2019

Perspectives of Patients with Comorbidity on the Use of eHealth Technology for Self-Management at Kenyatta National Hospital

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2019

Abstract

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BScN, Moi University, 2002

Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy
in Public Health

Walden University

May 2019

Abstract

Health care systems still focus on single disease management and ignore the complexities of multiple conditions management. Though self-management is the focus of chronic disease management, patients with comorbidities face challenges in meeting their self-management goals. The purpose of this study was to explore the perspectives of patients with comorbid conditions on the use of eHealth technology to promote self-management. The research was grounded on the technology acceptance model. I sought to explore the participants' understanding of self-management, the challenges to self-management and their perspectives on the use of eHealth for self-management. In this phenomenological study, 10 interviews were conducted from a purposeful sample of those with two or more comorbid conditions. The collected data were audio recorded and transcribed verbatim. Prolonged engagement, member checks, and triangulation were used to ensure trustworthiness. Self-reports and observation augmented the interviews. Data collection continued until saturation was reached, then analyzed iteratively and organized according to themes. The results showed that the participants managed their conditions at home by taking prescribed drugs, attending clinics, and following a special diet. However, they faced financial constraints, struggled with symptom control, and took too many drugs. The results also showed that technology could be used for people living with comorbidity as a source of information, to remind patients to take drugs or attend clinics, to increase awareness of symptoms, and to assist in the management of disease. This study is expected to help in understanding (a) the challenges faced by patients with comorbidities, and (b) how the use of technology promotes self-management in this growing group.

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Walden University

January 2019

Acknowledgments

I am grateful to Dr. Egondu for guiding me throughout the process. I am also thankful to Dr. Connors for her continuous guidance in the dissertation process. I also acknowledge the roles played by Dr. Tammy Root as the research coordinator and Dr. Dr. Nancy Rea the program director. I am also grateful to my family for their support and patience.

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Chapter 1: Introduction to the Study

Introduction

Disease trends have seen a change in pattern and incidence. Among these are diseases that co-occur as a combination of a chronic disease and an infectious condition, but more frequently as two or more chronic conditions (Valderas, Starfield, Sibbald, Salisbury, & Roland, 2009). This state, *comorbidity*, means the presence of more than one condition in the same person simultaneously (Feinstein, 1970). Comorbidity presents challenges in management because interacting diseases affect the time of detection, the choice of treatment, and the outcome of care (Ahmed et al., 2008). Thus, the patient must go to multiple appointments, manage multiple drug regimens, and understand the various disease processes (Bayliss, Steiner, Fernald, Crane, & Main, 2003). As patients struggle with managing these conditions, psychological distress is common (Anderson, Malone, & Francis, 2016). Given all these challenges, their unique needs are rarely addressed.

The single disease concept, which is more prevalent in primary care settings, differs from the model of comorbidity (Luijks, Lagro-Janssen, Antoine & Van, 2016), and the guidelines may not be applicable in the management of patients with multiple conditions (Young, Boyle, Brooker, & Mutch, 2015). There is, therefore, a need for improvement in management practices in these settings to address comorbidity. Evidence has shown that novel and innovative ways that promote self-management among patients with comorbidity can ease the burden somewhat for these patients (Hester, Newton, Rapley, & De Soyza, 2018; Depp, Moore, Perivoliotis, & Granholm, 2016); Zullig et al., 2015); Lorig, Sobel, Ritter, Laurent, & Hobbs, (2001). The central goal in managing these conditions is to understand the different diseases processes, to manage drug interactions, and to manage the information from different health care providers (Liddy, Blazkho, & Mill, 2014). Self-management emphasizes patient–provider collaboration and promotion of self-efficacy, which are crucial to successful management of chronic conditions (Grady & Gough, (2014); Bayliss et al., 2003). However, the patient must have the competence to make informed decisions and to know when to ask for help from a health care provider.

Over the past decade, eHealth has been used for patient support (World Health Organization [WHO], 2011). It encompasses the use of technology to deliver information through the internet, mobile phones, and other gadgets (Hamine, Gerth-Guyette, Faulx, Green, & Ginsburg, 2015). In the developing countries, this may mean the use of any form of technology including the television and radio. In addition, eHealth has been used as an educational tool in varied settings (Lobb, & McDonnell, 2009). It enables the distribution of information in a format that addresses the needs of individual patients (Zulman et al., 2015). However, its use among patients with comorbid conditions is poorly understood (Young, Boyle, Brooker, & Mutch, 2015). In addition, research on patients' perspectives on managing multiple chronic conditions using technology is limited (Bayliss, 2014). Since comorbidity is a personal rather than a disease characteristic, its successful management depends on understanding of the patient's health needs and preferences related to technology (Snowdon, Alessi, Bassi, DeForge, & Schnarr, 2015). The best way to leverage emerging technologies to promote self-management in comorbidities is still not clear.

By understanding the prospective users of technology and appreciating their self-management requirements, eHealth tools to address these needs can be developed. Thus, this chapter will offer background on the use of eHealth in promoting self-management for patients with comorbid conditions. The research questions that guided the study were derived from the literature review, and consequently a statement of the research purpose. The theory on which the study was based is described and shown in a schematic diagram. The significance, limitations, and delimitations of the study conclude this chapter.

Background of the Study

With the increased prevalence of chronic conditions, individuals with comorbidities are more common (Valderas et al., 2009). Almirall and Fortin (2013) reviewed published studies from 1970 to 2012 on multiple health conditions and found that over 67, 557 articles used the term *comorbidity* and another 434 referred to *multimorbidity*. Though consensus on the terminology is still lacking, based on this study, the term comorbidity was used more often than multimorbidity and, as such, will be adopted in this study. Comorbidity occurs when the patient has two or more conditions at the same time (Valderas et al., 2009). Though these conditions occur simultaneously, they may be independent of each other or related. In some situations, one condition may cause another.

The self-management approach to disease management assumes the promotion of patient empowerment. However, enthusiasm about patient empowerment is perceived differently by different providers, based on the extent of patients' involvement. Holmström and Röing (2010) noted that while some providers perceived empowerment as encouraging compliance and adherence, other providers felt that discussing possible treatment options was more appropriate. While the provider often drives patient empowerment efforts, in some situations patients opt for self-management as a self-preservation strategy to address a gap in the provision of health care (Kober & Van Damme, 2006). Despite this, there is consensus that patient empowerment is a process that involves transferring power for decision making from the provider to the patient. Thus, self-management encompasses collaborative goal setting, which enables the patient to carry out activities of daily living and to manage emotional effects of the disease more effectively. Adams, Grenier, Corrigan, (2004) summarized self-management as “the tasks that individuals must undertake to live well with one or more chronic conditions.” Self-management fosters self-care and builds problem-solving skills (McCorkle, 2011).

The management needs of patients with comorbidity are complex as one condition may mask another and thus make it hard to recognize (Liddy et al., 2014). Apart from these interacting disease processes, drug interactions, and functional limitations limit organized quality care (Azais, Bowis, & Wismar, 2016). In addition, in many primary care settings, health care is fragmented and thus the patient is left with the burden of integrating the information (Zulman et al., 2015). It would therefore, be practical to make the patient a partner in their care.

However, some authors see this as shifting the responsibility to the patient, and argue that the patient would rather be cured than empowered (Small, Bower, Chew-Graham, Whalley, & Protheroe, 2013). Holmström and Röing (2010) reasoned that the responsibility for making treatment decisions can be burdensome for the patient with serious illness. This shifting of responsibility also assumes that the patient has the *ability* to make these treatment decisions rationally. As Will and Weiner (2015) maintained, the behavior of the patient in adopting self-management depends on the seriousness and burden of the illness. This is a concern for the patient with comorbidity who must manage several treatment regimens.

Still, self-management leads to patient satisfaction, and reduction in health care costs associated with travel, admission, and management of complications (Agha, Schapira, Laud, McNutt, & Roter, 2009). In addition, evidence shows that practice strategies that are conducive to patient self-management are associated with improved outcomes among patients with comorbidity (Brady et al., 2013; McGillion et al., 2014; Siantz & Aranda, 2014; Sidhu et al., 2014; Zwerink, Brusell-Keizer, & van der Valk, 2014). Therefore, promotion of self-management strategies remains core in managing chronic diseases and by extension comorbidities. Though these studies focus on clinical outcomes emanating from self-management strategies, they lay the foundation for an exploration of this phenomenon.

As previously alluded to, improving care for chronic illness requires a collaborative effort. Already, medical advances are providing an avenue for improved quality of life and prolonging life for patients with chronic diseases. However, these advances—for example, improvements in diagnosis—are associated with increasing patient costs (Lucas, 2015). This is particularly problematic for the patient with multiple health conditions. Despite these costs, the advancements that include the use of technology can be a solution to some health care problems. McDermott and While (2013) proposed that advances in information technology (IT) can be beneficial to patients by improving access to health care and reducing costs. Lindberg et al. (2013) added that use of technology reduces overreliance on health care professionals, promote empowerment (Griffiths et al., 2012), and ensures patient–-provider collaboration, which, in turn, eases access to care. To avoid bias of information, Schultz and Nakamoto (2013) added that the patient must be guided in choosing the information that is beneficial to her or his condition. The need for psychological support and medical information can be achieved via social support groups, and the content can be individualized and offered to the patient at low cost. Dedding, van Doom, Winkler, & Reis, (2011) added that technology, and in particular, internet sources, can supplement existing forms of care and strengthen patient participation in their care.

While self-management strategies promote behavior change, these strategies can be effective only if the patient is invested in the idea. In the face of challenges, self-management equips the patient with the skills to adapt to these challenges and to manage their conditions (Huber et al., 2011). The information technology solutions available focus on the policy and are initiated by the provider. Black et al. (2011) stated that it is not clear whether these applications are beneficial to the patient. As technology becomes integrated in the health care system, the assumption is that the patient with comorbidity becomes her own expert and knows what works best for her. To my knowledge, no qualitative studies explore the use of eHealth strategies to promote self-management among patients with multiple comorbid conditions. This study sought to address this gap in the literature.

Problem Statement

Noncommunicable chronic diseases account for over 27% of deaths suffered by Kenyans, aged 30 to 70 years, and over 50% of inpatient admissions (WHO, 2015). While chronic diseases occur as a single condition, most patients have more than one condition occurring concurrently. Even though anecdotal evidence alludes to an increasing trend, the prevalence of comorbidity in Kenya has yet to be determined. However, Mugure, Karama, Kyobutungi, and Karanja (2014) conducted a study among 206 patients with diabetes or hypertension and found that 33.4% had comorbidities. In an earlier study to assess the risk of cardiovascular events among diabetic patients, it was reported that dyslipidemia, hypertension, and obesity were more prevalent in this population (Otieno, Vaghela, Mwendwa, Kayima, & Ogola, 2006), in addition to being poorly controlled. According to Otieno et al. (2006), the prevalence of hypertension among the diabetic patients was 50%. Comorbid conditions pose a greater challenge to patients due to conflicting daily self-care routines, several treatment regimens, and multiple instructions from health care providers (Haverhals et al., 2013). This leads to poor adherence to medications and treatment plans, which leads to more hospital visits (Ahmed et al., 2008), poor clinical outcomes, and increased morbidity (Anderson, Malone, & Francis, 2016).

Further, the health care systems in low-income countries are ill equipped to handle these changing disease patterns (Samb et al., 2010). In these resource-restrained settings, it is, therefore, imperative to find solutions that promote person-centered care and self-management.

Self-management can ease the burden of care coordination, improve the quality of life (Lorig et al., 2001), and reduce health care costs associated with travel, consultation, admission, and management of complications (Agha et al., 2009). The self-management of comorbid chronic diseases tends to be fragmented and purely medically oriented (Marwa & Mtshali, 2015). As a result, the health care of these patients can be suboptimal, that is, not meet set standards for care (Lo et al., 2016). In Kenya, this is abetted by the current organization of the health care systems, where the caregiver convinces rather than engages the patient. Navikas, Petric, Feigl, and Seychell (2015) proposed a collaborative relationship, in which patients could use information and communication technology for health purposes.

The use of technology can ensure a collaborative, multisectoral, and cost-effective approach to curtail premature deaths from chronic diseases. It empowers the patient to get more involved in his care (McDermott & While, 2013), and exchange health information with each other, while relying less on health care professionals (Lindberg et al., 2013). Subsequently, patients are increasingly using eHealth technology as a primary source of information (Friedman, 2009), and are no longer passive recipients of information. The problem is that the value of existing applications from the patients' perspective is unclear, and the patients' input is often ignored (Zulman et al., 2015). Quantitative studies are insufficient to address the issue in this study because the focus is on subjective meaning, which cannot be elicited using quantitative methods. Further, the quantitative paradigm presumes that only one truth exists, independent of human perception (Rossman & Rallis, 2003).

Therefore, to achieve a true understanding of patients' experiences, a qualitative inquiry would be more appropriate. The purpose of this study was, therefore, to explore (a) the perspectives of patients with comorbid conditions on the health care navigation challenges they face, and (b) the use of technology to promote self-management. Overall, the study is expected to contribute to knowledge on how the patients can exploit eHealth technology for self-management. A new health care partnership could be fostered, where patients can be supported with eHealth technology to be more knowledgeable in the management of their conditions.

Purpose

The purpose of this study was to understand the perspectives of patients with multiple comorbid conditions on the use of eHealth to promote self-management. To address this gap, the approach was based on the interpretive philosophy (phenomenological approach). In-depth interviews were conducted to provide insights into the perspectives of patients on the use of eHealth to support self-management.

Research Questions

The following research question guided the study: What are the perspectives of patients with comorbidities on the use of eHealth for self-management? It was supported by three sub questions:

1. What do patients with comorbidity understand by the term 'self-management'?

2. What are the challenges of self-management faced by patients with comorbid conditions?
3. What are the perspectives of the patients with comorbid conditions on how technology can be used to promote self-management?

Theoretical Framework

I identified the technology acceptance model (TAM) as the basis for the dissertation. The model was first advanced by Davis (1986, 1989) to predict how consumers come to understand and use a technology. It was subsequently used to predict technology adoption behavior The model postulates that behavioral intention determines technology acceptance and subsequently technology use. The use is affected by attitude, which is further influenced by the user's perceived usefulness of the new information systems and the ease of use (Davis, 1989). The perceived usefulness and ease of use are influenced other factors, external to the patient but which mediate behavioral intention and therefore, actual system use.

Crucial to successful implementation of eHealth is the right attitude towards it by the intended users. Currently, there is no understanding of what patients know about eHealth and their attitude towards its use. Perceived usefulness, as described in this study, was based on the patients' experiences with informal eHealth strategies. This study was conducted to understand the experiences of patients with comorbid conditions on the use of technology to support self-management. Understanding these aspects may form a basis for implementation of eHealth applications that target this group.

