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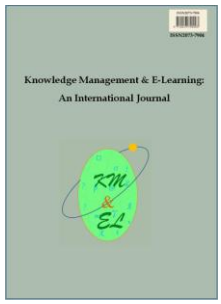

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Contextual factors and challenges to e-health literacy

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Abstract: We live in a digital world or digital era. Hence, People will argue that not only do information communication technologies (ICTs) make e-health possible but rather that it is an innovation advance whose time has come. Notwithstanding, e-health while hoping to create well needed improvement in health care, it is rife with certain challenges which are not limited to e-health literacy. However, this paper looks specifically at e-health literacy. The paper, in particular overviews e-health while addressing the impacts of key contextual factors that impacts e-health and e-health literacy regarding the propensity to adopt and use e-health in LEDCs.

Keywords: e-Health; e-Health literacy; Contextual factors; e-Health challenges; ICTs; e-Health adoption; Contextual variables; Informatics

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1. Introduction

The use of information and communication technologies (ICT) to support and facilitate health and healthcare information and delivery is often referred to as e-health. e-Health or electronic health can occur via varieties of platforms such as the web, mobile devices, and other computing platforms. In essence, the major driver of e-health involves the significant advances in information communication technologies which allow for information collection, dissemination, and general use or application by healthcare providers, patients, and or consumers. Despite the technology advances and enthusiasm about what e-health can offer to improve quality of healthcare at large, e-health literacy – which in general involves ability to use ICTs and comprehend information provided

through them appears to present a major challenge and or obstacle to e-health effectiveness or success. By e-health literacy, the author underscores the degree or level at which users or consumers are capable of accessing or understanding e-health information and systems application. As reinforced in the call for this special issue, there exists a vast range of e-health technologies. Thus, the degree which they meet information and understanding needs of end users is suspect. Hence, nowhere on the topic of e-health literacy is more germane for exploration than willingness to use and adopt the technologies. Furthermore other factors or users' contextual and demographical variables such as age, infrastructure and technical competence would impact the motivation to use e-health systems. Similarly, while these factors are of considerable concerns in the economically developed countries (EDCs), they may be of more concern in less economically developed countries (LEDCs) Thus, as one ponders e-health and e-health literacy issues in LEDCs, one must address the challenges/variables as they impact knowledge management.

Furthermore, e-health presents a race to digitize health information in an easily accessible digitized format or platform (e.g., Online). Therefore, this paper explores ICTs use in e-health. Specifically, the paper overviews e-health while addressing the impacts of key contextual factors that impacts e-health and e-health literacy in LEDCs.

2. Overview of e-health

As alluded to above, e-health allows for storage and exchange of health information among consumers, providers, government and other entities (Domínguez-Mayo et al., 2015). ICTs have been proposed as an important way of overcoming some of the challenges in community-based primary healthcare delivery. For instance, e-health applications provide health records, diagnostics and imaging for clinician to help in their decision making process (Cohen, Coleman, & Abrahams, 2015). At the same time, e-health portals provide patients or consumers direct access to their medical records. There are other functionality to e-health including patient tracking, appointment scheduling, and inventory and facility management to support healthcare (Cohen, Coleman, & Abrahams, 2015). It is no surprise that in the U. S. A., the race to comply with government mandated e-health policy is at a feverish pace because healthcare providers are likely to miss-out on incentives for compliance and in certain scenarios they would be penalized for noncompliance. Thus, the mandate to reshape healthcare infrastructure crystallized a commitment by the United States to make patients' medical records universally available through ICTs which is also fueling the growth of e-health and its usefulness (Barton, 2012; US Department of Health and Human Services, 2004).This idea is not restricted to U. S. A., as other governments around the globe are also pushing to join the race in e-health. e-Health is also seen as way to address the needs of the underserved, or to reach individuals in rural areas where access to established medical centers may not be possible. Some see e-health as a way to bridge the disparities in the quality of healthcare services for different population groups (Obasola, Mabawonku, & Lagunju, 2015; Wald, Dube, & Anthony, 2007).

