"The challenges of eHealth implementation in developing countries: A literature review"

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Abstract:Aim: *The aim of this analysis study is to research the challenges of eHealth implementation in developing countries by literature review.*
Background: *The usage of technology in delivering and providing health care is present worldwide. In spite of the potential benefits of eHealth, implementation of those systems is often rumored as difficult. The health care system of many developing countries, just like the gift state of affairs is therefore beset with varied challenges and problems. Developing countries is in its emergent stages of achieving meaningful use of the technology.*
Method: *The chosen analysis methodology is descriptive literature review. The Inductive Content Analysis and social control method Theory cryptography Framework were accustomed analyses the info.*
Findings: *Lack of ICT infrastructure, electrical power provides and basic ICT data or skills has been a number of the challenges facing eHealth implementation in developing countries victimization. Lack of infrastructure within the rural areas makes the agricultural of us ineffectual to access the web, besides electrical power provide isn't accessible this makes it even tough to mend ICT infrastructure that depends on electrical power to control thanks to this ICT data and skills is low among the agricultural of us.*
Conclusions: *once these challenges regarding eHealth implementation within the rural communities are resolved, can the agricultural areas be ready to appreciate the large remunerations that eHealth solutions offer.*
***Keywords:*** *Challenges, ehealth, Implementation, Developing countries.*

I. 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).

Figure 1: The face of eHealth.
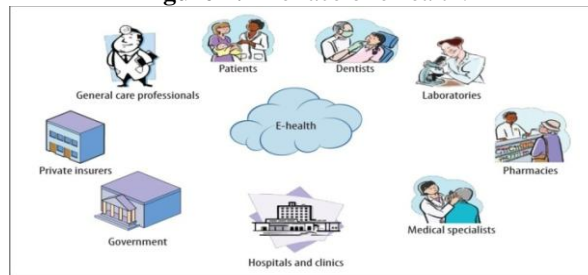
Source: Mario Kovac, 2014

II. 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 toescalate in the future (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 thedevising strategies and interventions to develop the extensive effective use of eHealth, in addition to addressing blockages to implementation (Stroetmann et al., 2012).

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 living in the developing countries.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, communicationtechnology 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.

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 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:
1. eHealth in the delivery of health services at a distance (tele-health) Management of
2. administrative and clinical information (health informatics) Distributing information and
3. 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).

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:
1. 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
2. Telemedicine systems as well as other similar services
3. 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 tele-consulting to all-inclusive automation of the healthcare system for effectual productivity. According to the International Communication Union (2008), eHealth extensively covers the areas of:
a. Products: such as instruments to guarantee the persistent monitoring of blood pressure in ambulatory patients.
b. Systems: such as computer-assisted surgery systems in health care.
c. 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 2eHealth solutions
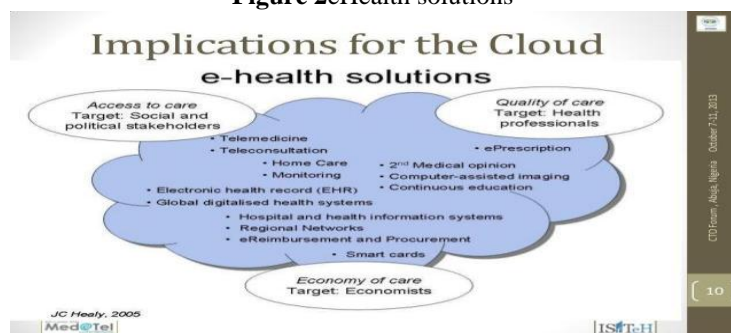
Source: J.C. Hearly 2005

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).

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, and 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 eHealthtechnologies.According to Adebesin 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 Literature review falls within (Anon, 2013). The major barriers enumerate by Adebesin 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 (Adebesina et al. 2013: Truffer et al. 2010).

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 3: Core components of interventions

No	Core components
1	Actors
2	Objects
3	Contexts

The Actors

      Actors comprise people and teams that meet one another in health care settings like health professionals, hospital managers and patients advanced interventions enforced for {people} or teams are orienting towards the modification of the behavior pattern of the people (Kennedy et al., 2003), and additionally alternative ways of shaping, classifying, and speaking regarding a drag (Celestin et al., 2003). This intervention administered is meant to transforms people's behavior (Berg, 1998).