The TAM has been shown to have high validity in predicting technology use (Alloghani, Hussain, Al-Jumeily, & Abuelma'atti, 2015; Davis, 1989; Holden & Karsh, 2010). TAM is mainly used in situations of voluntary use of an IT system, which is ideal in this case, since the participants had not participated in a formal strategy to get information on their health. TAM, however, ignores the features of the medical environment and the tasks performed by the health care provider. Still, it is appropriate for this study because it concentrates mainly on the particular attributes of the user and the technology, which has largely been overlooked in Kenya.

Nature of the Study

The phenomenological research focused on in-depth understanding of the research sphere of the participants (Ritchie & Lewis, 2003). It provided a holistic perspective within a specific context. The focus of the dissertation was to seek the viewpoints of patients with comorbidities about the use of eHealth for self-management. No data currently exists and this approach helped generate baseline data for this innovation from the users' perspective. To illustrate how their perspectives have an impact on the plan to adopt a technology, a thematic analysis of the interviews was done until the major themes were identified. These themes were used to form a framework that assessed the readiness for adoption of formal eHealth strategies among patients with multiple comorbid conditions in Kenya.

Definitions

For the purposes of this research, the following definitions were used:

Comorbidity: ‘‘Any distinct additional clinical entity that has existed or may occur during the clinical course of a patient who has an index disease’’ (Feinstein, 1970).

Concordant comorbidity: A disease with a related pathophysiology to the primary disease and takes a common treatment approach (Piette & Kerr, 2006).

Discordant comorbidity: A disease that is different to the pathophysiology of the primary disease and requires distinct approach of the separate diseases. This will also be used to refer to as multimorbidity (Piette & Kerr, 2006).

Multiple comorbid conditions: ‘‘The presence of two or more chronic conditions in the same person simultaneously’’ (van den, Buntinx, & Knottnerus, 1996).

Perceived usefulness: “The degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989).

Perceived ease of use: ‘‘The degree to which a person believes that using a particular system would be free of effort” (Davis, 1989).

Assumptions

This study was based on the following set of assumptions. The participants answered the interview questions truthfully. Though interviews are conversations with a purpose. Webb and Webb (1932) argued that people might not always tell what they really think, and the answers given are dependent on the context of the interview. In this study, the assumption was that the interviewees were truthful in their responses. The inclusion criteria helped identify participants with the relevant experience who had some basic knowledge of eHealth. The participant selection was based on the research questions, and the subjects sampled informed important perspectives about the phenomenon under study (Creswell, 2009).

The participation in the study was purely voluntary and not based on power issues. Oakley (1981) views the interview as a power game. The interviewee is the expert in that they have the information that the interviewer needs, while on the other hand the interviewer is an expert in the research area. The assumption in the study was that the interviews were non-hierarchical and there was no reciprocity. The interviewer was confident that the interviewee had freely agreed to participate.

The researcher was knowledgeable enough to conduct rigorous interviews. The success of the interview was dependent largely on individual and professional abilities of the investigator. Thompson (2000) recommended that the interviewer should prepare adequately for the interview ad have a good understanding the problem under study. Further, the interviewer must listen actively, have a clear and logical mind, good memory, establish good rapport, and remain credible by asking relevant questions.

Scope and Delimitations

The focus of this study was on the perspectives of patients with comorbidity on the use of eHealth in promoting self-management. The study population consisted of patients with comorbidities and this may restrict its application among other population. However, phenomenology, which was the guiding approach in this research, requires a homogenous group. The focus was on patients with at least two chronic conditions, regardless of the index condition. However, other patients were left out: those with a terminal illness and undergoing treatment, those lacking mental competence, and those with unmanaged psychiatric illness were left out. The study was limited to the national hospital, which is located in an urban setting. Since, to the best of my knowledge, this is the first study of its kind, I conducted this study in this setting to provide a basis for further research. However, the methodological approaches could be easily replicated in other settings.

Limitations

The choice of the study design presents several limitations. To begin with, qualitative research depends heavily on the researcher and whether or not she is proficient in her research skills (Creswell, 2009). Further, any researcher bias could influence the inductive nature of the research during data analysis. To address this, I clarified my own biases and took time to learn more about qualitative methods to improve my skills. The main method of data collection was interviews. By their nature, interviews guarantee that the interviewer steers the interview process, can observe emotions and behavior, and can clarify any points (Seideman, 2012). On the other hand, interviews can be quite costly, restricting the number of participants. Therefore, the quality of the data is dependent on the interviewer. It is therefore, more difficult to maintain research rigor (Anderson, 2010). To address this, I sought the expertise of qualitative researchers to guide me on data collection and analysis.

The research was based on the TAM), which looks at behavioral intention in adopting a technology. Technology acceptance is looked as a health behavior since the original model was measuring behavior. (Glanz, Rimer & Viswanath, 2008). TAM does not address the needs of the consumer who, in this case, was the patient. Further, the model has been applied mostly in IT studies and its applicability in the health care industry may be limited. Since I was interested in looking at behavioral intention, among the theories reviewed, it remains the best model in this case.

Significance

Supporting self-management among patients living with multiple chronic conditions contributes to an improvement in their overall health. While eHealth offers many advantages, an understanding of the patients' perspectives is lacking. No studies on eHealth strategies for patients with multiple comorbid conditions currently exist in Kenya (Njoroge, Zurovac, Ogara, Chuma, & Kirigia, 2017). This study fills a gap in understanding by focusing on the perspectives of these patients on the use of technology to support self-management. The results of the study are expected to help discern the needs of these patients, which would help in the identification of opportunities to advance technology use among them. By identifying opportunities for self-management support, patients with comorbid conditions would become more knowledgeable in the management of their conditions. Because, non-communicable diseases are on the rise in Kenya, there is need for novel ways to address them. Fortunately, there is a rapid growth in information technology. This study can bring about social change by addressing use of technology to promote self-management among this growing group.

Summary

This chapter has focused on an introduction to the study topic and provided a background. Based on the review of literature, a gap in the literature has been identified and this has been summarized in the statement of the problem. Patients with comorbidity are a group facing unique challenges. These challenges stem from the unpreparedness of the health care system to handle to their unique health care needs. While studies have been done on patient living with comorbidities, none has focused on the perspectives of patients with comorbidity. The chapter has also addressed limitations in the research and stated the significance of the study. In the next chapter, I review the literature and provide a comprehensive analysis on research done in eHealth and its application in self-management.

Chapter 2: Literature Review

Introduction

The purpose of this study was to understand the perspectives of patients with multiple comorbid conditions on the use of eHealth to promote self-management. With the rise in health care costs, health care providers are shifting the focus to the so-called frequent users of health care. These include patients with chronic diseases who are straining the already burdened health care systems. These chronic conditions often occur as comorbidities (Reid, Fisher, Reimer, Ma, & Ploeg, 2016), but health care providers are ill equipped to handle them. Subsequently, the needs of these patients are not addressed.

Patients with comorbidities are now the rule rather than exception, and the presence of these multiple conditions simultaneously creates barriers to self-management. Consequently, comorbidities are linked to poor clinical outcomes, increased hospitalization, and higher mortalities (Zulman et al., 2015). This is because patients struggle to comprehend and monitor the different conditions, and adhere to treatment regimens. In addition, they receive dissimilar information from different health providers, which they are unable to reconcile, because it is fragmented. While this section of the patient population is growing, little is known about how these chronic conditions cluster and the consequences of this coexistence. Further, clinical guidelines often focus on single conditions and exclude patient with multiple conditions.

The adoption of eHealth technologies may be the solution to supporting self-management among this population. However, the technologies must be personalized to the requirements of these patients, and not based on single disease management. In this chapter, I present the research strategies used to gather information on the central phenomenon. The rest of the chapter is dedicated to the literature review on the research, capturing the perspectives of patients with comorbid conditions on self-management, and how technology influence self-management. The review helps address gaps in the literature and illustrates how the current research addresses these gaps. Further, the review provides an improved appreciation of patients' understanding of self-management, the challenges they face, and whether they think technology can address these challenges.

Search Strategy

The inquiry was based on peer-reviewed journals, books, data from the Kenya Demographic Health survey(s), and hospital records. The databases accessed included CINAHL Plus, Science Direct, MEDLINE, and Academic Search Complete. The keywords and phrases used for the search were as follows: *self-management, perspectives, perception, multiple comorbid conditions, multiple comorbidities, multimorbidity, eHealth,* and *chronic diseases*. The search included articles published from 2010-2018. The articles found from the use of these key words were then used as a reference point to locate additional relevant literature. I used the university of Nairobi library to access its thesis repository. The repository provided data on local studies, which may not have been published. The data were analyzed in a literature matrix, which outlined the research questions, conceptual framework, methodological approach, findings, analysis of the data, and recommendations for future research.

Theoretical Foundation

I identified the technology acceptance model as the basis for the dissertation. The concentration of this study was the perspectives of patients with multiple comorbidities on the usage of eHealth technology applications to support self-management. I expected that the study participants would have some form of experience using technology for health. However, there are no formal eHealth applications for patients living with comorbidities. This study therefore, sought to understand their perspectives on eHealth and its application in promotion of self-management.

The concept of technology acceptance was developed by Davis (1986, 1989), and postulates that behavioral intention determines technology acceptance and subsequently usage of technology. The users' attitude, and consequently the perceived usefulness of the new information systems, and the ease of use influence the adoption of any technology. The usefulness and simplicity of use are mediated by the attitude of the user and intentions to use technology. Perceived usefulness as it is described in this study will be based on the patients' experiences with non- formal eHealth strategies. The patients' perspectives on the usefulness of these approaches can be used to predict their acceptance of formal eHealth application. The Technology Acceptance model has been shown to have high validity in predicting technology use (Alloghani, Hussain, Al-Jumeily, & Abuelma'atti, 2015; Davis, 1989; Holden & Karsh, 2010). It is also mainly used in situations of voluntary use of IT system that is ideal in this case since the participants will not have participated in a formal strategy to get information on their health. However, this model ignores the aspects of the clinical setting and the associated tasks. It is however appropriate for this study because it concentrate strongly in the individual attributes of the user and of the technology, which has largely been disregarded in Kenya.

Technology Acceptance on Use of eHealth Technology

The TAM and its variants have been applied in varied settings in health care. In fact, it has been widely used to describe user acceptability of the information tools. It has been demonstrated as a fitting theory for health care though not developed for such. Over time, it has been expanded to technology acceptance model 2 (TAM2) and the unified theory of acceptance and use of technology. TAM focuses on the social and cultural context that influences the use of technology (Davis, 1989). The TAM when applied to eHealth predicts how consumers come to receive and consume a technology. Though the model has been developed and used mostly in the United States, and may be considered new in the Kenyan settings, the model is still appropriate since the use of any technology is largely dependent on its perceived usefulness and simplicity (Davis, 1989). It shows a causal relationship between the constructs (Figure 1), is informative on choices influencing acceptance, and can therefore, be used to forecast user acceptance. It can also be used to direct strategies to improve acceptance. Glynn et al. (2015), Jorgensen, Schiotz and Christensen (2017), Lim and Kim, (2012), Rahimpour, Lovell, Celler, and McCormick, (2008), and Or et al., (2011), have used the model to explore patients' perception based on the TAM. Accordingly, the TAM was utilized in this dissertation, and the original posited associations still apply. These relationships are shown in Figure 1. However, this model has certain limitations since it ignores the sociocultural and design issues, which may relevant in the Kenyan setting.

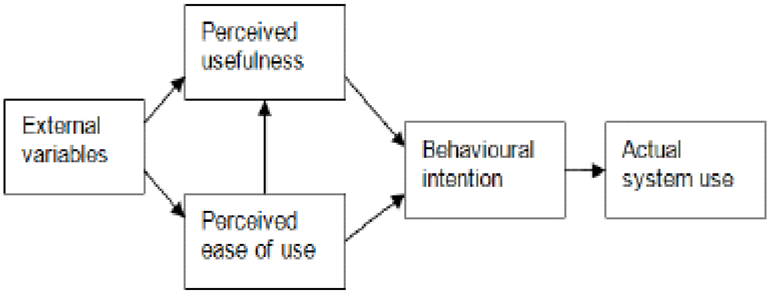

Figure 1. Technology acceptance model (Davis 1989 Davis, F. D.; Bagozzi, R. P.; Warshaw, P. R. (1989), "User acceptance of computer technology: A comparison of two theoretical models", *Management Science, 35* (8), p. 982–1003

Review of the Literature

Introduction to Self-management

There are greater numbers now of people living with chronic illness, partly due to changing diseases patterns and partly due to health care improvements (Mensah, 2016). These trends are observed all over the world. Subsequently, low and middle-income countries are now focusing on these chronic diseases as an emerging public health issue. To compound the problem, chronic conditions do not occur in isolation, but rather as comorbidities. Maintenance of patient independence and assuring a good quality of life are the focus in the management of comorbidities (Grady & Gough, 2014). Successful management of these conditions therefore, depends on self-management. In fact, there is a shift from the traditional provider-patient relationship; where the provider was the source of all information; to a collaborative one where the patient plays a major role in their care.

Self-management is “the care taken by individuals towards their health and wellbeing” (Barlow et al., 2002). This includes not only management of the symptoms and treatment of the chronic conditions, but also physical and psychosocial support as well as advancement of life style changes. Self-management is not simply “health education” or “giving information” but the actions taken to lead a healthy life while addressing their physical, psychological, social, and emotional needs (Kenning et al., 2015).

Though self-management is vital in the management of comorbidities, achieving it is a major task for patients. Often, these patients present to the health care provider with a number of medical issues stemming from interrelatedness of the diseases and interactions (Liddy et al., 2014). Further, they manage complex treatment regimens and have to prioritize self-management tasks. As a result, achieving self-management becomes a challenging task. Usually, these conditions require separate intensive treatment plans when they occur alone. When they co-occur, the need for more vigilance arises. However, this is not easy since the health care systems, are poorly equipped to address the needs of patients with comorbidity (Salisbury, 2012).

Self-management is a patient-centric approach that addresses the needs of patients with comorbidities (Kenning et al., 2015). Regardless of the disease combination, when the patient is equipped with adequate skills they can effectively manage their illness and improve health outcomes. It instills individual responsibility and offers tools for managing their illness (Grady & Gough, 2014). It also encompasses the goals of the patient, the health care provider, family, and community, working in a partnership. There is a broad body of literature on self-management of chronic diseases and comorbid chronic conditions. The next section focuses on the understanding of patients with comorbidities on the unique role of self-management in management of their illnesses.