Similarly, some e-health platforms such as web available information (e.g., medical forums, WebMD) offer advantages that include assisting patients in making informed health care choices. It also offers healthcare providers the opportunity to collaborate with other providers (Scholl & Olaniran, 2014) and or patients in a team environment either by supplementing physician provided information or engaging in an online support groups along with providers who have access to patient medical records

(Domínguez-Mayo et al., 2015; Wald, Dube, & Anthony, 2007). e-Health also promise safe storage of information along with accuracy of information that safeguards against error while promising increase efficiency and effectiveness of healthcare (Domínguez-Mayo et al., 2015).

In spite of the proposed and proclaimed benefits of e-health, empirical evidence validating such benefits in LEDCs is scarce. One of the reasons for such challenges and disparity between EDCs and LEDCs revolve around the fact that e-health is compounded by certain factors that may impact the extent which e-health promises are attained. Specifically, literacy and in particular *technical or e-health literacy* represents a major determinant of whether an individual adopt or use e-health. Cohen, Coleman, and Abrahams (2015) echoed this sentiment in suggesting that "even when e-health technologies are successfully installed, the use of these technologies is often beset by challenges [contextual] that if not understood and overcome can limit the potential of these technologies" (p. 2). Some of the contextual factors impacting e-health includes but are not limited to the following: interoperability, access, technological competence, language, ICT infrastructure and other demographical variables such as age and gender.

Domínguez-Mayo et al. (2015) discuss the *interoperability* challenge-which refers to ability of two or more different platforms to exchange information or communicate (Shiferaw & Zolfo, 2012). Similarly, majority of the websites or portals aiding e-health in spite of being designed for easy navigation still require certain level of literacy (i.e., for individuals with above an 8th grade education reading level) and language proficiency which may further creates divide in access, information processing, and overall competency of the e-health system in what is now known as digital illiteracy (Obasola, Mabawonku, & Lagunju, 2015; Shiferaw & Zolfo, 2012; Viswanath & Kreuter, 2007). Given that this is an area that is not always taken into consideration in e-health, it is important to look at the impact of e-health literacy on e-health because it is designed to cater to people regardless of different cultural and socio-economic backgrounds (Olaniran & Zhang, 2016). However, no technological innovation is without contextual and cultural implication and in particular e-health. Thus, the next section will look at the nature of e-health literacy along with other factors impacting e-health.

3. e-Health literacy

In LEDCs, majority of the people are living in the rural areas with limited access to quality care. In fact, village doctors with limited training, community health workers, unqualified allopathic providers and drug store sales people fill the void in providing medical treatment. Contributing to the problem is lack of education, increased healthcare cost, and at times patients' preference for traditional or alternative doctors (Mridha, Erlandsson, Islam, & Srinivas, 2015; Olaniran & Zhang, 2016). Mridha, Erlandsson, Islam, and Srinivas (2015) suggested that only small number of rural population that are well to do go to the cities for medical care. Even in the cities, private hospitals and clinics that offer quality or better services are generally too expensive for average individuals (Mridha, Erlandsson, Islam, & Srinivas, 2015; Olaniran & Zhang, 2016). Whereas, government hospitals that are more affordable are often in a state of disrepair and offer very poor services to patients. While, application of ICTs in healthcare is touted as a way to develop a cost effective solutions for providing quality healthcare in rural and LEDCs, the penetration and adoption of such technologies are questionable (Chandrasekhar, & Ghosh, 2001; Mridha, Erlandsson, Islam, & Srinivas, 2015) either due to Internet access cost, or lack of willingness to use technologies. For instance, the rapid penetration of mobile phone supposed to bring individuals into the digital age, but there is still greater

disparity around the globe as to how many of this mobile devises are able to access internet and what they are being used for. Furthermore, most of the medical equipment are imported but often do not function effectively due to poor quality of service and maintenance (Mridha, Erlandsson, Islam, & Srinivas, 2015). At times there is no local IT support individual to repair the equipment or provide routine maintenance necessary for medical equipment.

