to address these gaps of insufficient access and poor healthcare quality currently delivered in rural Ghana. This could aid to create a national repository of health data, which will therefore make the distribution of telemedicine applications stress-free in the future. Far to reach communities especially the rural areas presently in Ghana could have right of entry to specialist's services with an efficient telemedicine submission in place (Ouma et al., 2009).

Implementing a new technology such as eHealth, particularly in complex work settings such as in the health sector require of a cautious thought out plan and strategy, not only to guarantee a positive implementation but similarly to strike a balance concerning conflicting important goals. Important goals such as healthcare quality, patient safety and privacy, the organization's business plans and goals, process efficiency and the eHealth usability all need to be well-adjusted (Ouma et al., 2009).

eHealth implementation in the rural areas should not be an ordinary automation of current workflows, but reasonably it should be geared to the development of new and

well-organized workflows. eHealth implementation challenges could arise as a result of technology led; where the existence of a problem requires the advancement of a technological solution, whereas the existing technology is used to assist and improve present workflows. The existence of data collection and management challenges in Ghanaian hospitals and clinics in the rural communities will necessitate the use of eHealth technology to solve these challenges (Ouma et al., 2009).

When these challenges concerning eHealth implementation in the rural communities have been resolved, will the rural areas be able to appreciate the enormous remunerations that eHealth solutions provide. Hence the challenges should be highlighted in a step by step procedure in agreement to availability of resources at hand within the specified (Ouma et al., 2009)

Limitations

Although this thesis captures important amount of issues facing eHealth implementation in the rural settings, it does not report on cultural dimension of the people of Ghana which has the potential to impact the implementation of the eHealth care technology. This leaves a vacuum in my research work which can be complete in future studies and also investigating the opinions of other stakeholders like healthcare vendors - that is not captured in this thesis study (Rudolph et al., 2014)

Recommendation

The thesis study recommends some actions that could be applied to overcome the stated challenges to eHealth implementation in the rural settings where big hospitals are not available but rather small clinics which is patronized by the rural folks include transformation of eHealth standards development process at regional, national and international level as well as the adoption of a user-centered eHealth development approach (Benson, 2010).

Another recommendation is that developing countries start to look completely into socioeconomic and cultural issues, appraise and create technology-growth assisted environment. It is significant to develop skills as well as competencies dependable with local cultures, languages and health systems that will be required to realize the complete

benefits of these technologies (Hersh and Hickam, 1998). This suggests that universal admittance to education will be vital. In advancing, it becomes vital that developing countries commence initiatives that talk about the above identified problems that has the possibility to impact negatively on any eHealth implementation initiative (Salifu et al., 2014)

Finally, the thesis suggests that distinctive strategy has to be set in place by governments and policy makers to guarantee proper plan for a national eHealth environment as well as support funding for eHealth implementation. Create the legal framework for its implementation and long-standing sustainability should be national priorities. Besides, governments have to offer priority to investment in basic eHealth infrastructure and the improvement of human resource capacity as well as play dynamic role in eHealth implementation through the execution of suitable national policies and guidelines (Adebesin et al., 2014)

Reliability and validity

Reliability and validity discusses the degree to which results of a study are precise representation of the total population or research work and reliable over a period of time (Joppe, 2000) The work has been completed in such a manner that the findings are reliable as most research findings indicate the challenges of eHealth implementation among rural folks in developing countries, a case of Ghana.

The study was consistent using the essential tools available to quantify the results as well as the findings which are valid since most literature that was used has scientific background (Weber, 1990). To increase the reliability and validity of the study, it is essential to demonstrate a link among the results and the data (Polit & Beck, 2004).

Strengths

This thesis has both theoretical and practical implications in relative to eHealth implementation challenges in developing countries rural communities based on Ghana's experience. Theoretically, the thesis has implication for identifying issues of the eHealth system that is well thought-out as the most challenging issue to the effective implementation of the eHealth system, and the understanding of these concerns from the

viewpoint of government, healthcare providers and consumers who are the important stakeholders the system has direct impact on(Rudolph et al., 2014).

The findings outlined above will help researchers to further explore the problem concerning eHealth implementation in Ghana rural communities and come up with submission to help mend the eHealth system. Practically, the findings from this thesis will help notify major stakeholders including government, key decision makers as well as funding agencies about potential areas that require their immediate consideration for strategic distribution of scarce resources (Rudolph et al., 2014)