Understanding of self-management by patients with comorbidities

Delivery of care for people with comorbidities is complex because the burden to the patient is great. There is need for increased awareness on self-management practices, which should then be integrated to clinical practice. In addition, these practices should be practical and embedded in policy to ensure their acceptance. Core to all these strategies are the patients, who require support in their self-management activities (Grady & Gough, 2014).

Self-management programs when well implemented show improvement in the quality of life (Franek, 2013), health behavior and symptom management (Brady et al., 2013). van Vugt, de Wit, Cleijne, & Snoek (2013) also notes that self-management improves patient's efficacy and communication with the health care provider. However, this is hindered by inequities in health care and lack of understanding of disease management. In some situations, though the health care provider may attempt to help those in dire needs, often their efforts are unsuccessful because the health system is not supportive of such approaches. In chronic diseases, self-management is inevitable (Glasgow, Davis, Funnell, & Beck, 2003).

In order to promote physical and psychological health, day-to-day management of comorbidities activities should promote provider-patient interactions, monitoring the health status, and managing the diseases (Bayliss et al., 2003). The levels of comorbidities interfere with the functioning by raising simultaneous demands. Further, these diseases are varied in the severity and scope. Bayliss et al. (2003) interviewed patients who stated that when one condition aggravates another coupled with multiple problems with medications, they overwhelm the patient and interferes with self-management. The increased number of disease means that the patient has to integrate more information. In their study, Jacobs, Ownby, Acevedo and Waldrop-Valverde, (2017) interviewed patients with long-standing illness and sought to understand their self-management needs. The patients indicated that though they knew the name (s) of their disease (s) and knew the name (s) of the drug (s), they actually knew very little about their diseases. This lack of sufficient knowledge has implications on self-management activities. These findings compare with those of Bayliss et al. (2013) where the patients reported being overwhelmed with the effects of dominant individual conditions. Jacobs et al. (2017) noted that even though the patients had broad awareness of chronic illnesses, they were less knowledgeable on individual diseases and how their interaction with the other conditions.

Providers need to be ready to provide help to the patients when needed, to curtail poor outcomes resulting from factors that may be amenable to interventions. Their understanding of their condition can influence their perception. Kenning et al. (2015) argues that illness perception and beliefs about the cause and nature of illness can affect management. When the patients understand the disease process, they are more likely to respond appropriately. Bhamrah, Ahmad, & NiMhurchadha, (2015) add that information is not enough, and the patient must feel they are fully supported. Noel et al. (2007)

assessed patient with multimorbidity and found that they were willing to be attended to by providers, who are not necessarily physicians, and who dealt with multimorbidity as opposed to single disease management. A high percentage was also willing to learn about self-management and expressed need for further support to address their needs. Sartorius, Holt, & Maj (2015) explored diabetes care in low-income setting. Diabetes was used as a tracer condition to represent comorbidity. They concluded that in light of the health care constraints in low-income settings, patient empowerment and education should be prioritized.

As the disease burden increases, the patient tends to be overwhelmed. As a result, the patient is likely to give up leading to poor health outcomes, increase health costs, and a strain on the health care system (May et al., 2014). Faced by these challenges, it is important to appreciate the resources the patient draws from, and the way they can interact with health care utilization. Key to this is their understanding of their role in care. Although the diagnosis, treatment, and self-management strategies make sense to the physician, it may not be the case for the patient. As it is, self-management involves active daily participation in order to manage the conditions and prevent progression.

Challenges of Self-management

Often, issues related to self-management are examined from the perspectives of the providers rather than the patient. In the following section, I present the major challenges these patients face in an attempt to management their conditions. Many are related to having comorbidities.

Experience with disease and illness. The fact that we are dealing with a patient must not be forgotten. Living with a chronic condition poses a lot of lot of stress, which translates to physical and emotional symptoms like depression (Liddy, Blazkho, & Mill, 2014). This can hinder the patient from carrying out self-care activities every day. Among patients with multiple conditions, different diseases with different presentations compound these symptoms. The symptoms of one condition may be augmented or concealed by the presentations of another (Bair et al., 2009). In addition, medications used for one condition may interact with others reducing their efficacy. When symptoms are overshadowed by the presentation of another disease, this may interfere with the patient's ability to manage their care. Though the patients may be willing to learn the self-management skills, some manifestations such as pain could be a major limiting factor to implementing these endeavors (Liddy et al., 2014).

The patient with comorbidities has to balance the life demands and the disease demands resulting to tension. As Corbin and Strauss (1985) state, for the patients to practice self-management adequately, the influences of everyday life should be minimized. For example, jobs and responsibilities in their families may be interrupted by their being sick. Since management of their health competes with the everyday life activities, patients may be forced to forego self-management actions. They may find it easier to manage one condition, leading to prioritization based on severity and symptomatology. Morris, Sanders, Kennedy, and Rogers (2011) found that patients feel the pressure to allocate resources and will often choose the conditions that they feel should get priority. Inevitably, this may be a source of conflict with the health care provider. In addition, living with two or more chronic conditions is associated with a lower quality of life. White, Lentin, and Farnworth (2015) found that many patients with comorbidities simply focus on figuring out what is wrong, how to get it under control and getting on with life. This affects their lives since these decisions are made on a daily basis.

Higher number of comorbidities. The higher the number of comorbidities the more complex the management challenges. First, other chronic disease may affect treatment aspects of other diseases. Several chronic diseases such as cardiovascular disorders like diabetes and hypertension, and many others though unique share common challenges in their management. These include nutrition management, managing complex medication regimens, frequent monitoring of parameters, lifestyle adjustments, and frequent interactions with health care providers (Grady & Grough, 2014). However, since they are unique, interactions in the disease processes complicates self-management. For example, comorbidity complicates diabetes care by increasing the demands on the patient. Presence of these other conditions affects blood sugar control (Magnan et al., 2015). This could be because little is understood about the interactions of diabetes and other conditions with the exception of hypertension and depression (Long & Dagogo-Jack, 2015). This could have implications on management. For example, depression can reduce a person capacity for self-management because of their feeling of hopelessness, which may influence judgment (Chew-Graham, Sartorius, Gimino, & Gask, 2014). Others feel emotionally unstable, experience anxiety, (Banhato, 2016), lack energy and fear of death (Mason et al., 2016). On the other hand, improving the mood improves the patient’s appetite, which may affect diet control.

Secondly, comorbidity may affect the frequency and intensity of treatment of existing conditions. Cheraghi et al (2013) found that patients with comorbidity had a priority condition. While interviewing the patients, Cheraghi found that osteoarthritis was often prioritized because it caused pain. However, for majority of patients, the priority condition changed depending on perceived barrier to a future risk and its effect on functioning. These findings are similar to those of Auduly (2013) who found that self-management practices are not uniform since participants managed health crises according to daily changes due to illness. Simonik et al. (2015) exploring the readiness of patients living with HIV and two or more conditions to engage in physical activity found that the willingness was based on physical impairment and concurrent condition. Mc Sharry (2013) insists that a consideration of the patient’s perspectives is necessary because majority of the self-management occurs outside the health facility, where the patients decide prioritization of care.

Though different disease groupings result in diverse experiences, diseases with related pathophysiologic pathways may be easier to manage for patients and health care providers. Fraser (2015) who found that patients with concordant conditions were more likely to meet self-management goals because the treatment burden is less made this observation. The compound effects of drugs and coordination of multiple medications for concordant conditions is easier. Subsequently, the adherence to treatment is better resulting to better outcomes. In another study involving patients with multiple conditions, Slightam et al. (2017) found that patients saw conditions that affected function and quality of life, increased risk of complications, and with challenges in management as the most troublesome. In addition, presence of comorbidity may affect the effectiveness and tolerability of treatment.

Comorbidity may escalate the possibility of drug–drug interactions. The burden of treatment is great due to the number of medications (Rosbach & Anderson, 2017). Tran et al. (2015) adds that these treatment regimens are complex since a consideration must be made of potential interactions. The patients take many pills at a go for each condition, which contributes, to polypharmaccy. These drugs, which may also include over the counter drugs, may interact further complicating the management plans (Morrison et al., 2016). This can be challenging for the health care provider who may find it hard to integrate these clinical problems and review treatment plans.

Lack of financial resources. Financial constraints have been described as an obstacle to self-management because patients are not able to pay for medications or travel to receive care (Campbell et al., 2017). Often these patients require more hospitalizations accruing higher costs. In low socioeconomic settings, this problem is even more pronounced because there are competing life priorities, and the limited resources are allocated to the more urgent needs. Bair et al. (2009) found that patients with chronic musculoskeletal pain lacked the finances to travel for care and engage in self-management practices. As it is, these patients are faced with a great burden in managing the coexisting conditions. The patients therefore, prioritize care based on the available resources (Rosbach & Anderson, 2017). This may mean that self-management activities may be ignored.

The patients need money to pay for visits, take routine blood tests, and pay for drugs. Yet in the current health care system where the focus is on single disease management, these concerns may not be addressed. Zulman et al., (2015) note that patients with comorbidities often have numerous appointments, which require financial commitment. As an alternative, the focus should be on patient centered care where the diseases are reviewed simultaneously. This also decreases the likelihood of adverse drug events. Bratzke et al. (2015) also add that the shortage of funds influence prioritization of self-care activities as well as decision-making capacity.

In low socioeconomic settings, many patients do not have insurance. Any costs associated with hospitalization and purchase of expensive drugs must be offset from the pocket. Shadmi (2013) hypothesizes that in these settings access to care may also be limited prompting the patient to buy over the counter drugs. Physical symptoms and frequent absenteeism may also contribute to job losses contributing further to the financial burden. Care is prioritized based on their financial capability and self-management practices are ignored.

Perspectives on the Use of Technology

Approaches to foster self-management for patients with comorbidity are often overlooked. They require a comprehensive patient-focused approach. Petrillo and Richie (2016) insist that these self-management practices should incorporate both technology and patient goals.

Several studies have explored the perspectives of patients living with comorbidities on the use of technology to promote self-management. For these to be useful, they should be integrated in the normal daily life patterns (Clark et al., 2014). Williams et al. (2014) questioned patients with chronic obstructive pulmonary disease on their involvement in the use of mobile telehealth. The patients stated that the use of technology created an increased awareness of symptoms, and they felt reassured because they could monitor their conditions. These opinions were echoed by Powel et al. (2017) who interviewed patients with multiple chronic conditions following video visits. They found that these patients were satisfied with the video visits because they were convenient and saved time, but were worried about privacy and the ability of the physician to carry out an adequate physical examination.

Any eHealth tools should be designed to fit the needs of the end user. Harvey Dopson, McManus and Powell, (2015) contends that eHealth application allows personalization of information for patients with comorbidities. In another study, Gray, Miller, Kuluski, and Cott (2014) conducted focus group discussions to explore the needs of patients with comorbidities and eHealth support for their conditions. The patients explained that eHealth enables a shared communication amongst the patient and the caregiver and promotes synchronization and continuity of care. However, privacy, access to the eHealth tools and potential for increased social isolations should be considered. In a related study, Zulman et al. (2015) scrutinized the opportunities for use of eHealth among patients with multiple conditions. The results showed that eHealth use decreased the volume of visits and promoted self-advocacy and expertise. However, patients expressed the need that these applications should transcend disease boundaries.

eHealth applications are seen as a supplementation of the face-to-face visits. This includes access to personal health records. While some patients were willing to access their records others felt that this was a constant reminder that they are sick. In their study, Greenberg et al (2017) interviewed patient with comorbidities to determine whether there was a connection between the number of chronic conditions and use of electronic personal health records. The results showed that patients with higher comorbidities accessed their health record at least thrice in the previous year. They stated that these records gave them a unique opportunity to enhance self-management. These findings compare with those of Ancker et al. (2015) who interviewed patients with multiple conditions to explore their perception on managing personal information. The patients indicated that tracking their health was a lot of work though it helped navigate the different health care providers.

In some cases, though the patients were willing to use eHealth they were worried this would affect their relationship with their providers. Townsend et al. (2013) contends that some providers were not accommodative of the ‘expert patient’. These patients therefore, felt that eHealth tools should only be used as part of the management. In a related, study Townsend, Leese, Adam, McDonald and Li et al. (2015) interviewed patients with multiple conditions and who used health-related websites. These sites promoted communication between the patient and peers with similar conditions, and kept them informed. However, they created uncertainty because this knowledge prompted more questions about their conditions. By using these sites, patients were able to appreciate that health care providers do not have monopoly of knowledge. These sites provide information that the patients use to contribute to their care.

Education on the use of the eHealth is important. Gee, Greenwood, Paterniti, Ward, and Miller (2015) note that though eHealth technology makes important contribution in promotion of self-management among patients with comorbidities, eHealth education, and feedback on their use should be encouraged. This reduces anxiety related to technology use. Ware et al. (2017) in a related study explored the preferences and concerns of older patients on using eHealth. They agreed that eHealth has potential value in access to individual health information and facilitation of communication with peers and health care providers. However, patients should be guided in choosing sources with relevant and credible information that is easy to understand because health information obtainable on the internet can be misused for treatment and medications.

Social media use has also become widespread and patients with comorbidities have used it informally to communicate with peers. Benetoli, Chen, and Aslani (2017) noted that patients use social media to gather information, which they used during consultations, enabling them, participate in their care. Patients want to be listened to, ask questions, and have their individual concerns addressed. Information tailored to these needs can be accessed via technology.

Conclusion

Comorbidities are now of public health concern since the patients are regular users of health care and encounter many challenges. The current approach to care is focused on single disease management whereas the focus in comorbidity management is promotion of self-independence, which can be achieved through self-management strategies. Technology usage in promoting self-management has been applied successfully among this population.

eHealth technology creates increased awareness of the patient’s condition, fosters improved communication between the patient and their provider, decrease hospital visits, and provides guided access to personal health records. Further, social media can be used to reach out to peers living with similar conditions providing social support. However, the patient should be educated and guided on how to identify credible tools and applications to avoid misuse of information that may affect treatment plans.

The challenges faced by these patients are the same across the world. Although the current literature highlights the challenges faced by patients with comorbidities and the use of technology in promoting self-management, most of this literature is focused on areas where technology use in health is advanced. In the Kenyan setting, though supported by the eHealth strategy, eHealth applications are in the formative stages and any interactions are based on the patients’ initiative. Further, though there are some applications focused on drug adherence, none is focused on patients living with comorbidity. This study will contribute in the gap in literature by seeking an understanding of the perceptions of the patients with comorbidity, on how given the challenges they face in self-management can eHealth technology help curtail this. The purpose of Chapter 2 was to provide an overview of the current literature related to content and methodology that addresses the challenges of self-management, and the perspectives of the patient on the use of eHealth. Chapter 3 provides details of the methodology that was used to explore the perspectives of the patients. The purpose of this study was to understand the perspectives of patients with multiple comorbid conditions on the use of eHealth to promote self-management. With the rise in health care costs, health care providers are shifting the focus to the so-called frequent users of health care. These include patients with chronic diseases, who are straining the already burdened health care systems. These chronic conditions often occur as comorbidities (Reid, Fisher, Reimer, Ma, & Ploeg, 2016), but the health care providers are ill equipped to handle them. Subsequently, the needs of these patients are not addressed.