According to Blignaut, McDonald, and Tolmie (2001) health workers in developing country contexts may have low levels of computer usage experience (i.e., technological competence). They found in developing countries that at least 400 consultations with an e-health system are needed in order to get healthcare providers to the level needed to be able to enter patients' basic record. Thus, they concluded that it takes about 3-4 months of experience for service provider to learn and use e-health system at the level where they would not jeopardize patients' interest (Blignaut, McDonald, & Tolmie, 2001; Cohen, Coleman, & Abrahams, 2015). It is even more important to stress the fact that if it takes this much time for service provider who are educated to learn or gain basic competency of the e-health system, it stands to reason that it will take much longer time for patients who may not have the same level of education or are illiterate. Furthermore, the longer the learning time required to master an e-health system, the lees satisfied individuals are likely to be and consequently, resist the usage. For example, findings indicate a lower level of satisfaction among physicians mandated to use electronic medical records (Holanda, e Sá, Vieira, & Catrib, 2012). Therefore, a number of months of usage experience may be needed in developing countries before routine use of e-health system can happen.

4. The role of language e-health literacy

The language with which electronic medical record is kept creates another area of concern for e-health usage. Although, English has been dubbed as the language of the internet and internet commerce (Kayman, 2004), it needs to be said that English is not always the language in which medical information or records is offered to patients and this poses a challenge for patients who may be non-English speakers from different standpoints. For one, the inability of indigenous people to comprehend and use e-health technologies may be attributable, in some ways to the language barrier (Olaniran, 2007; Olaniran & Edgell, 2008). Similarly, the inability to understand information in one's own language may be restrictive and directly limits adoption and usage of a particular technology (Olaniran & Edgell, 2008). Consequently, language hindrances would exacerbate e-health literacy and prevent the realization of socio and economic benefits from ICTs and more so in less economically developed countries (LEDCs) (Kazakan & Dada, 2008; Olaniran, 2008; Omojola, 2009). Although some may argue that e-health information can be easily translated to local language, however, the reality is that technologies don't always provide idiosyncratic contextual meanings. Similarly, such translation tools require certain level of technical skills to be able to use them and such skills are not always present in LEDCs where a significant number of people are without the basic level education let alone computing or technological literacy.

Furthermore, the problem with English as a primary language of communication on the internet or other e-health platforms challenges individual identity (Olaniran, Rodriguez, Olaniran, & Olaniran, 2013). There are countries that believe English is part of their colonial heritage and are trying to move away from it (Kayman, 2004). Furthermore, some view an increase in the use of English within communication

technology creates a divide that widens the gap between the "haves" and the "have-nots" (Crystal, 2003; Kayman, 2004). Kayman (2004) went on to argue that the association of English with communication technology [such as e-health] reinforces its claim as the primary medium of globalization branded as the language of interaction. Universally, the reliance on the English language as the vehicle of global communication creates difficulty—especially among those individuals with little competence in the English language; consequently, restricting their usage of, e-health.

For instance, African countries, in particular, have diverse indigenous languages but its people are presented with colonial legacy of acculturation where they are forced to communicate in a second language (i.e., English or French depending) as a result, their primary language is subjugated to second class and in some cases no class at all (Mbagwu & Obiamalu, 2009; Omojola, 2009). Specifically, Nigeria has over 360 languages and dialects, yet individuals are compelled to communicate in English or some version of English which categorizes English speakers to the elite group while non-fluent speakers are simply categorized as illiterates. As a result, the fluent English speakers are categorized as the elite group and may be more advantaged in accessing and understanding e-health information than the non-English speakers.