The Objects

      This appearance at the institutional through that data and activities are engineered powerful among them are standard drug therapies, pointers in clinical procedures and medical records in electronic formats. Interventions of this nature that link to things comprise of medical tools, therapeutic agents and technology for deciding and pointers within the clinical procedure (May et al., 2003). The aims of this sort of interventions are to bring age within the skills and actions of the individuals (Berg, 1998).

The Contexts

      Contexts talk to the visible factors that ar institutional, structure and different legislative parts that play vital role in serving to or limiting the resource that folks and procedures perceive. The interventions that are viewed as cumbersome during this space takes the shape of roles performed by professionals within the field, channels that mediate health care organizations and therefore the entire structures of the organization (Celestin et al., 2003). Once enforced, the end result of the intervention leads to effective and economical strategies of building procedures in health care (Berg, 1998).

Assumptions of normalization method Theory

      The model is pent-up by its prominence on work as collective action over an amount of your time in health care settings. It's established on 3 assumptions (Campbell et al., 2000). Firstly, the NPT model adopts implementation. this is often delineate 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 4: Four factors in NPT

Four factors of the Second assumption.	
Interactional Workability	**Relational Integration**
Skill Set Workability	Contextual Integration

      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 Literature review" 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 ofCommons Health Committee, 2005).

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.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 by literature review.

Research question: What are the challenges of eHealth implementation in developing countries?

Methodology: This research is done as literature review. The objectively report Purpose of a literature review is to topic and base this summary onthe current knowledge on a previously published research.

Formulation of the research question: The course and attention of the descriptiveliterature 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.

Selection of the material: A comprehensive search of the literature writings are basedupon 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 evidenceof 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).

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 5.**

Figure 5: Phases of descriptive literature method.

Formulation of the research question	Selection of the material	Synthesis	Discussion
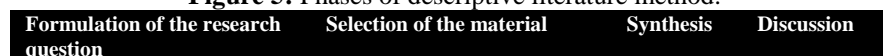
Discussion: In this stage the important findings of the literature review are put togetherand summarized into one idea (Kangasniemi, 2013). Major findings of agreement and disagreement in the reviewed literature ought to be discussed (Kangasniemi, 2013: Green, 2006). The discussion should relate the 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).

Data collection and search strategy for the articles

The articles used for this analysis work were 10 in variety. The search strategy was completed exploitation EBSCO, PubMed, Science Direct and Google Scholar. The search was completed exploitation the Arcada University of Applied Sciences Library portal. The ArcadaFinna portal page was used also as different portals in health care, physiatrics, therapy and sports programs.Firstly, the search words employed in the looking for the articles will be seen below in Table one. Search words have associate degree perceptive impact on search outcomes. exploitation the precise words can speed-up the analysis method, whereas the incorrect search words will bring the search results to a painfully screeching finish (Day and Gastel, 2006).Search engines, journals, compartmentalisation and abstracting services reason papers exploitation keywords. Thus, an explicit list of keywords can guarantee correct compartmentalisation and assist showcasing your analysis to interested teams. This chance can increase the possibilities of your paper being cited (Taylor and Francis, 2011).

Table1. Search words used in data collection

1. Challenges, eHealth, implementation.
2. Challenges, eHealth, implementation and developing countries.
3. Challenges, eHealth, implementation, developing countriesand other etc.

Secondly, during an analysis work, the scientist should state inclusion and exclusion criteria for employed in the study. Inclusion criteria area unit options that the possible subjects or literatures should have if to be enclosed within the study, whereas exclusion criteria area unit those options that exclude prospective subjects or literatures from inclusion within the study (Van, 2007).Inclusion and exclusion criteria might comprise factors like age, race, sex, ethnicity, kind and stage of unwellness, the subject's earlier treatment history, and also the presence or absence of different medical, psychosocial still as emotional conditions (Helfand et al., 2009). During a clinical study, inclusion and exclusion criteria area unit supposed to confirm patient's safety through the study, offer information of subject suitableness for the study, scale back withdrawal and guarantee that primary end-points of study area unit touched (Van, 2007).

Table 2: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Articles Published in English Languages	Articles Published in other English Languages but not English
Free Articles	Articles without abstract
Articles with abstract	Nonscientific articles
Scholarly written articles	Older articles for the limitation year 2000 and below
Full Articles	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 485 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 83 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 199, and 3 articles and Science Direct 1 article were chosen randomly using the years range from 2007- 2017. All most 10 articles are viewer **Figure 6.**

Figure 6: Search strategy of articles

FIRST SEARCH USING KEY WORDS			
EBSCO=147	PUBMED=83	SCIENCE DIRECT=56	GOOGLE SCHOLAR=199
USING ALL CRITERIAS			
EBSCO=56	PUBMED=21	SCIENCE DIRECT=12	GOOGLE SCHOLAR=41

READING THROUGH			
EBSCO=4	PUBMED= 2	SCIENCE DIRECT=1	GOOGLE SCHOLAR=3

FINAL 10

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.