Patients with comorbidities are now the rule rather than exception, and the presence of these multiple conditions simultaneously creates barriers to self-management. Consequently, comorbidities are linked to poor clinical outcomes, increased hospitalization, and higher mortalities (Zulman et al., 2015). This is because patients struggle to comprehend and monitor the different conditions, and adhere to treatment regimens. In addition, they receive dissimilar information from different health providers, which they are unable to reconcile, because it is fragmented. While this section of the patient population is growing, little is known about how these chronic conditions cluster and the consequences of this coexistence. Further, clinical guidelines often focus on single conditions and exclude patient with multiple conditions.

The adoption of eHealth technologies may be the solution to supporting self-management among this population. However, the technologies must be personalized to the requirements of these patients, and not based on single disease management. In this chapter, I present the research strategies used to gather information on the central phenomenon. The rest of the chapter is dedicated to the literature review on the research capturing the perspectives of patients with comorbid conditions on self-management, and how technology influence self-management. The review of the literature helps address gaps in literature and illustrate how the current research addresses these gaps. Further, the review provides an improved appreciation of the patients' understanding of self-management, the challenges they face, and if they think technology can address these challenges. In chapter 3, I will address the methodology.

Chapter 3: Research Method

Introduction

The purpose of this dissertation was to understand the perspectives of patients with comorbid conditions on the use of eHealth to promote self-management. In Chapter 2, the focus was on the current literature. It showed a gap in studies on technology use in self-management in middle- and low-income countries. Chapter 3 outlines the research methodology used to explain this phenomenon and includes the research design, participant selection process, the role of the researcher, data collection, and data analysis processes. It also describes the steps that I took to ensure data trustworthiness and adherence to ethical procedures.

Research Design

This study was qualitative. An appropriate qualitative research design is the one that ensures alignment of the research purpose, research questions, and the methods used to generate valid data (Grossoehme, 2014). A general qualitative approach was the primary approach to answering the research questions. In addition, in order to obtain the patients' experiences with comorbidity, phenomenology was used. Phenomenology, which focuses on the personal experiences and interpretation of the world, was the most appropriate methodology to examine the understanding and challenges faced by patients living with comorbidity. These experiences are described as lived. Langdridge (2007) stated that phenomenology focuses on people's perception of the world they live in and the meanings that they give to their experiences. Using interviews, I can carry out an in-depth analysis of these experiences in order to explore the meaning assigned to a particular phenomenon in daily life (Finlay, 2009; Giorgi, 2009). Phenomenology is centered on the proposition that different people perceive events and experiences differently.

The word phenomenology is derived from the Greek word ‘phainomenon,' which means ‘to that which is seen' or ‘appearance', and ‘logia', which means dialogue, doctrines or science (Reed & Klein, 1967). Though its origin dates back to early Greek times, phenomenology did not become a philosophical system until the 20th century (Starks & Trinidad, 2007). Phenomenology examines two aspects of experience: What is distinct in each person's experience and what is common to the experience of the group that has shared the same circumstances (Merleau-Ponty, 1962). The description of experiences is the crucial concept in the phenomenological approach, focusing on what the subject wants to share.

The choice of the appropriate phenomenological approach is based on the underlying philosophical view. In this line, there are two views: The interpretive and descriptive approaches. Heidegger who ‘rejected the theory of knowledge as epistemology and adopted ontology' formulated the interpretive approach (Finlay, 2009). Heidegger argued that, even though phenomenology is descriptive in nature, the interpretation of the lived experiences is essential. This study’s approach follows the hermeneutics approach, which moves beyond the description, and seeks meaning that results from interactions with the phenomenon (Creswell, 1994). On the other hand, Husserl developed the descriptive approach at a time when there were considerable advances in science, and focused on a description of this science rather than an explanation of it (Zahavi, 2003 p. 39). Scientists focus on the structure of the consciousness as experienced by the person.

In a phenomenological sense, experience includes not only the relative passive experiences of sensory perception but also imagination, thought, emotion, desire, volition, and action. It includes everything that an individual lives through and performs (Heidegger, 1996). Thus, we may observe and engage in other things in the world, but we do not experience them in a first-person manner. What makes an experience conscious is a certain awareness one has of the experience while living through or performing it. However, as Heidegger has pointed out, we are often not explicitly conscious of our habitual patterns of action, and the domain of phenomenology may spread out into semi-conscious and even unconscious mental activity. In this research, the expanded formulation of the Existential Phenomenology as proposed by Heidegger presupposes that the individual cannot separate himself from the world (and so cannot have the detached viewpoint Husserl insisted on) was applied. It is a combination of the phenomenological method with an understanding of man in his existential world. Therefore, even though the participant has not consciously experienced the phenomenon, they cannot lack a viewpoint. Based on this, I sought to understand the perspectives of patients with comorbid conditions on the use of eHealth in self-management. To Heidegger, human beings use words and language to represent their interpretation of the reality they live in (Heidegger, 1996). This word, as written text, can be obtained through interviews, and in Heidegger's view can be used to understand and present lived experiences. I used the interpretive phenomenology approach. To understand the perspectives of the patients, I used interview questions that were interpreted through the interview process. This approach was appropriate since I was able to elicit the participants' realities in the management of their conditions and how the use of eHealth can influence this.

Measures

The purpose of this study was to explore the perspectives of patients with comorbidity on the use of eHealth to promote self-management. Comorbidity was identified as the simultaneous presence of two or more chronic in one person. eHealth was conceptualized as use of any form of technology to get information on health, or using technology to connect with the health care provider or others with similar conditions, with the intention of understanding how best to manage their conditions. The guiding research questions are addressed next.

Research Questions

This dissertation used the interpretive phenomenological approach to understand the perspectives of patients in Kenya on the use of eHealth in self-management. Using the principles of interpretive phenomenology, the study was guided by these research questions.

Research Question 1: What is the understanding of self-management by patients with comorbidity?

Research Question 2: What are the challenges of self-management faced by patients with comorbid conditions?

Research Question 3: What are the perspectives of the patients with comorbid conditions on how technology can be used to promote self-management?

Role of the Researcher

In qualitative inquiry, the researcher takes up several roles as part of the data collection (Creswell, 2007). The first role I played was offering information and an explanation to the participants on the research purpose and questions. Moustakas (1994) states that the researcher must endeavor to create a trusting environment and help the participants to relax, by showing how they fit in the research. This encouraged the participants to be open and share rich data on their experiences. The other prominent role was facilitation of the flow of the information. Poggenpoel and Myburgh (2003) maintain that by building rapport with the participants, the researcher can enhance a sense of belonging and consequently their participation in the data collection process. Yuksel, Yildrim, and Robin (2015) agree and state that in some situations, the researcher can even share their own experiences in an attempt to put the participants at ease. However, the researcher must ensure that they maintain their subjectivity throughout the study. I took up these roles in the study. To address my biases, I acknowledged my thoughts and feelings on the matter before conducting interviews.

Ethical Protection of Participants

The participants in this study were adult patients with comorbid conditions attending the chronic diseases clinics at Kenyatta national hospital. There is no known harm associated with participating in the study. I worked closely with the health care providers to ensure timely referral and treatment for any negative psychological impact since the participants were narrating experiences that may not be pleasant. However, no participant experienced this. No immediate benefits were derived from participating in the study I provided an incentive of Ksh. 1000 to each participant. In addition, if the findings results in any improvements in the care provided to the patients with comorbidities, then they will benefit from the overall improvement in the services. The study did not interfere in any way to the care given to the participant and the participants were at liberty to participate or not. Each participant signed an informed consent and confidentiality was guaranteed. The consent form was in English, but was also translated to Swahili, which is the national language. I did the translation, since I know the language. Files, audiotapes, and transcripts were kept in a locked cupboard, and only accessible to the researcher. The consent forms were stored separately from digital recordings and notes taken during interviews, transcription, and analysis. The materials will be kept for five years then destroyed. Identifying information was removed from the transcripts during the data validation process. No participants' names are used in the report. I had no conflict of interest in the study.

Interviews

The in-depth interviews were directed by the research questions. When designing eHealth programs, the target is a group of patients with a similar problem. Since no known formal eHealth programs targeting this group exist, there is need for a general understanding of the needs of these patients. The personal experiences of the individual are necessary and were elicited by conducting in depth interviews. They enabled the researcher to explore details at an individual level. To guarantee correctness of the information, in addition to memos and field notes, the interviews were digitally (audio) recorded. Each session lasted 20–30 minutes, and this provided the participants the opportunity and sufficient time to build rapport and tell their stories. At the end of each interview, I conducted member checking.

Participants

The study participants numbered 10. This number was based on the guidelines for phenomenological studies. Lincoln and Guba (1985) propose 5-10 participants for phenomenological research. However, because of the iterative relationship between the sample and data analysis, Berg & Lune (2014) recommend that recruitment should continue until there is saturation of themes. In fact, Mason (2010) proposes that to ensure the right sample is achieved, multiple and complementary recruitments strategies should be applied. Therefore, based on the guidelines by Lincoln and Guba as well as Creswell, I selected 7-12 participants for the study. However, after conducting ten interviews, I achieved saturation, and there was no need to recruit more participants. The participants had at least two chronic conditions and in this study, identification of chronic conditions was based on self-reports. Martin, Leff, Calonge, and Nelson (2000) found that self-reports concurred with medical records up to 83% of the time for hypertension, diabetes, and hypercholesterolemia. In another study by Barber, Muller, Whitehurst, and Hay (2010), self-reports and primary records were comparable but for certain morbidities. However, when applied in an older population, the accuracy of self-reports reduced (Nilsson, Johansson, Berg, Karlson, & McClean, 2002). I used self-reports as the method of identification since patients who are aware of their conditions are more likely to be conscious about the management.

Participants Selection Procedures

Phenomenology requires a homogenous group of participants with similar experiences (Creswell, 2007). The participants in this study were recruited through chronic disease clinics at the Kenyatta national hospital. All patients attending these clinics were eligible for selection using purposeful sampling. I visited the clinics and post flyers with a description of the study, criteria for participation, and contact details for those interested to contact me. To identify those to include in the sample, I recruited those who have at least two chronic conditions. The patients were eligible regardless of their age. I excluded patients with any active terminal illness or uncontrolled psychiatric illness since the nature of their illness means they will be preoccupied with the management of these diseases on a daily basis, and this may affect their perception of self-management. After the identification of eligible participants, I obtained a written consent, which was followed by discussions on when to conduct the interviews, being adaptive to the participant's schedules. The following is a summary of the procedures followed.

1. Posting of flyers detailing the purpose of the study, the criterion for selection and contact details of the researcher. The posters helped me to reach out to the potential participants and to identify those willing to participate in the study. I also obtained permission from the hospital to post flyers in the clinics. In addition to the flyers, I visited the clinics during the clinic days, talked to the

participants about the study, and invited those who wished to participate to contact me.

2. Identification of those that met the criteria for the study. A criterion-based selection was applied by specifying some common criteria for all participants (as per the inclusion criteria).
3. Explanation of the purpose of the study and the role of the participants. I obtained consent for participation in the study and asked those who agreed to sign an informed consent.
4. Schedule the interview. The interview lasted approximately 20 to 30 minutes, and all the research questions were addressed in this step. At the end of each interview, I conducted member checks.

Data Collection

Data were collected using semi-structured interviews. These interviews used open-ended questions, which allowed the individual to express their perspectives. In studying the viewpoints of patients with comorbidities on the use of eHealth in self-management, this was the principal method of data collection. This approach centered on the supposition that different persons with different illnesses perceive self-management differently.

Before each interview, I obtained consent to record the interview. One interview was conducted for each participant. After building rapport, signing the consent, and gathering information about the individual’s life, I explained the nature of the study. I then invited the participant to share their experience on the phenomenon under study.

The interviews were conducted in a conference room away from the clinic. The main factor in this selection was access, convenience, value system, privacy, and free from distraction. Each interview lasted 20–30 minutes. Each interview was assigned a code, for example, Participant 1, 9 September 2018. In the report, pseudonyms were used to avoid identifying the participants. Each interview was recorded and written down in verbatim to ensure accuracy in data collection. Any personal identifying information on the recording was de-identified during transcription to ensure participant confidentiality. I also kept a field journal, which helped in contextualizing the data. Besides, I wrote expanded notes as soon as the interview was over. Transcription, which involves the conversion of speech to written text, was done as soon as possible after each interview. I listened to the recording and made verbatim transcriptions. Since not all the interviews were in English, I translated them and then back translated them to the original language. I am conversant with all the languages used, therefore I did the translation.

The transcribed data was in individual files and locked in cabinets with restricted access. The iterative nature of data analysis was a continuous process until the data analysis and interpretation was finished. During the interviews, I observed behavior and expressions, which helped in analyzing the data. This observation also helped me capture thoughts, feelings, sensations, memories and clarify these during the self-reports. I recorded this in the field notes.

Data Storage, Archival and Quality Assurance

Each participant was allowed enough time to express him or herself, ensuring the validity of the data. The interviews were transcribed verbatim to ensure the accuracy of data interpretation and ensure credibility. I analyzed the data iteratively. Since transferability was not a primary objective in qualitative research, the context of data collection was used to define the data, and this contributed to the interpretation. Further, purposive sampling addressed this by maximizing the information to the context.

Instrumentation

Prior to data collection, I obtained Ethical Review Committee approval (KNH ERC/A/226). Each participant turned in their signed consent and verbally gave the consent to participate in the study. At this point they were reminded of the voluntariness of the study and the right to withdraw at any time without fear of intimidation. I conducted a pilot study to test the suitability of the interview questions. I did this by administering the interview protocol two volunteers. Since no changes to the tool resulted from these two interviews, the data was used for the study. In this sense, this pilot also served as a means of data collection.

I conducted in depth interviews to gain insight on the participants’ experience with self-management and technology. Since I was using a phenomenological approach, this approach was appropriate. The main intention of phenomenology is to access the consciousness of the individual and ascertain their experience on the phenomenon (Chesnay, 2014). It examines the experiences of the person in the way they have lived and created meaning. The phenomenological interview is carried out based on guiding questions. The questions direct the interview allowing the participant to express him or herself. These questions must be understood by the participant so that they are able to speak and share their experiences.