Linguistically, it appears there is some level or evidence of cultural assimilation with ICTs that may further hinder e-health literacy especially when one considers the fact that fewer people speaks English when compared with other languages. A case in point is Mandarin which is spoken by more than one third of the world population (Mbagwu & Obiamalu, 2009). Therefore ICT designers responsible for EMRs are operating on the linear assumptions about user biases and differences with regard to technology adoption. According to Olaniran (2012) the underlying linear assumption about technologies such as e-health centers on the notions of "one size fits all" or "if we build it they will come." However, this assumption often overshadows the benefits to be derived from ICTs and specifically e-health platforms (Omojola, 2009). It is said that the bias towards language selection for ICTs is more pronounced when one looks at the proportion of people speaking a particular language. For instance, It has been shown that *Microsoft office*, which is offered in over 27 languages, was offered in Italian, which is spoken by 60 million people located in Italy, Switzerland, and Croatia; on the other hand, other languages that come close to, or exceeded, this figure are not given the same treatment (Omojola, 2009). A case in point is Hausa spoken by over 70 million, Swahili, by 100 million, Yoruba by another 40 million are not given the same level of priority when compared to English or French (Loubser, 2010; Omojola, 2009; Olaniran, 2012). Also, keyboard design and letters on computers make it difficult to write some words in local languages thereby rendering some languages as irrelevant or extinct. This is not unique to Nigeria or Africa but rather around the globe. A case in point is Dyirbal in Australia (Dixon, 1991; Omojola, 2009). Consequently, access to technology is directly determined by individuals' knowledge of the foreign language that in most cases people do not understand; thus, e-health literacy may further suffer.

From a cultural standpoint, language is critical to identity and it needs to be reiterated that the pitting of a language against another creates a hegemonic divide between the majority and minority groups. For instance, Nigeria has three major languages—Hausa, Yoruba, and Igbo. Whereas the three languages are spoken by about 100 million people, the rest of the population (about 50 million) from over 200 ethnic groups speak languages that are not recognized as part of the dominant groups (Omojola, 2009). Thus, from a power relation standpoint, the recognition of one language over another further marginalizes the minority groups while putting their respective languages on the verge of extinction. From e-health literacy standpoint, it would seem that e-heath

though intended to remove the digital divide; it might actually be widening the divide. At the same time, it needs to be stressed that the challenge of the digital divide is not only about accessibility, or differential use of ICTs among people, rather, a social division between those who are very involved with technologies and those who are not or unable to (Omojola, 2009). e-Health information through ICTs becomes enablers of globalization because they are fostering universal ideologies (Olaniran, 2007; Omojola, 2009). Hence, individuals especially in the LEDCs have seen globalization as an agenda purported to spread Western values across the world (Omojola, 2009; Yau, 2004). Consequently, indigenous cultures are considered insignificant as ICTs which power-health systems are manifested in digital world of Internet and World Wide Web relegate some of these cultures into irrelevance and non-consequential (Omojola, 2009; Salawu, 2006).

5. Other factors

There are other variables or factors contributing or impacting e-health literacy and consequently whether one can adopt or use e-health resources adequately. Some of these factors include but are not limited to Infrastructure, age, and gender.