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 7: Inductive content analysis process.

Open coding	Creating categories	Abstraction

Open committal to writing

Inductive content analysis commences with establishing the data through a method known as open committal to writing. Through open committal to writing, researchers review the material; build notes and headings within the text as they browse. This method typically necessitates continual reading of the fabric, once that the man of science writes down the notes and headings onto a committal to writing sheet (Elo and Kyngäs, 2008).

Creating classes

The next step includes grouping the info, decreasing the quantity of classes by combining connected headings into intensive classes and forming higher order classes. Through this method, researchers manufacture data and acquire additional understanding of the fabric (Elo and Kyngäs, 2008).

Abstraction

Abstraction means that expressing a typical description of the analysis topic through making of classes. Every class is termed exploitation content-characteristic words.

Ethical thought

Arcada University of field features a tight framework and help for analysis work. This analysis study followed the framework of Arcada in approach to analysis work. Reviewed articles used are befittingly documented to avoid plagiarism (Punch, 1994). The utilization of scientific article was conjointly done by the man of science (Truscott, 2004). Ethics could be a Greek word that easy means that one's character or ethical right (Richards and Schwartz, 2002).Ethics in analysis study presently refers to a branch of philosophy that's apprehensive with however folks have to be compelled to behave, act and conduct themselves during an analysis study (Orb et al., 2001). It involves given ruling concerning the actions for exploitation someone's work whether or not right or wrong and making rules to defend these actions (Kicthener, 2000: Guillemin and Gillam, 2004). The man of science followed the procedure for doing analysis by writing and submitting to his supervisor for approval. The supervisor browse the analysis done by the man of science and target-hunting likewise as corrected the add accordance with moral rules and laws (Morrow, 2001).It is within the analysiser's view; this work has been ready in line with the principles and regulation that oversees research work the Arcada University of field (Hoeyer et al., 2005).

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 eHealthprogrammes in Uganda: A literature review
2.	Molunga and simon(2017), Implementation of E-health in Developing Countries Challenges and Opportunities: A Case of India,
3.	Funmi et al. (2013) Barriers and challenges to the adoption of eHealth standards in South Asia
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 Bangladesh
6.	Afarikumah Ebenezer (2014), Electronic health in Literature review :Current and future prospects

7.	Rudolph et al. (2014), A study of the issues of eHealth care in developing countries: The case of Bangladesh
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 Bangladesh

III. Research findings and results

Literature review could be a state of affairs whereby the scientist reads through some educational literatures and is ready to choose out the most ideas written in those literatures. When rigorously reading through the ten articles, the subsequent ideas became evident regarding the challenges facing eHealth implementation in developing countries, a case of Literature review. These area unit Lack of ICT Infrastructure; wattage Supply; Basic ICT information or Skills; Resistance to New Technology; Internet; monetary and property Issues; Privacy, Security, knowledge Protection and Confidentiality; restrictive legal and policy framework; and Socioeconomic Constraints and Development.

Lack of data and Communication Technology (ICT) Infrastructure

Lack of ICT infrastructure is that the most significant eHealth system problems that stand as a barrier to its implementation consistent with shoppers and clinicians operating within the rural areas. Data and Communication Technology infrastructure that essentially comprise of computers and different communication devices like (smart phones, iPad, and therefore the rest) area unit essential to any processed health system. However, the acquisition of those basic electronic artifacts still be a significant challenge not simply to the typical Literature reviewian living on an occasional financial gain wage within the rural communities, however additionally government and in private run establishments comprising of hospitals and clinics. (Rudolph et al., 2014)