I used in-depth semi structured interviews for the study. In depth interviews are common in qualitative research and used to get the participants to express their opinion and experiences on the phenomenon under study. Chesnay (2014) adds that the semi-structured interviews guide includes questions that can be altered depending on the conversation. Further, the interview presupposes the development of a theme depending on the situation.

In-depth interviews focus on an individual, providing the researcher with the opportunity to understand the personal context of the phenomenon. The exploration of the personal context allowed detailed subject coverage. Subsequently, the interview questions were open-ended thus allowing the individual to discuss and express their experiences. I was also flexible in the sequence of questions, and this allowed an in-depth probe. The interview schedule was developed based on a literature review on the topic and I ensured that this was in alignment with the research questions. The guide comprised of a list of questions as well as prompts that encouraged the interviewee to talk about issues that did not come up spontaneously. The following questions were in the guide:

Research Question 1: What do patients with comorbidity understand by the term ‘self-management’?

Question 1: What conditions do you suffer from? Which one do you consider most serious?

Question 2: Do you seek treatment for all the conditions or the most serious?

Question 3: How many doctors do you see to manage your conditions?

Question 4: Are you worried about proper management of these conditions?

Question 5: How do you manage these conditions at home?

Questions 6: Do you have any support in the management of these conditions?

Research question2: What are the challenges faced by patients with multiple comorbid conditions?

Question 1: Do you have health insurance? How do you fund for care?

Questions: What are the sources of information for management of these conditions? Is it helpful?

Question 3: What challenges do you face in ensuing proper management of the conditions?

List everything you can think of that affects your ability to manage your medical conditions.

Prompts: What makes it easier/more difficult to care for your medical conditions?" and "What would you like to change about what you need to do for your medical conditions?"

Question 4: How do these conditions interact?

(For this question, the participant used a sheet with their conditions listed. They then used an arrow to indicate how these conditions affect each other).

Question 5: How do these interactions affect how you manage the conditions?

Research Question 3: What are perspectives of patients with comorbid conditions on the use of eHealth technology to promote self-management?

(These questions generated the information on the type of technology used by the participant).

Question 1: What does technology mean to you?

Question 2: What does 'eHealth technology' mean to you?

Question 3: Can you give me some examples of 'eHealth technology'?

(This question is a follow up of question 2, which explores the meaning of eHealth technology from the participant's perspective).

Question 4: You currently have different health conditions. Are there any technologies that you use and find helpful to communicate, get information, understand interaction, and understand how to manage these conditions?

Question 5: Do you know of any formal tools in use in the hospital to help you manage the multiple conditions?

Question 6: What is your view on how technology can be used by the health care providers to help you manage your conditions?

Question 7: Do you have any ideas on how technology use can be improved to help you with the challenges discussed earlier?

Trustworthiness

Validity of qualitative research refers to its trustworthiness. Trustworthiness refers to believability, transferability, confirmability, and soundness of exploration (Lincoln & Guba, 1985). Credibility refers to the reflection of the reality of the participant. Transferability pertains to the applicability in other contexts or samples, while confirmability authenticates the process and documents researcher bias. Dependability accounts for instability. In this research, ample time was allowed to each participant to express him or herself. Triangulation, which is the collection of data from different methods, is the other approach that was applied. In-depth interviews were combined supplemented by field notes and journals.

Credibility and trustworthiness of the data was ensured by transcribing interviews verbatim to ensure accuracy of data interpretation. I analyzed iteratively. Since transferability is not a primary objective in qualitative research, the context of data collection defined the data and this contributed to the interpretation.

Ethical consideration

Supporting self-management among patients living with multiple chronic conditions contributes to an improvement of their overall health. While eHealth offers many advantages, an understanding of the patients' perspectives is lacking. No studies on eHealth strategies for the patient with multiple comorbid conditions currently exist in Kenya. This study fills a gap in understanding by focusing on the perspectives of these patients on the use of technology to support self-management. It is unique because it addresses an under-researched area.

There is a need to ensure that any research has no potential to harm the participants (Dalbye, Calais, & Berg, 2011). First, I obtained ethical approval from the University of Nairobi-Kenyatta national hospital ethics committee (KNH ERC/A/226). After that, I sought authority to collect data from Institutional Review Board (IRB) approval at Walden University (IRB No. 05-17-18-0386222) after submitting the ethical approval documents. Per the requirements of Walden University IRB and the Human Subjects' Committees governing the site, all copies of the ethical approvals were provided to the administrator of health facility where data was collected. I obtained authorization from Kenyatta national hospital after ethical approval. Before data collection, I obtained informed consent from the participants (Appendix B). The informed consent educated the participants on the following:

- That they are participating in the research
- The purpose of the research.
- The procedures used in data collection.
- The risks or benefits of participating.
- The right to stop at any time.
- The procedures to be followed to ensure confidentiality

Before each interview, consent was obtained to record the interview. The participants were informed that involvement was voluntary and they could pull out from the study at any time without fear of repercussion. They were also assured that the choice to participate or withdraw from the research would not affect the services they receive from the health facility in any way. No participant developed emotional distress during the interviews. All collected data were de-identified, sealed in envelopes, and kept secure in locked file cabinets by the researcher. The consent forms were kept separate from digital recordings and notes during interview, transcription, and analysis. Only the researcher had access to the data. After transcription, coding, and analysis, the recording will be stored by the researcher for an additional 5 years after which it will be destroyed. I have no conflict of interest.

Data analysis plan

Data analysis refers to the systematic procedures carried out to identify relationships. The data analysis was done in 3 stages.

Preparation

- I kept a field journal to help in the contextualization of the data, for example, noting that the participant "seems distracted."
- Write up field notes. Field notes are considered a form of data storage method because of the tendency to forget but are also part of data analysis. Lofland and Lofland (1999) note that field notes help to retain gather gathered. Therefore, I recorded my observations during the interviews and wrote expanded notes as soon as possible after the interview.
- In-depth interviews recording. These were recorded with one digital recorder. However, as soon as the interviews were done I made a copy of the recording and stored in a pass worded folder on the computer. I saved a copy to prevent accidental data loss due to malfunctioning of the tape recorder.

Transcription

The recordings were transcribed verbatim to check against the original recording. The true verbatim style was used to document natural human speech patterns –including hesitations, pauses, interruptions, interjections, laughter, and non-speech utterances that are vital to understanding human communication). The true verbatim style is mainly used for records of an interview (psychological research) where an exact record is required.

Analysis

Using an iterative process, I reviewed all transcripts individually in order to familiarize with the data. During this process, I kept memos of potential common codes for use in data analyses. I used NVivo to code the data. Using this software, I was able to group the data into nodes/themes. This iterative process helped to provide a trail of discrepancies and resolution and provided a final consensus on emerging themes on the research questions. I then summarized the consensus data into major themes and subthemes for the final write-up.

Summary

The purpose of this chapter was to provide the methodology of the study. The qualitative approach is the most appropriate for this study since I was interested in finding out the perspectives of the participants on a lived phenomenon. The purposeful sampling method was used to select 10 participants who were knowledgeable on self-management. I conducted all the interviews and transcribed the interviews verbatim. I then analyzed the data using Nvivo and organized the results in themes. In chapter 4, I present the results of these interviews.

Chapter 4: Results

Introduction

The purpose of this dissertation was to understand the perspectives of patients with comorbid conditions on the use of eHealth to promote self-management. The following research questions guided the study:

RQ 1. What do patients with comorbidity understand by the term 'self-management'?

RQ 2. What are the challenges of self-management faced by patients with comorbid conditions?

RQ 3. What are the perspectives of the patients with comorbid conditions on how technology can be used to promote self-management?

In this chapter, I will describe the settings, participants' demographics, the data collection and data analysis processes, evidence of trustworthiness, and the study results.

Setting

I collected data via face-to-face, individual interviews. All participants provided informed consent. In accordance with the IRB policies as well as the local ethics review committee requirements, they also provided consents for the interviews to be recorded. Each interview was recorded at the convenience of the participant. All the participants preferred to have the interviews on the days they were volunteered and after they had attended the clinic. I had to adapt to this because the participants would be unavailable until the next clinic appointment, which ordinarily would take 2 months. I conducted all the interviews in a conference room located away from the clinic. This room was identified because it was private and convenient. I also ensured that the interviews were not lengthy because many participants had been waiting for care for some hours.

Demographics

Ten participants with comorbidities were interviewed for this study (see Table 1). All the participants met the criteria of having two chronic conditions simultaneously. Pseudonyms were used to identify the participants.

Table 1

Characteristics of the Participants

Participant	Sex	Age	Number of comorbidities	Comorbidities	Number of years living with comorbidities
John	Male	58	2	Diabetes mellitus, hypertension	1
Jane	Female	56	3	Diabetes mellitus, hypertension, arthritis	1
Joseph	Male	52	2	Hypertension, arthritis	1
Jennifer	Female	62	2	Hypertension, cardiac disease	6
James	Male	54	2	Hypertension, diabetes mellitus	9
June	Female	68	2	Arthritis, hypertension	>20
Jackie	Female	54	2	Asthma, osteoarthritis	4
Julia	Female	31	3	Hypertension, SLE, Asthma	4
Jasper	Male	64	2	Cardiomyopathy, diabetes mellitus	6
Jessica	Female	40	2	Hypertension, HIV/AIDS	3

Note. SLE =Systemic Lupus Erythematous, HIV/AIDS = Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome.

Data Collection

I recruited 10 participants with whom I conducted face-to-face individual interviews. Once I obtained ethical approval from the local ethical review board, I emailed the approval to the Walden IRB and upon their recommendations began recruiting participants. I began the recruitment process in September 2018. I posted flyers in the medical outpatient clinics. The following clinics fall under the medical outpatient clinics: cardiac clinic, the endocrinology, rheumatology, chest clinic, rheumatology clinic and the neurology clinic. In addition, there is the general clinic where patients with other medical conditions like hypertension are attended.

After posting the flyers, I also asked the staff to draw the attention of the potential participants to the flyers and asked those who were interested to contact me. I instructed the staff that their only role was to draw the attention of the participants to the materials posted on the notice board for information on their health, just as they would during a clinic visit. By avoiding divulging purpose of the study, or referencing the flyer directly, I ensured that the staffs were not part of the recruitment and therefore did not influence the participants' decision to participate. Only the interested participants contacted me in person or on phone. I got responses on the same day the flyers were posted. Once a participant approached me, I explained the purpose of the study and the methods used in data collection after which I obtained informed consent.

I conducted interviews on the same day since it was convenient for the participants. Each participant confirmed that they had consented for the interviews and the recording and were ready to proceed. The data collection process started on 9/19/18 and the interviews lasted roughly 20 to 25 minutes. Each interview was given a code based on the date of the interview and the position of the participant. For example interview 2 was coded P2 20th September 2018. Later the participants were assigned pseudonyms that make their voice better heard. I recorded each interview with a tape recorder and transcribed each of the interviews verbatim. The last interview was conducted 5 October 2018. I conducted on average one interview per day. During the course of obtaining consent from the volunteers, I noticed that some were not comfortable with the audio recording. In such cases where the participant was hesitant, I excluded them from the study and identified a different volunteer. This was necessary because even after assurances, these participants were fidgety and unwilling to continue. I thanked them for their interest in participating in the study.

Data Analysis

Coding Process

In preparation for data analysis, I kept a field journal, and wrote field notes during the interviews. I used one notebook throughout the interview process as a research log, where I wrote the name and the participant identification code, which was made up of the date, month, and participant’s position in the interviewing process. I audio recorded all the interviews using a tape recorder. I also wrote the start time and stoppage time on my journal, and compared this with the recording on the tape recorder. In addition, as soon as the interviews were done, I made a copy of the recording and stored in a pass worded folder on the computer. I saved a copy to prevent inadvertent data loss due to malfunctioning of the tape recorder.

I started the analysis by transcribing the interviews verbatim against the original recording. This included the natural forms of human speech like hesitations, pauses, laughter, interruptions, and non-speech utterances. I did this as soon as the interviews were done. I then read and reviewed the individual transcripts to familiarize myself with the data. As I did this, I kept memos of potential common codes based on the literature. I printed out the transcripts and highlighted potential codes based on what came to mind as I read the transcripts. These codes were short words/phrases sometimes got directly verbatim from the transcript. I kept these in mind as I moved to the next step. I then imported the documents into NVivo and created nodes based on the interview data. The software allowed me to code, categorize, and develop themes. I began by running a text query but this did not produce useful results. In the end, I used the questions used in the interview guide in discussing five themes. The participants described their experiences with comorbid illnesses and how technology can be used to promote this. Five major themes emerged: "management of the diseases", "obstacles in disease management", "restrictions in activities of daily living", "understanding of technology" and, "use of technology to promote self-management." Developing the nodes helped me see all the comments as they related to the themes (Table 2).

Table 2

Nodes/Main themes

Theme
Managing the diseases
Regular monitoring
Clinic attendance
Use of drugs
Diet management

- Obstacles in disease management
  - Lack of insurance for outpatient services
  - Multiple drug regimens
  - Missed appointments
- Management of distressing symptoms
  - Managing distressing symptoms
  - Disease interactions
- Understanding of technology
  - Meaning of technology
  - Types of technologies used in health
- Use of technology to promote self-management
  - Source of information
  - Reminders

I was careful to ensure that the participants’ voice came through and that the categorization reflected the true nature of the data. In addition, the NVivo software tracked the participant’s data allowing me to see which participant made the comment.

Evidence of Trustworthiness

I reminded each participant that, as indicated in the consent form, that participation in the study was voluntary and that they had the right to withdraw at any time without fear of intimidation. This assured the credibility of the study by ensuring that participation was voluntary and not coerced. At the beginning of each interview, I established rapport with the prospective participant, and started by finding out how they were and the language of choice. I found that this ensured that they were relaxed and more receptive to the questions. However, I noted that once the participant understood that they were being audio recorded they became weary of the process. I took time to set them at ease and explained the data protection processes I would follow. If the participant was still uneasy with the recording, I excused them from participation. Additionally, since majority of the participants were older persons, I ensured that I respected the cultural issues concerning the interviewing process. Throughout the interview process, I conducted member checks by clarifying any areas that were ambiguous.