5.1. Internet/Infrastructure

Most e-health applications require the need to be on some form of internet networks. However, there are still some disparities in access and usage around the world. The disparity can be attributable in part to issue of affordability. On the other hand, even when people can afford mobile phones, poor signals restrict when and how they can use the device; more importantly, only a fraction of people with mobile phones have smart phones (Henriquez-Camacho, Losa, Miranda, & Cheyne, 2014; Kamis et al., 2015; Olaniran & Zhang, 2016). Furthermore, statistics suggest that less than a third (i.e., 27.5%) of people in Africa have access to or use the internet. The figure in Asia is not much better either as approximately 1/3 (34.8) of the people have internet accesses. For example, in Bangladesh, office of Telecommunications reported a minuscule 4.5% of its population as having access to the internet (BTRC, 2014; Hoque, Mazmum, Ahsan, & Bao, 2014). Put in another way, regions with more than two third of the world population have less than a quarter (23.7%) of its people as internet users (Internetworldstats, 2014). In essence, there is a digital divide which would also impact the issue of e-health literacy and consequently, the adoption and eventual use of e-health technologies. Aside from disparity in internet access, there are other infrastructures that can hinder or promote e-health use. Mobile telephony or computer use needs to be powered by electricity a factor that is often taken for granted. However most developing nations suffer from frequent power outage or what has been termed as *epileptic power* that could further hinder access to e-health information (Matar & Alnabhan, 2014; Abel & Obeten, 2015; Obasola, Mabawonku, & Lagunju, 2015). Mridha, Erlandsson, Islam, and Srinivas (2015) found in both Bangladesh and India that unreliability of electricity supply, weak internet backbone, high internet access cost, financial constraints prevent the purchase of and use of ICT equipment, while the lack of adequate ICT affect the number of computer-literate employees that can put in place quality e-health initiatives. Specifically, it has been suggested that a slow or non-functional EMR or one that is constantly out of service would hinder or *erode* trust in e-health system which might also impact the level of literacy of the e-health. (Holanda, e Sá, Vieira, & Catrib, 2012).

5.2. Age

Age has been shown to have direct impact on technology and other innovation adoption and usage. As a result, it seems that e-health literacy may be impacted by age as well. Most technological innovations including e-health are believed to be targeted by designers at the youths or millennials, and males in the middle and upper class of western nations (Röcker, Ziefle, & Holzinger, 2014; Rogers, 2009; Ziefle & Jakobs, 2010). Thus, older adults who traditionally are less technically competent in the use of ICTs may be disadvantaged with e-health possibilities in terms of its adoption and use. The disadvantage is believed to not be limited to *cognitive and sensory* capacity but also in terms of the technology acceptance (Heart & Kalderon, 2011; Henriquez-Camacho, Losa, Miranda, & Cheyne, 2014; Kifle, Payton, Mbarika, & Meso, 2010; Olaniran & Zhang, 2016; Röcker, Ziefle, & Holzinger, 2014). Sukums et al. (2014) found in a study among Tanzanians and Ghanaians where the mean age is about 38 years old that 80% of the participants were computer illiterate or beginners. More importantly, they found that *education level, age, and years of work experience* were directly related to ICT literacy (See also Kamis et al., 2015). Hence, the impact on e-health literacy is telling in the sense that older adults are less likely to have e-health literacy given the low level of computer knowledge. Consequently, it stands to reason that if elderlies are the ones who are less technically inclined, it is doubtful that they will hold a positive attitude towards any ICTs and in particular e-health; as a result, their e-health literacy may be non-existent or very low at best. For example, age was negatively correlated with computer literacy along with years of experience – where individuals with five or less years of professional experience (i.e., youths) were found to report basic computer literacy or knowledge than those with 10 or more years (Sukums et al., 2014).

Furthermore, older administrative staff in hospital sectors has been found to show increase resistant to change in general. Thus, older health care providers are reluctant to deploy e-health due to resistance to change (Hoque, Mazmum, Ahsan, & Bao, 2014). At the same time, patients or health information consumers tend to show preference and trust for more face to face encounters with health care providers than they do with e-health. The resistance to change or reluctance to new technology would only hinder e-health and e-health literacy.

5.3. Gender

Gender also seems to be another factor contributing to e-health literacy. Consequently, gender is important in understanding acceptance of pervasive medical technologies (i.e., e-health) (Kamis et al., 2015; Röcker, Ziefle, & Holzinger, 2014). Studies indicated that women reported lower levels of technology *self-efficacy* and anxiety when compare to males, which could negatively bias e-health acceptance and other pervasive medical technologies (Röcker, Ziefle, & Holzinger, 2014; Wilkowska, Gaul, & Ziefle, 2010). Also, as alluded to above, ICTs are traditionally targeted at young males which put women at a disadvantage. The disparity between male and females in terms of ICTs is further exacerbated when EDCs are compared with LEDCs. For instance, it is not uncommon to see some families in LEDCs focus on having their male children educated while females are not provided the same opportunity. Furthermore, women are reported to have significantly lower scores than their male counterparts in terms of positive attitudes toward ICTs (Sukums et al., 2014). Therefore, if women do not enjoy the same treatment as men and are often refused education that could expose them to ICT or computer literacy, their e-health literacy would also suffer.

