

**Reducing Disparities in Hypertension among African American Women through
Understanding Information Seeking and Information Use**

by

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Dedication

This dissertation is dedicated to my family. To Sidney, my world: Aim high and believe in yourself – you can accomplish anything. Thank you for listening to my presentations and for being patient with me when you were ready to play. You're the best daughter that Mommie could ask for. To my parents, thank you for setting high expectations for me, then providing all of the support and encouragement that I needed to exceed those expectations. You've led by example and I pray that I am able to do for Sidney all of what you have done for me. To my sister, thank you for inspiring me and for reminding me why we decided to do the work that we do. You're the perfect example of what it means to be outstanding and humble. I love you all and I wouldn't have been able to achieve this goal without each of you!!

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ABSTRACT

Purpose: The purpose of this dissertation project is to establish a foundation to develop interventions to reduce the health disparity in hypertension that disproportionately affects African American women: (a) explore the evidence on Internet health information seeking; (b) describe Internet behaviors and information behaviors in a sample of African American women; and (c) determine the ability of a conceptual model to explain the variance in information use in a sample of African American women.

Methods: The first set of data (literature review) was collected from 15 electronic databases. A total of 9 empirical studies were included in the review. The second set of data was collected from African American women attending a Midwestern church conference (n = 156). Frequencies, descriptives, and means were used to describe blood pressure, hypertension knowledge scores, and information seeking. Pearson *r* correlations were used to examine the relationships between information seeking and other information behaviors. Logistic regression was used to examine use of information take action to self-manage blood pressure.

Results: Manuscript 1 provides seven themes related to Internet health information seeking. Manuscript 2 shows that African American women could use enhanced hypertension education and the Internet could be a facilitator for nurse-patient interactions. Manuscript 3 displays findings that describe the ability conceptual model to explain information used to actively manage blood pressure in African American women. The conceptual model was a good fit to the data as correctly classified women who reported use of information to take action to self-manage blood pressure and those who did not among women at risk for hypertension. The conceptual model was not a good fit for women diagnosed with hypertension.

Conclusions: Using the Internet as a tool may be useful for African American women who are interested in self-managing their blood pressure. Women in the sample were using the Internet with frequency and could benefit from enhanced hypertension education. Social aspects of information seeking were identified in this sample; the women reported collaborative information seeking, incidental information acquisition, and information sharing. Information sharing was a significant, independent explanatory variable in the logistic regression models predicting information use.

CHAPTER 1

Introduction

Hypertension, or high blood pressure, is a serious global health issue (Bakris & Ritz, 2009; Kearney et al., 2005). According to the Centers for Disease Control, approximately one out of three Americans has high blood pressure (CDC, 2011; Valderrama et al., 2012). Hypertension is a dangerous chronic illness, with almost no early signs, and those with hypertension have an elevated risk of cardiovascular disease and stroke (Chobanian et al., 2003). Moreover, hypertension is one of the leading causes of morbidity and mortality in the United States (Roger et al., 2011). Despite the potential negative outcomes associated with uncontrolled blood pressure, hypertension is highly preventable and can be successfully managed (Chobanian et al., 2003). Although treatments are available, less than half of those with hypertension successfully control their blood pressure (Valderrama et al., 2012).

Statement of the Problem

Although hypertension is a global problem and its rates are increasing among all populations, particular racial/ethnic groups have higher rates and poorer outcomes than others. African Americans in the United States have the highest prevalence of hypertension of any such group in the world (Roger et al., 2011). They also have a higher prevalence of both advanced cardiac and renal disease (Chobanian et al., 2003). The Institute of Medicine has deemed such health outcomes as unacceptable and unfair, and challenged all healthcare professionals to ensure that all patients receive quality care (Smedley, Stith, & Nelson, 2009). In addition, the Institute

of Medicine has recommended that research studies be conducted to identify sources of disparities and intervention strategies as well as barriers to accessing care (Smedley et al., 2009). One Healthy People 2020 goal is to improve both health communication and information technology to improve health outcomes and achieve health equity (United States Department of Health and Human Services, Healthy People 2020, 2011). Health communication and information technologies need to be implemented and tested, to determine their usefulness and ability to improve health outcomes among African Americans with hypertension.