To ensure transferability, I have given a detailed account of my field experiences, and made explicit the cultural and social relationships in the context of the research. I have reported the phenomenon under study and given a thick description of the research findings. As Lincoln and Guba (1985) assert, this would enable those who seek to transfer the findings to their own site judge transferability. I have also provided the demographic characteristics of the participants and explained how I conducted the study. This would make it easy for other researchers to replicate the study in other settings. Dependability in this study was maintained by ensuring that the research processes were logical and clearly documented. I have provided a detailed account of the methodology used. Tobin and Begley (2004) assert that the research process should be logical and traceable. This would ensure that other researchers could judge the dependability of the research by examining the research process (Lincoln & Guba, 1985). I have also kept all the audio recordings, the transcripts and the field notes, which will provide a documentation trail.

Tobin and Begley (2004) explain that confirmability means that the researcher’s conclusions and findings are derived from the data. Confirmability is concerned with establishing that the researcher’s findings and interpretations are clearly derived from the data. This must be demonstrated in the research. In this study, I have demonstrated that the results are derived from the collected data. I have ensured this by providing direct quotes from the participants without any personal interpretation. I have also provided the rationale for the theoretical and methodological choices as recommended by Koch (1994).

Results

Throughout the study, I sought to answer three research questions, labeled RQ1, RQ2, and RQ3. Subsequently, after data analysis, five major themes emerged. These were validated from various interview questions. Theme 1 answered RQ 1, Theme 2 and 3 answered RQ 2, while Theme 4 and 5 answered RQ 3.

RQ1 *What do patients with comorbidity understand by the term 'self-management'??* This question focused on the type and number of comorbidities and how the participants' management the diseases while at home. From this question one theme/node emerged. Under this theme, there were four categories.

Node 1: Managing the diseases

The first node describes how the participants managed the comorbidities while at home.

Category 1: Regular monitoring.

In this category, three participants explained that one of the ways of monitoring their health status was via regular testing/measurement of parameters. Jane stated, "I had come recently here for monitoring of my blood sugar, and I found it was 7 point something before eating, I had come just on my own for the test." Julia explained, "I go to a clinic near my house to monitor my blood pressure and then I record the readings and bring them the next time to the clinic. I can tell when the parameters are abnormal." Jessica stated, "I am careful about my blood pressure. I use an app in my phone to check the blood pressure regularly. Sometimes they are not accurate. In such case, I go to the clinic. I do so especially when I feel sick.” The other seven participants explained that even though they do not monitor their diseases at home, they are keen when they come to the clinic to understand the values. For example during clinic days, they all get their blood pressure and blood sugar checked. All the participants interviewed understood what the normal parameters are based on their disease.

Category 2: Clinic Attendance.

In the management of the comorbid conditions, all the participants explained that they were strict in keeping their clinic appointments as a way of tracking the diseases. For example, Joseph stated, “Here we are given clinic appointments every two months and I make sure I attend.”

James stated, “I make sure I keep all the appointments” while Julia stated, “I come to the clinic as scheduled.” Jennifer stated, “I come to the clinic as scheduled”.

Category 3: Use of drugs.

In this category, the participants stated that one of the ways of managing the multiple diseases was by taking the prescribed drugs. In all the cases, the participants were aware of and could name the drugs they took for the diseases, including the frequencies (number of times per day). The participants stated they were keen to take the drugs as prescribed. They used phrases like, “I take my drugs as prescribed”, “I do not miss my drugs”, and “first of all I take drugs.” For example, Jessica said, “I take as septrin in the morning, Nebilet for blood pressure and for HIV I take one tablet at night, at 10pm”. John stated, ‘I am on Glucophage for the diabetes. I used to be on Lantus insulin but this was stopped when the blood sugar stabilized”. Jane stated, “I take drugs as prescribed. When I am in pain, I take the drugs”. Julia stated, “for the hypertension I take drugs on time and the blood pressure is okay” while Jenifer stated, “I make sure I take the prescribed drugs.”

Category 4: Diet Management.

In this category, the participants discussed the use of special diet in the management of the diseases. John stated, “we were educated about eating habits. I take tea without sugar, and eat more fruit and vegetables.” Joseph shared similar sentiments and stated:

> On diet, right from the beginning, I was advised which foods not to eat. So I take indigenous vegetables, I avoid red meat, even if I come to your house as a guest, and you put that on my plate, is will say no.

James shared similar experiences and stated, “I eat the right foods. First, of all the foods must be whole meal foods, then I avoid sugar and I do not add salt on the table, only when cooking. I also take a lot of water.” June stated, “I take a lot of vegetables. At home I eat the traditional vegetables like sageti, terere, and managu .” Jenifer said, “I control the disease by eating well. Eating fruits and foods that add blood and strength.” Jasper stated, ‘I eat arrowroots, spinach, meat- white meat, fish, and I avoid red meat. I also eat brown flat bread and corn meal.” Two participants also showed an understanding of the effects of diet on the control of symptoms. Jasper stated, “when I eat bananas, the sugar goes high. If I eat two or three bananas, the blood sugar rises. So I avoid them." Similar sentiments were shared by Julia who stated "if I take fatty and salty foods the blood pressure will go up."

However, one participant expressed that it was not always possible to eat the recommended foods. John stated, "sometimes I am forced to eat the normal food with the rest of the family." In another case, the participant was unaware of the requirements of a special diet. Jane stated "I did not know the food that is required so I eat what I can get. I was not told what to eat." Upon follow-up, Jane explained that this was not explained to her. At the end of the interview, I took the chance to educate her on the proper diet given her conditions. Jessica felt that though she complied with the diet, there were many restrictions. She said,

> The diet too, for the blood pressure I have to watch what I eat. I have decreased my salt intake, I do not take coffee. You know that for the blood pressure I have to watch what I eat. I watch my diet a lot a lot. I also avoid gaining weight. There are many diet restrictions.

RQ 2: *What are the challenges faced by patients with multiple comorbid conditions?* This question sought to explore the challenges the participants faced in the management of the conditions.

Node 2: Obstacles to Disease Management

In this theme, in response to the question on challenges faced in self-management, the participants the challenges in the following categories.

Category 1: Lack of insurance for outpatient services

All the participants explained that finances were a major hindrance in the achievement of self-management goals. They stated that they needed money for tests, drugs and to keep clinic appointments. Only one participant had health insurance that catered for outpatient care. John stated,” yes, I have insurance that covers the outpatient costs but it is limited since it also includes my family.” The rest of the participants were members of the national health insurance scheme, which catered for inpatient care only. They therefore had to pay for the outpatient services as well as drugs out of their pockets. Jane stated, “I pay cash. It is hard but it is my body and I have to struggle. Sometimes I ask my children for money.” Joseph stated, “the main worry is money. Money is the most problematic because when you do not have the money and you are supposed to go the clinic, you cannot.” Jenifer explained that the lack of finances hindered them from getting the required tests stating, “I have financial difficulties. Like now, I did not have money and I needed, Ksh. 6000 (USD 60), for tests. I also need money for the drugs and face many difficulties.” In other cases, the financial strains were a source of stress for the participant. June stated:

> My children pay. My son pays but the diseases use a lot of money. The costs are many. The drugs are expensive and sometimes I cry when I hear of the cost of the drugs. However, they encourage me and ask me to buy drugs for each week.

In other cases, the participants had to rely on friends or spouses for help. Jackie stated, “I ask people of good will and my friends to contribute. Once I get the money I buy the drugs.” Julia added, “my husband is paying now. Sometimes I get the money sometimes I don’t.” Jenifer attributed clinic attendance to her financial status and stated, "When I have money, I come to the clinic." Jackie stated, "I had been asked to come to the clinic in 2016 but I missed because I did not have the money for the tests." Julia also expressed concern that the appointments were too many and stated, "I have come to the clinic three times this month, and this is challenging because I do not have money."

Category 2: Multiple Drugs

Each of the participant explained that remembering to take drugs at prescribed time is tiresome. Though the participants took the drugs as prescribed, they were worried about forgetting to take the drugs, bad effects, and the burden of many pills. Jackie explained that the many drugs could lead to confusion in the dosing regimen stating: Earlier on, I was taking too many drugs. At times, I even confused the dosing. Like one time I remember a drug I had been given been instructed to take once a week. However, I took the drug every day. I have too many drugs. Jenifer stated "I worry that the drugs will finish me.'' In other cases the participants did not know when and how to take the drugs. Jane stated: I did not know it was serious and that there are certain times when I am supposed to take the drugs. The doctor has told me today that I have to take the drugs as prescribed. If I am not in pain, I do not take the drugs. In addition, sometimes when I find that my blood pressure is okay, I stop taking the drugs. June stated "there is a time I was taking seven different drugs. I had to take my time swallowing them because they were so many." In other cases, the participants were concerned about the number of drugs and the resulting confusion while taking the drugs.

Joseph stated, "when I take drugs, I can do my work without any worries. However, if I do not use the drugs, it (the disease) can bring me down. The hands become stiff and I cannot function." The other participants explained that they had no option but to take the drugs.

Category 3: Missed Appointments

The participants understood that clinic attendance was important in the management of the diseases. In this category, the participants stated that as much as possible they ensured that they attended the clinics as scheduled. However, they did not always keep clinic appointments for varied reasons. Of those who reported having missed appointments, this was attributed to finances. Joseph stated, "money is the most problematic. When I do not have the money and I am supposed to go to the clinic I cannot." Jenifer attributed clinic attendance to her financial status and stated, "when I have money, I come to the clinic." Jackie stated "I had been asked to come to the clinic in 2016 but I missed because I did not have the money for the tests." Julia also expressed concern that the appointments were too many and stated, "I had come to the clinic three times this month, and this is challenging because I do not have money. I had to start the appointments and the test all over."

The rest of the participants said even though they did not miss the appointments, they had to look for ways of financing the trips that included borrowing. The rest of the participants explained that though they did not miss the clinic appointments because of money, they often were rescheduled because of large number of patients waiting to be attended to. This often meant that the doctor would see a certain number of patients and reschedule the rest. They described this as frustrating. I observed these during the days I was collecting data. A doctor would come to the clinic and see the first 30 patients, despite having over 60 patients booked for the day.

Node 3: Restrictions in the activities of daily living

In this category, the participants were still responding to question on the challenges faced in managing comorbid conditions. They expressed their experiences with the diseases and their impact on their daily lives. In response to the prompt, “What makes it easier/more difficult to care for your medical conditions?” several categories emerged.

Category 1: Distressing condition/symptoms

Every participant had a condition that they considered more problematic. In all the cases, the participants attributed the seriousness of the condition to the symptoms.

John stated, “Hypertension is more problematic because of the fluctuations.” Jane stated, “the disease that stresses me most is arthritis because of the stiffness of the joints. Sometimes I am unable to move or lift anything.” Joseph stated, “Arthritis is the most problematic because of the pain. When it is bad, it is very painful.” Jenifer indicated, “hypertension is more worrisome because it is affected by my mood” while James stated, “The hypertension. The blood sugar is usually within normal but the blood pressure keeps fluctuating. I a businessman and my interaction with people means I get stressed and the blood pressure rises.” June indicated, “The disease that is most problematic to me is arthritis. I am in pain at night and I am unable to sleep. Sometimes it is so bad that I keep moving around from the chair to the bed to the floor.” Jackie stated, “Arthritis is problematic. I keep having pains in my joints and back. The pain was severe does not go away" while Julia indicated, "hypertension is very problematic. Sometimes the blood pressure is high, I have a headache, and I feel tired." Jasper stated, "the heart disease is more serious. I get tired after walking for a short distance. Every time I walk I become restless." Jessica indicated, "HIV/AIDS is easy to manage. However, the blood pressure is tricky because at times because of the day to day happenings you find that sometimes you are stressed up and it affects my blood pressure."

Category 2: Disease interactions

Only four of the participants were able to explain how the diseases interact. This question was asked to gauge their understanding on how one disease can potentiate the signs and symptoms of another disease and therefore affect the quality of life. Joseph explained that when he took the drugs as prescribed he could work with no worries. He was able to explain that when he missed drugs, the symptoms of one disease could aggravate the other. He stated, "today when I go for monitoring, I know my blood pressure will be high because I am in pain." June stated "I am in pain a lot and I think this could cause the blood pressure to rise. When I am unable to sleep because of the pain in the knees and my back, my blood pressure will rise." Julia stated, "sometimes the blood pressure is very high, I have a headache, and I feel tired. This is because I had other problems, my abdomen was swollen, and I was stressed."

One participant also explained that one disease affected the management of the other one. Jessica explained:

> In fact, I was asking the doctor at comprehensive care clinic whether the HIV drugs, my ARVs are the ones that caused high blood pressure. He was trying to

> convince me but I think there is a relationship. Because previously I did not have hypertension. In addition, for all those eight years I have lived with HIV, it does not mean that what I was going through changed in any way. In fact, it has changed for better.

One participant expressed frustration at not understanding why the blood pressure was the way it was. John stated, “sometimes I take the blood pressure and it is okay. Other times it is so low. Sometime I feel normal but when I take the blood pressure it is high and I wonder what is happening.” Similar sentiments were expressed by James who stated,

I do not know how they (diseases) interact but there is a time I was watching a TV program and the presenters said that when you get hypertension you also get diabetes. I agree because I also started with hypertension and then I developed diabetes.

The other participants explained that during the clinic days they are educated on the diseases and have heard that some disease coexist but were not sure how. They consequently could not explain how the diseases influence each other and affect management.

RQ 3: What are the perspectives of patients with comorbid conditions on the use of eHealth technology to promote self-management?

This question focused on the participants understanding of technology and its use in promoting self-management.

Node 4: Meaning of technology

This node was derived from response in RQ 3 where the participants were asked to explain in their own words what they understood technology as. This information was important since their understanding of technology influenced their understanding of its use in health.

Category 1: Understanding of technology.

In this category, the participants were responding to the question on the meaning of technology. Generally, the participants described technology as advancements. The word digital kept recurring in five interviews. The participants provided their responses as follows. John said, ‘technology refers to advancements, being digital” while Jane indicated, “technology refers to the devices we use like the phone, digital devices.” Joseph stated, “technology means you can get information even without going to the doctor, you (health care provider) can use gadgets during appointments to book appointments so that I am attended to fast.” Jenifer said, “technology means advancements or being digital”. While James stated that, “technology means things that are being discovered every day, “June indicated, “technology simply means digital advancements”. Jackie indicated, ‘technology means devices like my phone” while Julia said, “I could say technology is something digital, like my phone”. Jasper said, “I think technology means advancements” while Jessica stated, “technology is a way of passing information and making things easier through social media and social networks, being digital.”