As presented above, contextual variables such as interoperability, access, technological competence, language, ICT infrastructure and other demographical variables such as age and gender ostensibly impact the propensity to use e-health and consequently e-health literacy. For instance, it is impossible to have adequate e-health literacy when one does not have access to ICTs that makes e-health possible. Likewise, having access may not suffice, when information available through the medium cannot be comprehended (i.e., language comprehension). Furthermore, e-health systems that are perceived to be out of reach for certain demographics (e.g., age, gender) are less likely to be perceived as offering any benefits to the excluded group and consequently the degree of literacy associated with such technologies. The next section provide in detail implications as well as recommendation for addressing each of these issues.

6. Implications and recommendations

The issue of e-health literacy goes beyond mere ability to use the technologies or understand health information available from them. There are other factors that are responsible or impact e-health literacy. Therefore, as the push for increased use of e-health continues, there is a need to consider how to bridge the global digital divide locally and especially in LEDCs. One of the most pressing needs is figuring out how to make e-health information accessible, affordable, and understandable to users and in particular, in LEDCs. A significant number of people around the globe lives in rural communities and towns with no electricity and phones, it becomes increasingly difficult to take advantage of communication technologies and what they offer in terms of e-health. To this end, accessibility and affordability poses challenge for e-health implementation and eventual adoption especially when a choice must be made between meeting basic economic necessities versus information needs (Kazakan & Dada, 2008; Olaniran, 2008; Omojola, 2009). Furthermore, health care givers such as hospitals, clinics, or other government representatives, would need to change by learning how to use e-health and then determine the best way to use locally available ICTs to provide e-health to patrons and individuals in rural areas. One way to help alleviate the problem is to provide health care workers computer knowledge especially given the fact that it has been shown that there is a positive relationship between computer knowledge and computer system usage (Sukums et al., 2014). The introduction or education of people and especially those in the rural areas about ICTs may need to precede any national roll out of e-health initiatives in order to encourage acceptance of e-health.

At the same time, governments in LEDCs would have to realize that the ability to provide adequate e-health services and subsequently accomplish e-health literacy goals in their countries is dependent on their commitment to improve infrastructure such as functional electricity, communication cell towers and computer training to citizens. After all, research suggests that people with lower education levels and other indicators of vulnerability (i.e., Bolivia & Peru) were less likely than their counterparts to participate in mobile health including health related text messaging services (Kamis et al., 2015). Similarly, it has been suggested that training for doctors, nurses, and patients are important to familiarizing people with e-health and in helping to reduce their anxieties about the system (Hoque, Mazmum, Ahsan, & Bao, 2014). More importantly, e-health training programs ought to be a need-based approach such that the system should be customized to meet the needs and demands of the patients. Hoque, Mazmum, Ahsan, and Bao (2014) suggest the need to involve all pertinent stakeholders in e-health project to be successful. Along this area is the need for government to embrace different types of forum such as seminar, symposium, including short films and public announcements in

local traditional media for implementing e-health within a country. When governments mobilizes and deploy these media tools, it would help motivate individuals to use e-health and subsequently increase or improve the level of e-health literacy accordingly.

Quite important however is the need to adapt any design and development of e-health to the local needs. For instance, local individuals understand the people including: health care providers and consumers and as such they are able to decide how best to overcome issues relating to language, education, and other cultural factors that may create resistance to e-health use. Simply adopting or transferring e-health protocols that works in other countries will not work (Olaniran, 2008; Olaniran & Zhang, 2016). Perhaps one method of facilitating e-health development and growth in a rural region is to allow doctors and clinics that already embraced it in urban area to incorporate it in their practices in rural areas of the country (Hoque, Mazmum, Ahsan, & Bao, 2014). That way, they are more able to see what is working and what is not and quickly fix any problem.