Blood pressure is the force of blood against the walls of the blood vessels. Hypertension, or high blood pressure, is identified by a person's blood pressure measuring greater than 140/90, needing to take an antihypertensive medication, and/or being told at least twice by a healthcare professional that one has high blood pressure (Roger et al., 2011). For persons with diabetes or renal disease, it is recommended that blood pressure be kept below 130/80 (Chobanian et al., 2003). Hypertension increases the risk of a myocardial infarction, cardiovascular stroke, heart failure, renal disease, and renal failure (Chobanian et al., 2003). Because blood pressure increases with age, older adults are more likely to have hypertension (Schiller, Lucas, Ward, & Peregoy, 2012). However, high blood pressure is a modifiable risk factor (Chobanian et al., 2003; Roger et al., 2011). There are evidenced based recommendations available to assist patients to successfully self-manage their blood pressure, such as lifestyle changes and medications (Eckel et al., 2013).

From 2003 to 2010, the prevalence of hypertension among adults in the United States increased to 30.4%, approximately 66.9 million people (Valderrama et al., 2012) (See Figure 1). Almost 54% of those with hypertension had uncontrolled blood pressure (Valderrama et al., 2012). Of the estimated 36 million with uncontrolled blood pressure, 32 million reported having

a usual source of health care, and 30 million had health insurance (Valderrama et al., 2012). These statistics are of particular concern because they conflict with previous reports that those with uncontrolled blood pressure did not have access to care or insurance (CDC, 2011). Thus, with a large percentage of those with hypertension reporting having health insurance and a regular provider, there appears to be a breakdown somewhere in the healthcare system and opportunities to intervene have been missed (Valderrama et al., 2012). After controlling for access to care or insurance, differences among racial and ethnic groups in hypertension control and outcomes remain, which is considered a health disparity (Smedley et al., 2009).

Race in the United States

The United States Office of Management and Budget (OMB) determines classification and standards for reporting race and ethnicity in America. There are five categories that an individual may self-select for race and two categories that may be selected for ethnicity. The five racial categories are: “American Indian or Alaska Native”, “Asian”, “Black or African American”, “Native Hawaiian or Other Pacific Islander”, and “White” (OMB, 1995). The two ethnicities are: “Hispanic or Latino” and “Not Hispanic or Latino” (OMB, 1995). In line with the purpose of this paper, hypertension among African Americans and Whites will be discussed. Therefore, the definition of both of these racial categories will be provided.

According to the OMB, a person who self identifies as “White” has origins in any of the “original peoples” from Europe, the Middle East, or North Africa (OMB, 1995). A person who self identifies as “Black or African American” has origins in any of the black racial groups in Africa, and terms such as “Haitian” or “Negro” also apply to this category (OMB, 1995). It is important to note, these categorizations might complicate the provision of an intervention that is tailored to racial, ethnic, or cultural beliefs. For example, there may be cultural differences in

conceptualization of hypertension among immigrants from Haiti, or African nations such as Somalia or Ethiopia, when compared to thoughts of an African American, who is a descendant of Africans who were enslaved in the United States. Likely, treatment choices may also be different among Whites, whose ancestors were settlers that established New England when compared with choices made by second generation Whites from the Middle East.

As the OMB provides two terms (Black or African American) to describe one group, the literature was reviewed to determine the most appropriate term. In the United States, a nationwide study was conducted to determine preferences for the terms “Black” and “African American” among “Americans of African descent” (Sigelman, Tuch, & Martin, 2005). Among over 2,000 participants, the preference for either term was almost equally divided: 48% of the sample preferred “Black”, 49% of the sample preferred African American (Sigelman et al., 2005). In one additional point of clarification, both African American and White may be used as noun in referencing a person or persons within a particular reference group (African American, n.d.; White, n.d.) Thus, the terms “White” and “African American” will be used henceforth.