Category 2: Types of technology used in health

This category was derived as a follow up to the question on the meaning of technology. In this category, the participants indicated the types of technology they have used in managing their health. None of the participants was aware of any formal tools used by the health care providers and targeting patients with comorbidities. However, all the participants said they had used a mobile phone, television, or radio to access information on health. Jane also added that she had used the computer to search for information on her diseases. Julia indicated, ‘I have used my phone to search the cause of my diseases. I also had an app in my phone, which I used to monitor my blood pressure. It is not always accurate but I have used it. I always compare with the readings in the clinic”. Jessica mentioned the dial a doctor, which is an app used to call and ask for advice. She said,

> There is an app they call dial a doctor or call a doctor something like that. One text and ask the questions. I used it when I was pregnant and it was helping a lot, because I needed to understand how to manage with HIV/AIDS.

Node 5: Uses of technology in promoting self-management

This node was derived from the response to RQ 3 on how the identified technology has been used to promote self-management.

Category 1 Source of information

In this category, the participants explained that they used technology to get information on their diseases. All the participants stated that they had used either the radio or television to acquire information on the diseases. Joseph stated, “I get information from the media but I am careful. I watch the television and listen to the radio”. June stated “the doctor could call me and give me information, see if I am taking drugs and I can call for encouragement. Sometimes when I cannot sleep because I am in pain, I can call and ask what to do.” In another case, two participants felt that the doctor can use technology to get information. James stated, “I can get information from the doctor. The doctor can use the phone during consultations and share information with me.” Julia stated, “the doctor can use the phone to check on my symptoms during the clinic appointment.” Jane indicated, “they (doctors) now bring programs (on TV and radio) on different diseases and I listen when the programs are on radio. I do not miss.” Jackie indicated, “I listen to the radio on as they talk on general conditions. However, other times I hear them talk about my diseases. Like the other day, I was telling my daughter that they were talking about prevention of asthmatic attacks by avoiding cold”. Julia indicated she has used her phone to search the internet on information on asthma while Jasper said he relied mainly on the radio as a source of information. Jessica indicated that due to her HIV status, she often gets information on her phone on management of side effects and importance of adherence. She also indicated that she has used the internet to search for information on the comorbidity when she developed hypertension. June stated, “the health care provide could call me and give me information, see if I am taking drugs and I can call them for encouragement. Sometimes when I cannot sleep, I need someone to talk to and tell me what to do.”

Category 2: Reminders

In this category, the participants explained how technology can be used to get reminders from the health care provider. Five of the participants felt that technology can used to remind them to take drugs, attend appointments, or find out how they are progressing. Jenifer stated that though this has not happened before “the health care provider can call me and remind me to take drugs.” Julia stated, “the health care providers can call me to remind me to take drugs. They can also call me and ask how I am doing. In addition, the doctor can use the phone to check on my symptoms.” Jane stated,

> The health care provider can remind me on how to take drugs. In addition, reminders on diet, time to take drugs. Sometimes, I remember to take drugs at 4pm and because I am not feeling sick or in pain I take the drugs when going to bed. Therefore, I mess up the hours. The reminders would help.

Joseph stated, “It can help when I am at home and relaxing and I get a reminder to take drugs.” Jenifer shared similar views and stated, “the health care provider can call me to remind me of clinics and to take drugs.” Jessica stated that she has received communication on her phone to remind her to attend her clinic appointments.

Summary

The purpose of this phenomenological study was to understand the perspectives of patients with comorbid conditions on the use of eHealth to promote self-management. Ten participants were interviewed in the study. These interviews were audio recorded and transcribed verbatim. Once transcribed, I exported the data to Nvivo where I identified common nodes/themes. Five themes emerged: “management of the diseases”, “obstacles in disease management”, “restrictions in activities of daily living”, “understanding of technology” and, “use of technology to promote self-management.”

These themes enabled me answer the research questions that guided the study. Their main self-management activities included keeping clinic appointments, taking a special diet, and taking the medications as prescribed. Overall, the participants who had two or more chronic conditions expressed facing several challenges in the management of the diseases. They described their lived experiences as facing financial hardships that forced them to make decisions between treatment and other self-management activities. In addition, they struggled with the management of symptoms and the many pills used to manage the multiple conditions. They explained that their major source of information on management of the disease was from the health care provider. Though the hospital did not have any formal tools, they described having used several media like television and radio to get further information from programs that addressed chronic illnesses. Others reported having used the phone to call and get information from the doctor or get reminders for clinic appointments.

In Chapter 5, I will summarize the findings and share the interpretation of the results. I will also discuss the limitations of the study and make recommendations for future research. Finally, I will share the social implications of the study and make a conclusion for the study.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this dissertation was to explore the lived experiences of patients with comorbidities in order to understand their perspectives on the use of eHealth to promote self- management. After conducting interviews and analyzing the data, five themes emerged: management of the diseases, obstacles in disease management, restrictions in activities of daily living, understanding of technology and, use of technology to promote self-management. These themes answered the three research questions that guided the study. Overall, the participants expressed that they faced challenges in the management of multiple chronic conditions. These challenges included financial difficulties, multiple drug regimens, and poor management of symptoms. Despite the struggles, the participants expressed their commitment to the management of the diseases by keeping clinic appointments, taking drugs as prescribed, and following a special diet while at home. They seemed to understand that despite the challenges, they had to do what it took to manage the diseases. In this chapter, I will address the key findings, the interpretation of these findings, the limitations of the study and recommendations, and the contribution of the study to social change.

Interpretation of the Findings

Research Question 1 asked: What do patients with comorbidity understand by the term ‘self-management’? Self-management is, ‘the care taken by individuals towards their health and wellbeing' (Barlow et al., 2002). It encompasses collaborative goal setting that enables the patient to carry out activities of daily living and manage emotional effects of the disease more effectively. McGregor (2007) summarizes self-management as, “the tasks that individuals must undertake to live well with one or more chronic conditions.” Self-management fosters self-care and builds problem-solving skills. The question sought to understand how the participants understood self-management.

The participants shared their experiences on the management of the diseases while at home. They explained that apart from keeping clinic appointments where the diseases are monitored, they also engaged in activities that helped manage the diseases, such as following special diets and taking prescribed medications. Grady and Gough (2014) explain that the focus in the management of comorbidities is the maintenance of patient independence and ensuring a good quality of life. Kenning et al. (2015) explained that self-management is not simply giving information or health education but actions taken to lead a healthy life. This is similar to an explanation of self-management by Barlow et al. (2002): “the care taken by individuals to their own health and well-being.”

Though self-management is important in the management of comorbidities, the participants prioritized care depending on their situation. For example, if they faced financial constraints, some chose to forgo the clinic appointment in favor of buying drugs. Liddy (2014) explained that patients prioritize self-management tasks depending on the most problematic issue. Each of the participants had a condition that he felt was most problematic and was keen to control the symptoms of this disease. In fact, this condition was often what drove him to attend the clinic.

In order to improve their quality of life and manage their diseases, the participants noted the various activities they undertook. These activities promote self-efficacy and improve communication with the health care provider. However, as Davis, Funnell, and Beck (2003) explain, though self-management is inevitable in chronic diseases management, it can be hampered by the lack of information. Some of the participants did not understand how the diseases interacted neither the rationale for lifestyle adjustments. Others may lack information on the importance of adhering to the prescribed drug regimens. The higher number of comorbidities means the patient has to integrate more information. In fact, in this study, the patients were only able to mention the diseases they had and some of the drugs they take but lacked information on the disease itself and its actual interactions with other comorbidities. This is likely to overwhelm the patients. As it is, self-management requires daily participation in order to manage the conditions and prevent their progression.

Research Question 2 asked: What are the challenges faced by patients with multiple comorbid conditions? The participants expressed their experiences with living with multiple conditions and the challenges they faced. Financial constraints were mentioned as the major barrier in the management of the diseases. All the patients were members of the national hospital insurance fund scheme but it only catered for inpatient admission. This scheme is open to every Kenyan. In the recent past, the scheme is now covering the outpatient services. However, in the study area, this has not been commenced. Subsequently, all the participants paid for outpatient services from their pockets, which was a major constraint. Campbell et al. (2014) explains that patients need money to pay for the medications, consultations, and pay for travel. Consequently, patients prioritize care based on their financial fluidity. However, notable in this study was that every participant understood the importance of drug adherence. The participants explained having to buy drugs on credit or forfeiting a clinic appointment until they got the money to pay for consultations. These findings concur with those of Rosbach and Anderson (2017) who found that patients prioritize care based on the available resources. The participants prioritized care based on their financial capability.

The participants also described their experiences with the management of symptoms. They explained that some of the diseases did not show any symptoms despite being poorly controlled. On the other hand, they struggled with the management of distressing symptoms like pain. When the presentation of another disease overshadows the presentation of symptoms, it may interfere with the patient’s ability to manage the conditions. Bair et al. (2009) explains this stating that symptoms of one conditions may conceal the presentation of another. In addition, Liddy et al (2014) explains that though the patient may be willing to learn self-management skills, some manifestations can be a limiting factor.

In this study, every participant had a priority condition based on the level of stress emanating from that condition. This meant that the participant found it easier to manage one condition based on the symptomatology. As Morris, Sanders, Kennedy and Rogers (2011) explain patients feel pressure to allocate resources based on the condition they feel should get priority. This may be a source of conflict with the health care provider. Cheraghi et al. (2013) explained that each patient had a priority condition depending on its effect on functioning.

The higher number of comorbidities means that the patient has to manage complex treatment regimens. The participants described their experiences with having to take multiple drugs with different effects, nutrition management, and frequent monitoring. Since each of the diseases is unique, their interactions complicate management. This is further compounded by the fact that most chronic disease interactions, with the exception of hypertension and depression are poorly understood (Long & Dagogo-Jack, 2015). The coexistence means that the frequency and intensity of treatment of the conditions must be increased. Further, the comorbidity may escalate the possibility of drug interactions. Tran et al. (2015) explains that the treatment regimens are complex. Morrison et al. (2016) concur stating that drug interactions may complicate management.

What are the perspectives of patients with comorbid conditions on the use of technology for self-management? The participants expressed the need to information and support in the management of the comorbid diseases. They described their experiences with the use of several media to get information on their diseases. Though their main source of information was the health care provider, they expressed the need for more information. In addition, in many primary care settings, health care is fragmented leaving the patient with the burden of integrating the information (Zulman et al., 2015). It would therefore, be practical to make the patient a partner to their care. The participants explained that the radio and TV programs were a rich source of information and some used this information to change their lifestyle. In Kenya, there are several health programs hosted on radio and television, hosted at specific times by qualified health care providers. They have become very popular across the masses since they are very informative and many people tune in at this time. The participants explained that they followed these programs and it helped them understand their diseases better. These findings concur with those of Williams et al. (2014) who found that patients explained that used of technology created and increased awareness of symptoms, and reassured them that they could manage the symptoms. Clark (2014) explained that for technology to be useful, it must be integrated in the normal daily patterns. To avoid bias of information, Schultz and Nakamoto (2013) add that the patient must be guided in choosing the information that is beneficial to their condition. This was the case in this study because they all had access to the radio or television and made a choice of the programs to listen to or watch.

The participants expressed the need for further interaction using technology to support them in the management of the conditions. They desired that the health care provider could use the available technology to communicate with them regarding how to take drugs, reminder on clinic appointments and general support. Gray, Miller, Kuliski, and Cott (2014) explain this stating that patients expressed that eHealth enables a shared communication between the patient and the caregiver. Zulman et al. (2015) asserts that the use of eHealth tools had the potential to decrease the volume of visits and promote self-efficacy. Though there are no formal tools used by the health care providers to reach the patients, the potential of the mobile phone in communicating with them was raised. Each of the participant interviewed owned a mobile phone. The participants explained that, especially when they had no symptoms, they tended to forget to take their medication and would benefit from reminders by the health care provider. They would then appreciate if their phones were used, with their permission, to give reminders.

Education on the use of eHealth is also important. The participants were of varied ages and some were not aware of other eHealth applications that they could exploit. Gee, Greenwood, Patterniti, Ward, and Miller (2015) explain that though eHealth makes an important contribution in promotion of self-management, eHealth education should be promoted. This would reduce anxiety on technology use. This is particularly notable in this study. With the exception of two participants, the rest had not thought of accessing the internet for information. This could be linked to access to internet services. Though these participants attend the clinic in a hospital located in the urban area, they originated from varied settings with no ready access to internet. In exploring the needs of older patients on the use of eHealth, Ware et al. (2017) found that they had diverse needs and preferences, and any technology must address the gap in access to health information. Information tailored to these needs can be accessed via technology.

Though the use of technology at home can lead to improved patient outcomes, increased quality of care and promote patient involvement in their care, its implementation at is not always feasible and may take time for formal implementation. In their review, Peeters, Wiegers and & Friele, (2013) explain that though the value of eHealth applications is known, concept of self-management is not well defined. Further, the studies reviewed in this study show the influence of technology on patient understanding of their diseases but not necessarily effect on self-management.

The technology acceptance model. This framework by Davis (1986) helped me understand the phenomenon on the perspectives on the use of eHealth technology for self-management. Davis proposed that usage of technology depends on the user's attitude and perceived usefulness of the technology. The patient's perspectives on the usefulness of the approaches determine their acceptance. Though there were no formal applications in the hospital, their acceptance of formal applications depends on the use of non-formal applications.

The simplicity of and usefulness of use are mediated by the attitude of the user and the intentions to use technology. Though each participant had a mobile phone, only a few used the phone for health information. This could be explained by the participants' characteristics sine majority were aged over 50 years and not competent on the use of the internet. However, all used the known and easily available media, the radio, and television, to learn more about their conditions. As Clark (2014) found, the value of eHealth applications should be integrated in normal daily activities.

Harvey et al., (2015) contends that eHealth applications allow personalization of the needs of the end user, in this case the patient with comorbidity. To this end, the individual attributes of the user as proposed by Davis (1986) should be considered. The participants expressed the contribution of technology towards disease management. While some relied on locally available media, others used their phones or the internet. The television and radio are common in Kenyan households, with every family owning either or both. In addition, the mobile phones are quite popular. However, while there are other interventions targeting adherence to drugs in some conditions like HIV/AIDS, birth preparedness among others, none are focused on the patients with comorbidities. Yet this medium offers a ready avenue for reaching these patients. There is need to understand the end user in order to tailor interventions to their needs.

Crucial to successful implementation of eHealth is the right attitude towards it by the intended users. Perceived usefulness as it is described in this study was based on the patients' experiences with non- formal eHealth strategies. It was conducted to gain understanding on the experiences of patients with comorbid conditions on the usage of technology to support self-management. The technology acceptance model can predict an individual's use and adoption of technology. It predicts intention to use and is easy to use. Understanding these aspects may form a basis for implementation of formal eHealth applications targeting this group. The technology acceptance model can be used to direct strategies to improve acceptance of technology.