Computing instrumentation

Mostly each sanatroium within the developed countries has computing equipment, transmission facilities, imaging and printing system, communication similarly as net system. the present ICT infrastructure haven't been altogether incorporated and networked in a very mode to help the electronic health care delivery system within the developing countries similarly as routine planned preventive maintenance isn't carried out because of monetary fund constraints as service level agreement don't seem to be accustomed describe the character and excellence of ICT services outsourced (Achampong , 2012). Computing instrumentation (desktops, laptops, servers), transmission systems (Television sets, VCD and optical disk players, camera's and camcorders), networking devices (switches, routers, wireless access points, firewalls, native space networks (LANs) and wide space networks (WANs)), imaging (desktop and network printers) mobile telephone and communication (Personal Digital Assistants (PDAs), cell phone, landlines, fax machines etc.), and net systems (GPRS, ADSL, VSAT and modems) kind the muse for data and Communication Technology (ICT) infrastructure (Kiberu et al., 2017) aside from few hospitals within the urban cities that contains an absolutely purposeful native space network (LAN) within the developing countries, most of the care facilities just like the clinics among the agricultural people have restricted their LANs to the receptions, records departments and pharmacy departments of the clinics. The LANs area unit usually accustomed assist the flow of data between records department and therefore the pharmacy department similarly as reception wherever the patient registers (Kiberu et al., 2017).

Initial stages

The new eHealth system being implemented in the developing countries which Literature review 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. 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).

Electric Power Supply

Another major challenge to some developing countries is uninterrupted electricity power supply. Literature review 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 Literature review and especially in the rural areas, one cannot fully rely on the electric power actually supplied by the Electricity Company of Literature review 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).

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 Literature reviewians 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).

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)

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).

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 Literature review is not an exception (Salifu et al., 2014).

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 Literature reviewians 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 Literature review, 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).

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 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)

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 Literature review 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. 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).

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).

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 it 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).

Sustainability

Lack of maintenance culture is another drawback facing eHealth implementation within the rural areas thanks to the actual fact that the realm doesn't attract complete staff to measure. Each corrective and preventive maintenance is extremely important for any ICT instrumentation. The monetary policies for acquisitions of any instrumentation ought to incorporate the upkeep of such instrumentation and provides allowances for depreciation in worth that isn't matters in several organizations in Literature review. The govt of Literature review might enforce AN ICT policy ban any organization from commercialism, provision and putting in some ICT instrumentation while not maintenance agreement (Mugo and Nzuki, 2014).Privacy, Security, knowledge

Protection and Confidentiality: Privacy, security, knowledge protection and confidentiality are challenges of eHealth implementation at rural areas in developing countries.

Privacy and Security

Privacy is that the right of persons to outline for themselves once, how, and to what extent their info is communicated to others. Privacy and security considerations of stakeholders' personal records and knowledge conjointly seem as a significant challenge to a prospering implementation of Literature review's eHealth system. With the recent speedy proliferation of cyber-fraud within the country, the folks in rural area unitas are principally uncomfortable concerning their info going public (Rudolph et al., 2014) though, some sort of laws and policies area unit being place in situ to ensure the protection and security of their info, the agricultural people merely don't trusts in these systems since they assume the govt laws don't seem to be enforceable. Health records frequently contain extraordinarily sensitive personal info. Stakeholders area unit quiet not happy with the policies, measures and laws lay in situ to confirm the protection of their personal health info. As a result, they are doing not offer the impression to be hooked in to the eHealth implementation system (Rudolph et al., 2014)

Data protection

There is presently no policy guideline with regards to electronic info knowledge interchanges moreover as patient recognizable info within the health care sector in Literature review. A right of electronic knowledge and knowledge inside the health care sector isn't well-defined. Privacy, confidentiality and security problems haven't been considerable addressed in research; these problems have an effect on implementation of eHealth. Users of eHealth like clinicians and patients need to take care that their confidentiality is safe if eHealth is to be accepted by them. Privacy and security of electronic health care knowledge area unit of relevant importance in developing countries if eHealth is to realize confidence among health care stakeholders (Achampong, 2012).

Confidentiality

Medical records will hold lush quantity of sensitive info, like emotional issues, sexual behaviors and diseases, fertility and abortions, misuse, moreover as physical abuse. Uncontrolled right to use this sort of knowledge is damaging to the patient confidentiality. Rural people are a unit of the concern that these info concerning them may be created public in developing countries wherever enforcement is low particularly Literature review (Rudolph et al., 2014).

Regulatory of legal and policy framework

Regulatory of legal and policy framework is tough in most developing countries to get clear policies and coordination between governmental agencies and eHealth initiatives. This is often an enormous obstacle to the implementation of eHealth in developing countries. Political instability problems create it truly tough to seek out government policies for long comes. In several developing countries there are not any state policies, and if there are a unit, they usually modification once there's a modification of state (Mandirola et al., 2016). In Literature review, there are a unit variety of data Communication Technology policies that are place in situ to facilitate the fast implementation of ICT comes within the country however these policies keeps on dynamical thanks to poor political can of constant another government comes (Achampong, 2012).