African Americans With Hypertension

Compared with Whites, African Americans are diagnosed with hypertension at a younger age and are more likely to have poorly controlled blood pressure (Chobanian et al., 2003; Roger et al., 2011). Consequently, African Americans are living with uncontrolled blood pressure for a longer time, which means they are more likely than Whites to have a stroke, have renal failure, or die of heart disease (Chobanian et al., 2003). The prevalence of hypertension among African American women is 44%, higher than among Whites and African American men (Roger et al., 2011; Rosamond et al., 2008) (see Figure 2). Additionally, African American women have a shorter life expectancy and earlier onset of chronic disease and poorer blood pressure control in

comparison to White women (Chobanian et al., 2003; Heidenreich et al., 2011; Schiller et al., 2012). Although rates of hypertension are increasing among all populations, these disparities are projected to continue (Heidenreich et al., 2011). It is critical to find effective, appropriate interventions to help African Americans self-manage their blood pressure.

Costs Related to Hypertension

Health care system. Based on costs reported in the Medical Expenditure Panel Survey from 2001 to 2005, Heidenreich and colleagues (2011) were able to present current costs and project future direct costs for all cardiovascular diseases. In 2010, it was estimated that 131 billion dollars were spent in direct medical costs (Heidenreich et al., 2011). In addition, they calculated indirect costs, such as work loss, which in 2010 was approximately 25 billion annually. Of all cardiovascular diseases, hypertension is projected to have the greatest medical cost and will almost triple by 2030 (Heidenreich et al., 2011).

Personal costs. Although the costs reported by Heidenreich and colleagues (2011) were useful in determining how hypertension affects the medical system and workplace, they did not provide the specific costs borne by the patient or families. Among other “costs” are numerous adverse outcomes related to hypertension. Uncontrolled blood pressure increases the risk of stroke and dementia (Goldstein et al., 2011; Wang & Vasan, 2005). Both stroke and dementia may place a heavy burden on caregivers and significantly decrease the quality of life of patients who suffer from the effects of these conditions. Hypertension can also lead to renal disease and failure, which again places an increased burden on the patient, caregivers, and the healthcare system (Roger et al., 2011).

Hypertension may damage the eyes and vessels that provide blood flow to the eyes, which can cause vision impairment (Wong & Mitchell, 2007), potentially affecting one’s ability

to drive, read, and overall safety. Uncontrolled blood pressure can also lead to decreased blood flow to the sexual organs, causing sexual dysfunction in both men and women (Chobanian et al., 2003). Although these costs cannot be measured in terms of dollars, one can imagine how these ill effects might lead to changes in mood, sleep, eating habits, and other measures of quality of life. Relationships between hypertension and depression have been identified among older non-White adults (Bosworth et al., 2003). Bosworth and colleagues (2003) found that patients with hypertension were more likely to be depressed, with more stressors and less support.

Significance to Nursing

Nurses are well positioned to work to reduce the disparity in hypertension among African Americans. The Institute of Medicine has recommended that nurses (a) practice to the full extent of their education and training and (b) be recognized as full partners among all healthcare professionals (Institute of Medicine, 2011). Nurses are trained to monitor, treat, and educate patients; advanced practice nurses can also prescribe medications and develop individualized treatments plans (Bengtson & Drevenhorn, 2003; Breen, 2008; Chummun, 2009; McLean, Kingsbury, Costello, Cloutier, & Matheson, 2007). Nurse scientists are trained to develop and test strategies to increase the number of evidence-based interventions to be implemented. Each of these nursing roles is extremely important for increasing the number of patients whose blood pressure is under control (Institute of Medicine, 2011).

Currently Recommended Treatments

Nursing can have a significant role in the treatment of hypertension, including lifestyle modifications, medication therapy, and education, as described in the following.