Limitations of the Study

In my study, I conducted 10 interviews with participants with comorbid conditions. I am a novice qualitative researcher and since data collection heavily relied on me, any biases I may have had may have influenced the inductive nature of data analysis. I had intended to conduct interviews on a different date from the recruitment date. However, I had to adjust this and conduct interviews on the same day. Subsequently, the participants who may have been waiting to be attended to for many hours were impatient. However, I ensured that at the end of each interview I clarified the information and did not delay them. Since I used a phenomenological approach, and a small sample of 10 participants, the findings cannot be generalized to other population groups that do not share the phenomenon (Langdridge, 2007).

Recommendations

I used a phenomenological approach to explore the lived experiences of patients with comorbidities in order to understand their perspectives on the use of technology for self-management. The choice of the design limits the generalization of the study to other settings. Although there has been tremendous knowledge in the use of technology to promote self-management worldwide, there remains a lack of empirical knowledge on how to integrate it into the daily life of the person with comorbidity. Based on the findings of this study, I have the following recommendations on further studies:

- A qualitative study on treatment adherence among patients with comorbidity.
- A qualitative study on patient satisfaction with physician-patient communication during consultations.
- A feasibility study on follow up using mobile phones for patients with comorbidity.
- A qualitative study on self-management priority setting and decision-making in adults with comorbidity.

Implications

Supporting self-management among patients with comorbidities contributes to an improvement in their general health. I recommend that positive social change in the lives of patients with comorbidities start with an understanding of the challenges they face in the management of these diseases. Further, an understanding of the perspectives on the use of technology should be enhanced. Researcher can gather data that can be used by stakeholders in the implementation of formal eHealth tools. Through my study, I was able to understand the challenges faced by the patients with comorbidities. I was able to ascertain that they have used the television and radio to get information on their diseases. These form an important alternative to the information offered by the health care providers. In the clinics where I collected data, there are very many patients waiting to be attended to by the doctors. As a result, it is hard to personalize information for each patient because of the limited contact time. The use of these simple forms of technology offers an alternative avenue to promote self-management activities by offering information. Further, they offer an idea of how organized program can be used to target certain population. Other researchers can focus on patients who are using formal tools in other settings to explore their feasibility in the promotion of self-management.

Because communicable diseases are on the rise in Kenya, there is need to focus policies and research on approaches that promote self-management. Based on the results of this study, the policymakers and the implementer of national health insurance fund can use the information to include the outpatient care in their coverage. In areas where this has been implemented, a research on the satisfaction with the services can be done. Jasper stated “The only thing I can suggest is that patients with hypertension, diabetes, and cardiac disease should be given drugs for free because the drugs are many and expensive and they must take them.”

There is need to consider having a stakeholders forum to explore how technology can be used to reduce the hospital visits, pass information and promote adherence. A pilot study on the feasibility of formal tools can be used for the patients. This study has provided an identification of the opportunities to advance technology among patients with comorbidities. Using technology, patients with comorbidity will be more knowledgeable on the management of their on their conditions. This category of patients with comorbidity remains largely unnoticed. Despite their numbers rising, the organization of the outpatient clinics from this study remains fragmented. This study has brought to the fore the problem of comorbidity. Subsequently, upon the dissemination of the results of this study, the policy makers should rethink the focus on outpatient care.

Conclusion

This study was conducted to assess the lived experiences of patients with comorbidities on the use of technology to promote self-management. To study this phenomenon, I conducted in depth interviews with participants with comorbidities. I audio recorded the interviews which I then transcribed verbatim. I then important the data into NVivo for analysis and five themes emerged from the analysis: “management of the diseases”, “obstacles in disease management”, “restrictions in activities of daily living”, “understanding of technology” and, “use of technology to promote self-management.” These themes helped me understand the challenges faces by patients with comorbidity and their perception on how technology could be used to promote self-management. Each participant had a condition that he or she considered most problematic because either it affected the quality of their daily lives, or they had difficulties controlling the symptoms. For the most part the participants said that they faced financial constraints. They stated that they needed money to buy drugs, buy food, and keep doctor’s appointments. Though they were all members of the national hospital insurance fund, they had to pay from their pockets for these services and this was a major constraint. Additionally, poor management of symptoms and multiple drugs regimens were described as to other challenges to self-management. To promote self-management while at home, the participants reported that they kept clinic appointments, took the prescribed drugs, and took special diets.

Concerning eHealth technology, none of participants was aware of any formal tools used by the hospital for clients with comorbidities. However, they all had used one form of technology to either learn about the disease or change their lifestyle. There are formal TV and radio programs on a daily basis that the participants mentioned that this was a great source of information on the diseases.

It is clear that the patients with comorbidities struggle with the comorbidities. However, from these programs the health providers can get ideas on how to use formal technology tools to reach patients. As the patients struggle with managing the diseases at home, it is clear that they struggle particularly in understanding the symptoms, understanding the diseases, and getting information on how to improve their quality of life. In addition, the financial constraints could be a source of stress for the patients making some of the conditions to worsen. This study shows a niche that the health care providers can address to help the patients improve their quality of life while increasing an understanding of their challenges. It brings about social change by bringing out an understanding on the challenges faced by patient with comorbidities, and how the use of technology to promote self-management among this certainly growing group. By its nature, qualitative study brings about an immediate social change by interacting with the participants and influencing their perception on their care.

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Appendix A: Recruitment flyer

Walden University

Volunteers Wanted for a Research Study

I am looking for volunteers to take part in a study on, ‘Perspectives of Patients with Comorbidity on Use of eHealth Technology for Self-Management’.

As a participant in the study, you will be asked to participate in individual interviews where I will seek your views on use of technology in the management of the comorbid conditions. The purpose of the research is to understand the perspectives of patients with comorbidity on the use of eHealth to promote self-management.

For you to be eligible, you must have at least two chronic conditions. Your participation is voluntary and would involve one interview session, lasting approximately 30-40 minutes.

In appreciation for your time, you will receive Ksh. 500.

For more information about this research, or to volunteer for this research, please contact:

Dorcas Maina

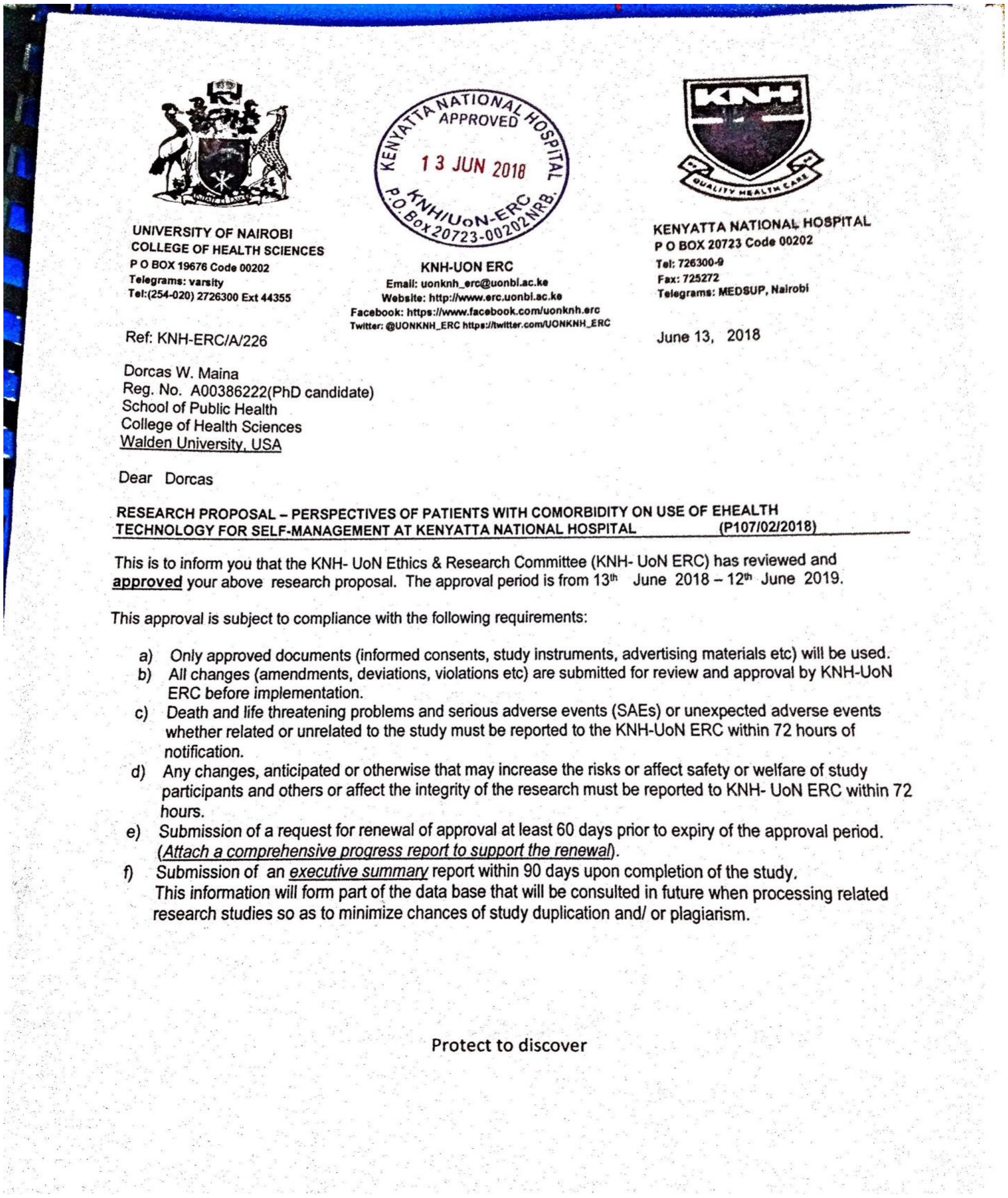
Walden University

At Phone number +254724440843

Email: dorcas.maina@waldenu.edu

The study has been reviewed and approved by the University of Nairobi and Kenyatta National Hospital Ethics Review committee and the Institutional Review Board at Walden University

Appendix B: Approval Letter from Kenyatta National Hospital-University of Nairobi Ethical Committee



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KENYATTA NATIONAL HOSPITAL
APPROVED
13 JUN 2018
KNH/UoN-ERC
P.O. Box 20723-00202 NRB.

Ref: KNH-ERC/A/226

June 13, 2018

Dorcas W. Maina
Reg. No. A00386222(PhD candidate)
School of Public Health
College of Health Sciences
Walden University, USA

Dear Dorcas

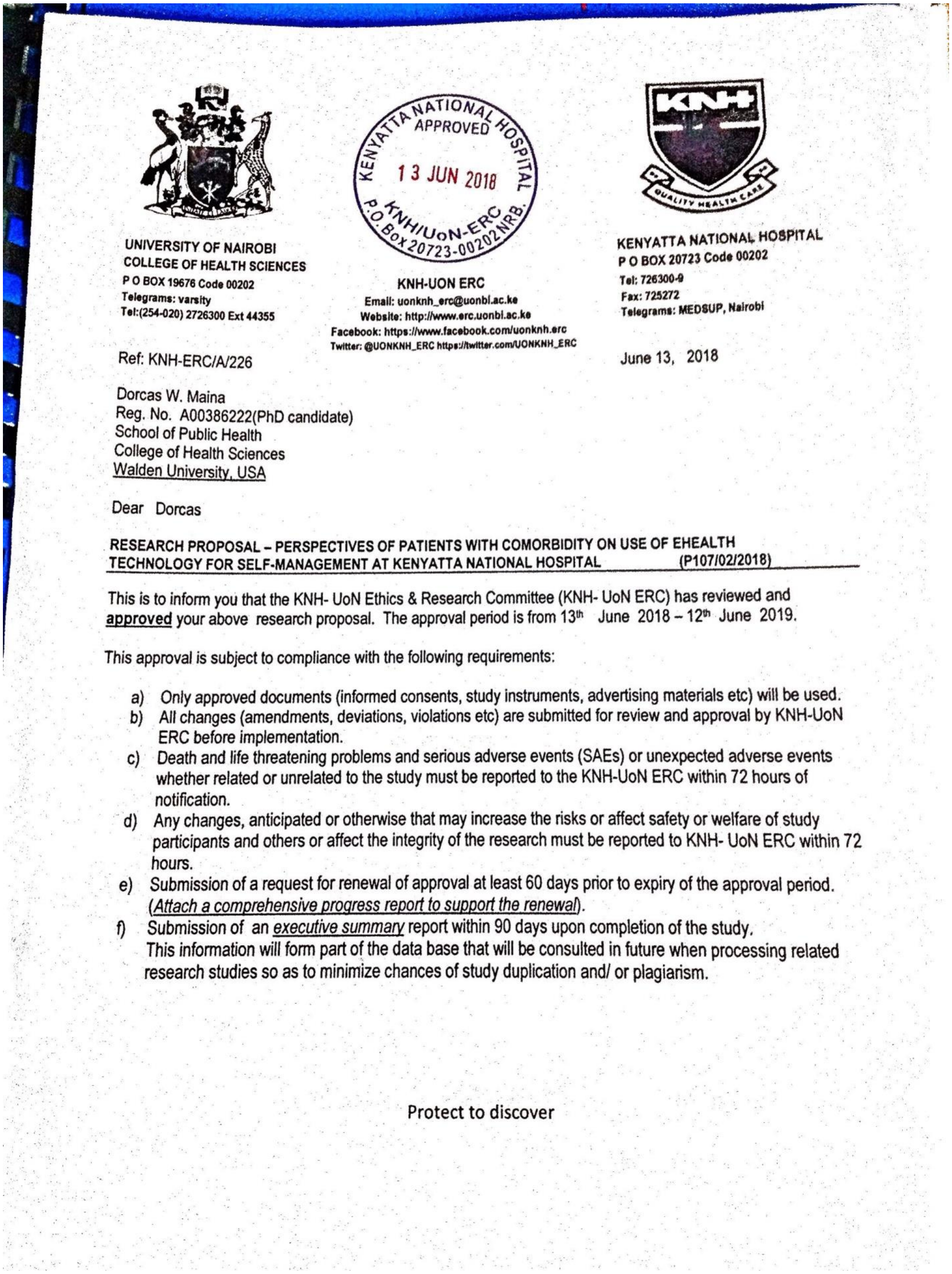
RESEARCH PROPOSAL – PERSPECTIVES OF PATIENTS WITH COMORBIDITY ON USE OF EHEALTH TECHNOLOGY FOR SELF-MANAGEMENT AT KENYATTA NATIONAL HOSPITAL (P107/02/2018)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is from 13th June 2018 – 12th June 2019.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH-UoN ERC before implementation.
c) Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Submission of an *executive summary* report within 90 days upon completion of the study.
This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

Protect to discover



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