Socioeconomic Constraints and Development

In developing and developed societies, the health sector has 2 demands: first off, to cut back and management the increasing value of aid moreover as second, to supply expanded and affordable access to quality health care services. Immediate imbursement at health care facilities is ruinous for poor folk's economic scenario and should cause severe constraints of crucial means that for daily wants (Salifu et al., 2014). There's growing proof of units visaged with socioeconomic challenges like forced into deeper economic condition once visaged with great amount of medical expenses significantly once joined with a loss of household financial gain thanks to ill-health.

IV. Research discussions

eHealth is that the transmission of health resources and health care by electronic suggests that. It contains three central parts: the transfer of health data, for health professionals additional as health customers and via the online or telecommunications. It's by victimization the influence of data technology and ecommerce to advance public and private health services through the education and training of health workers (Mandirola et al., 2016).eHealth has innumerable importance at intervals the administration of health care services. There's very little doubt relating to the benefits of data technology utility to health (Lasker et al., 2014), but in many developing countries there unit severe barriers to effective eHealth implementation (Jones et al., 2014). Data

technology will modify substantial enhancements across varied aspects additional as has the potential to profit every developed and developing countries (Mandirola et al., 2016). The findings created public on high of shows that many of the functions at intervals the hospital or clinics at intervals the agricultural live|areaunit|unit of measurement|unit} as sq. measure manually done as there are a unit solely many data and communication technology in place, consequently lots remains to be completed. Additionally the utilization of data and communication technology at intervals the agricultural sq. measureas area unit presently defined by the following as associate degree outcome of the current challenges facing eHealth implementation (Ouma et al., 2009).

Unavailability - Presently hospitals at intervals the agricultural parts that unit referred to as clinics haven't got adequate data technologies in place. The agricultural clinics haven't got phonephone landlines in place as most of the employees use personal mobile phones each of these clinics has alone several computers. These few computers can alone be discovered at intervals the matron's geographic point. typically|this can be} often as a result restricted accessibility of funds to position these data technologies in place at the clinics (Ouma et al., 2009).

Unreliability - what's additional the telephones, computers and eHealth instrumentality in place at the agricultural areas experience really continual break downs because of its obsolete nature forcing members of employees to maneuver from purpose to purpose thus on speak or save data leading to loads of it slow wastages. This instance has been predominant at the clinics at intervals the agricultural areas as internet service does not perform at the clinics at intervals the agricultural areas because of no property (Ouma et al., 2009).

Inaccessibility - what's additional many of the employees members at intervals the clinics at the agricultural areas haven't got access to the info and communication technologies in place significantly accessibility to the online property additional as accessibility to the few out there computers. Typically this can be} often because of the insufficiency at intervals the number of the facilities in place at intervals the agricultural areas to be utilised by the health care professionals and so the people at intervals the community (Ouma et al., 2009).

Lack of skills – Majority of the employees members at intervals the agricultural areas do not appear to be trained or well equipped with elementary laptop computer operations skills. Consequently they will well not be able to hold on the utilization of data and communication technology. Except these challenges unit taking into thought, the clinics will keep to not implement eHealth solutions because of the challenges of inconvenience, unavailability, unreliable and above all unsustainable because of lack of skills among employees and so the people living at intervals the agricultural areas as is that the case presently. This entails the way to require care of those challenges that area unit a barrier to the implementations of eHealth among the developing countries. (Ouma et al., 2009).It is imperative that eHealth solutions unit purposeful over a quantity of it slow to agree for a sleek incorporation and transition bearing in mind the particular indisputable fact that not all the challenges are resolved promptly by the developing countries but be dead bit by bit. By endeavor these, the governments at intervals the developing countries area unit capable to line up and smoothly live the results as a result of the implementation technique take at intervals the many phases. The planned phase's unit as created public below:

Phase one - In addition referred to as the initial stage wants wholly totally different stakeholders in eHealth solutions to work on at intervals the direction of the implementation of eHealth. at intervals the course of this half the govt. and hospital administrators got to be at intervals the strategy of procuring varied data and communication technologies instrumentality needed at intervals the hospitals and clinics at intervals the agricultural areas. This might embrace computers, its accessories and networking instrumentality in addition to purchasing the info and communication technology instrumentality, package development got to begin at this stage (Ouma et al., 2009). the govt. will work with several researchers to develop prototypes of open provide package for usage at intervals the dispensaries, health centers, clinics, sub-district hospitals, the district hospitals, provincial hospitals and so the national hospitals at large. typically|this can be} often a less costly selection likened to purchasing of on the shelf package that necessitates licensing for a selected vary of machines so limiting its use at intervals the agricultural clinics. Besides, the assorted employee's members at intervals the clinics just like the doctors and nurses got to be trained throughout these initiate order to assist eHealth implementations (Ouma et al., 2009).