9. REFERENCES

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INTERNET SOURCE

https://www.isfteh.org/files/media/ghana_national_ehealth_strategy.pdf

<https://www.google.fi/search/ehealth+implementation>

APPENDIX 1: THE CONSTRUCTS AND THEIR DIMENSIONS

1.Interactional Workability	2.Relational Integration	3.Skill-set Workability	4.Contextual Integration
It means complex intervention affecting interactions amid people and practices - How?	It means complex intervention relating to existing knowledge and relationships - How?	It means current division of labour affected by a complex intervention - How?	It means complex intervention relating to the organization in which it is set - How?
<p>Congruence is concerned by the relations that can legally be allocated inside an interaction.</p> <p>What method of the work?</p> <p>What part is played by each member?</p> <p>The accomplishment of work within time and space offered.</p> <p>What formal and informal guidelines govern the verbal and non-verbal behaviour of the interaction?</p>	<p>Answerability is concerned with the information and act of the people approving the difficult intervention.</p> <p>What knowledge and skill required by the work?</p> <p>Who has this awareness of the variances required?</p> <p>The assistances needed of participants as well as the formal and informal guidelines that govern the distribution of knowledge, skills and practice in interactive networks.</p>	<p>Allocation is concerned with the responsibilities done by people and how conclusions were made.</p> <p>How supply of resources and rewards are related to status and authority?</p> <p>Formal and informal arrangements about the identification assessment of the essential skills as well as the description possession of these skill-sets.</p>	<p>Execution is concerned with the practicalities of integration.</p> <p>How decisions about the supply of resources, expenses and hazards within the organization are managed?</p> <p>How the managerial decision-making concerning the implementation of the intervention as well as formal and informal mechanisms are assessed.</p>
<p>Disposal of the work is concerned with the core effects of relations in complex interventions which reflect on the goals.</p> <p>How difference about the result of the work is minimized?</p> <p>When and where the aims and results should occur as well as common beliefs about the importance and consequences of the work?</p> <p>It can also narrate on the interaction between the human and non-human actors.</p> <p>The intervention must encourage the efficiency of the main idea proposed.</p>	<p>Confidence is concerned about the beliefs, knowledge and practice needed in solving a complex intervention.</p> <p>It reflects on agreement about the core of an effective knowledge and practice.</p> <p>How measureable can their reliability be assessed?</p> <p>How the opinions on practical usefulness and consistency of knowledge facilitate the various linkages in the health system.</p>	<p>Performance reflects the ability of an organization and people to excellently organize themselves on how to use a complex intervention as part of their actions.</p> <p>This covers staff training as well as formal and informal procedures that outline the boundaries of capability of individual workers</p> <p>How the amount of autonomy is allocated to each one, and how services are provided?</p>	<p>Realization reflects the apportionment and ownership sense of duty for the implementation on a complex intervention.</p> <p>The debate that is needed to change existing systems and performance to create new ones.</p> <p>How possible to minimize the distraction and hazards associated with change?</p> <p>What way can new resources be acquired and used in training?</p>

Source: Campbell et al. (2000)

APPENDIX 2: ARTICLES FOR THE LITERATURE REVIEW

NUMBER AND SEARCH ENGINE	AUTHORS AND YEAR	TITLE OF ARTICLE	SUMMARY OF THE ARTICLES
1.EBSCO	Kiberu et al. 2017	Barriers and opportunities to implementation of sustainable eHealth programs in Uganda: A literature review	Opportunities for new innovations, and their application into healthcare.
2.EBSCO	Malunga and Simon, 2017	Implementation of E-health in Developing Countries Challenges and Opportunities: A Case of Zambia	A well-balanced view and experiences among Health Care Providers on e-Health implementation.
3.EBSCO	Funmi et al. 2013	Barriers and challenges to the adoption of eHealth standards in Africa	The adoption of e-health standards by African countries and provide ways of overcoming the barriers.
4.EBSCO	David et al. 2014	Determinants of Electronic Health in Developing Countries	Low quality of healthcare services due to scarcity of highly trained clinicians and high cost of healthcare services unaffordable to majority of citizens, problems that can be alleviated through embracing eHealth in developing countries.
5.PUBMED	Achampong Emmanuel Kusi	The state of information and communication technology and health informatics in Ghana	Improving the effectiveness of health care providers, the efficiency of health care managers and new opportunities for health care clients.
6.PUBMED	Afarikumah Ebenezer	Electronic health in Ghana :Current and future prospects	Although eHealth seems to have a limited role in Ghana at present, there is growing interest in the opportunities it may offer in terms of improving the delivery and access to services, especially in remote locations.
7.SCIENCE DIRECT	Rudolph et al. 2014	A study of the issues of eHealth care in developing countries: The case of Ghana	An attempt to improve the quality and standard of health delivery services provided to the citizens, Healthcare Information Technology (HIT), otherwise known as electronic healthcare (e-healthcare)
8.GOOGLE SCHOLAR	Mandirola et al. 2016	Challenges and hurdles of eHealth implementation in developing countries	Identifying the challenges and hurdles to improve eHealth in developing countries.
9.GOOGLE SCHOLAR	Ouma et al. 2009	Implementing successful eHealth implementations within developing countries	The daily operations of hospitals using eHealth tools particularly in the developing world.
10.GOOGLE SCHOLAR	Salifu et al. 2014	Preparedness for e-Health in developing countries: the case of Ghana	Difficulty in accessing health care facilities and an inability to pay for health insurance.