Perhaps, the first step in any e-health system and subsequent deployment is to start with transferring patients' records from written notes to the EMRs (Angst & Agarwal, 2009; Hoque, Mazmum, Ahsan, & Bao, 2014; Jha et al., 2009; Khalifa, 2013). What this does, is to allow doctors and patients to realize how such a database can help them in exchanging information or communicating information among other health care providers. At the same time, patients' access to their record may save them from the challenges of having to make an extra trip to care givers to obtain their health information especially when they have to go to another care centers or provider. This approach would allow users to see the benefits of e-health especially regarding how it empowers them to become active participant in their health care and decision making process (Anshari, Almunawar, Low, & Al-Mudimigh, 2013; Neuhauser & Kreps, 2003) to the extent that they are motivated to want to continue to use e-health for other services. Hence, such motivation may pay a big dividend for eventual adoption and more importantly, improving the overall level of e-health literacy in the country.

From a different standpoint, security and privacy issues must be critical for e-health to gain grounds or adopted on a national scale. There must be national standards regarding privacy and security in order for patients to gravitate towards e-health. Patients need to be sure that their information is secure and that any disclosure of information about their health would only be done in the strictest of confidence and with their permission. In an attempt to make security a top priority in e-health, it has been suggested that firewall, anti-hacking devices and other protective initiatives such as: fire protection, humidity control, back-up power, and patients' alert systems must be in place (Hoque, Mazmum, Ahsan, & Bao, 2014; Li, 2012; Xu et al., 2011). Some examples of organizations and initiatives at the fore-front of security issues in e-health and mHealth in LEDCs includes: *Mobile Health Alliance Initiative* which defends the use of health related mobile technologies around the globe and *Peekvision* which uses mobile devices to help in patients' diagnoses in rural areas (Henriquez-Camacho, Losa, Miranda, & Cheyne, 2014). Other related security applications involve medication authentication and matching medication to the right patients and dosage.

Without adequate security and privacy safeguards people will not trust e-health and the may resist to adopt the system and subsequently e-health literacy is bound to suffer. Also, it is important that implementation and deployment of e-health in any country needs to be a gradual process (Matar & Alnabhan, 2014). Too much information at once or a one-time approach is bound to fail due to information overload and resistance to change.

Indeed, e-health may be beneficial in improving health care however, for the benefits to become realities other factors such as the one discussed in this paper needs to be in place or attended to. Literacy in e-health is not a goal that can be accomplished overnight. Detail preparation and painstaking attention to factors underlying e-health literacy must first be addressed. Adequate infrastructure among other contextual variables, are critical to e-health adoption and success. Furthermore, contrary to the notion that e-health is cost saving, e-health deployment and becoming e-health literate requires significant financial commitment at least initially to put in place the necessary ICTs require to power e-health altogether.

7. Future research

Perhaps one area that future research can focus is the need to recognize that e-health makes its most contribution in allowing communication or health information to change from being passive to a more active and interaction driven (Anshari, Almunawar, Low, & Al-Mudimigh, 2013; Harris, 1995; Neuhauser & Kreps, 2003; Rice & Katz, 2001). Hence, a question worth exploring is that in light of challenges facing e-health in LEDCs how do providers and consumers overcome the challenges while balancing e-health use with cultural factors that are at the root of decision making?

8. Conclusion

This paper identifies challenges facing e-health and how they impact e-health literacy especially in LEDCs. Some contextual variables were explored in terms of how they affect adoption and potential use of e-health technologies. The paper also presents some implications and recommendations for implementing a comprehensive and successful e-health program. Finally, the paper identifies areas for future direction in e-health.

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