Phase two- Named because the preparation stage needs native space Networks and Wide space Networks that ought to be mounted at this stage to expedite the communication among the assorted clinics within the rural areas and therefore the few central hospitals within the country. The assorted software package templates developed in part one for the health info systems ought to be bespoke to be used at the various hospitals and clinics. Additionally, policies governing the usage of eHealth solutions ought to be created and probably there

ought to be cross-sector linkages among varied government ministries to help within the implementation of eHealth systems (Ouma et al., 2009).

Phase three - Implementation stage needs the hospitals and clinics ought to have info and communication technology structures in situ like the usage of health info systems, telemedicine and therefore the net which will then be enforced in every hospital or clinics to extend the standard of services delivered to the patients (Ouma et al., 2009).

Phase four – the analysis stage needs the usage of varied eHealth solutions that area unit in situ got to bereviewed at this stage so as to outline the manner forward for the hospitals and clinics within the rural areas. In agreement to the findings, modifications ought to be created wherever potential and conjointly the way forward ought to even be projected once investigation of the findings (Ouma et al., 2009) it's tough for governments in developing countries or nations to work out their investment priorities (Omotosho et al., 2006). However, there are a unit associate degree quantity of pilot comes that have shown improvement within the eHealth implementation in some developing countries, like a fifty p.c reduction in mortality and 25-50 p.c will increase in productivity. A number of these pilot comes have finish up whiles others area unit still being enforced as a result that the majority of the pilot comes are donor initiated (Afarikumah, 2014). eHealth comes provide monumental opportunities that ought to be shared with the neediest persons living within the setting areas. (Afarikumah, 2014)

V. Conclusion and recommendation

The principal purpose of the eHealth is to deliver a documented record of care that assists gift and future care by clinicians and different supporting agencies within the clinical atmosphere. This documentation offers a way of communication between clinicians tributary to the patient's care the most beneficiaries square measure the patient United Nations agency visits the clinics or hospitals and therefore the clinicians (ISO/TC 215 Technical Report, 2003). Demands for affordable and quality tending square measure off from been achieved in developing countries, specifically within the face of inadequate resources for each human and money. Facilities square measure typically inadequate in variety and inadequately trained to perform these duties (Afarikumah, 2014) Implementing eHealth system might support to deal with these gaps of meagerly access and poor tending quality presently delivered. this might aid to form a national repository of health knowledge, which is able to so create the distribution of telemedicine applications stress-free within the future way to achieve communities particularly might have right of entry to specialist's services with Associate in Nursing economical telemedicine submission in situ (Ouma et al., 2009). Implementing a brand new technology like eHealth, significantly in advanced work settings like within the health sector need of a cautious thought out set up and strategy, not solely to ensure a positive implementation however equally to strike a balance regarding conflicting necessary goals. necessary goals like tending quality, patient safety and privacy, the organization's business plans and goals, method potency and therefore the eHealth usability all got to be adjusted (Ouma et al., 2009). eHealth implementation shouldn't be a normal automation of current workflows, however moderately it ought to be intermeshed to the event of recent and well-organized workflows. eHealth implementation challenges might arise as a results of technology led; wherever the existence of a tangle needs the advancement of a technological resolution, whereas {the existing|theprevailing|the gift} technology is employed to help and improve present workflows. The existence of knowledge assortment and management challenges and clinics in communities can necessitate the employment of eHealth technology to unravel these challenges (Ouma et al., 2009).

VI. Limitations

Although this thesis captures necessary quantity of problems facing eHealth implementation within the rural settings, it doesn't report on cultural dimension of the folks of Literature review that has the potential to impact the implementation of the eHealth care technology. This leaves a vacuum in my analysis work which might be complete in future studies and conjointly investigation the opinions of different stakeholders like tending vendors - that's not captured during this thesis study (Rudolph et al., 2014)

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