Treatment

Studies have shown that successful treatment of hypertension reduces one's risk of stroke, myocardial infarction, and heart failure (Chobanian et al., 2003; James et al., 2014). Reports have shown that nurses are well equipped to help patients learn about hypertension, make lifestyle changes, adhere to medication, and self-manage their blood pressure (Aminoff & Kjellgren, 2001; Bengtson & Drevenhorn, 2003; Bosworth et al., 2005; Clark, Curran, & Noji, 2000; Hacıhasanoğlu & Gözümlü, 2011; Hill, 2003). What follows is a brief overview of recommended treatment to manage hypertension and nursing's potential role in providing these treatments.

Lifestyle Modifications

Diet. Chobanian and colleagues (2003) recommend that antihypertensive therapy begin with lifestyle modifications, which include changes related to dietary and exercise patterns. The Dietary Approaches to Stop Hypertension (DASH) diet has been a successful guide for eating patterns to decrease and control blood pressure (Heller, 2007). Decreasing the amount of sodium consumed in one's diet has also been successful in helping those with hypertension to reduce their blood pressure (Eckel et al., 2013). Flack et al. (2010) made specific recommendations regarding hypertension management in African American patients, such as increasing grains and fruits, while limiting fats.

Weight reduction is particularly important among African American patients with hypertension, as studies have shown that rates of obesity are higher among this population (Peters & Flack, 2000; Flack et al., 2010). In addition, monitoring and limiting sodium intake is important among African Americans (Peters & Flack, 2000; Flack et al., 2010, Eckel et al., 2013). There is evidence that lifestyle modifications are efficacious in reducing blood pressure in African Americans with hypertension (Appel et al., 2003).

Other lifestyle modifications. Physical activity is an important component of lifestyle modification to reduce and control blood pressure (Eckel et al., 2013). Chobanian and colleagues (2003) recommended 30 minutes of exercise on most days of the week in order to reduce one's blood pressure. Lifestyle modifications have been shown to reduce blood pressure alone, as well as increase the efficacy of drug therapy (Chobanian et al., 2003; Eckel et al., 2013). Because cigarette smoking and drinking alcohol increase blood pressure, limiting one's alcohol intake as well as smoking cessation are additional recommended lifestyle modifications (Chobanian et al., 2003).

Nurse administered interventions have been successful in assisting patients to self-manage their blood pressure through making these lifestyle changes (Aminoff & Kjellgren, 2001; Bengtson & Drevenhorn, 2003; Bosworth et al., 2005). In fact, nurses addressed lifestyle factors more than physicians (Aminoff & Kjellgren, 2001). After receiving guidance from a nurse on lifestyle changes, some patients may not need medication therapy (Bengtson & Drevenhorn, 2003). However, many patients are unable to lower their blood pressure with lifestyle changes alone (Chobanian et al., 2003). For example, those who live in "food deserts", where it is difficult to access a grocery store might be unable to participate in lifestyle changes that require purchasing fresh vegetables (Odedosu, Schoenthaler, Vieira, Agyemang, & Ogedegbe, 2012).

Medication Therapy

If blood pressure is not successfully lowered after participating lifestyle changes, it is recommended that medication therapy be initiated (James et al., 2014). There options for initiating medication therapy and recommendations are slightly different for African Americans (James et al., 2014). Some patients require a combination of medications to maintain their blood

pressure within a safe range (James et al., 2014). It is important to note that studies have shown that side effects may vary among racial groups. For example, both African American and Asian patients have a higher risk of angioedema and cough compared with Whites when taking the same blood pressure-reducing drugs (Chobanian et al., 2003). Besides, some African American patients are less likely to adhere to medication therapy when side effects are undesirable (Odedosu et al., 2012).

Nurses can mitigate these problems in two ways. First, they must remain current in evidence-based practice and cognizant of differences among groups, especially nurses who are prescribing anti-hypertensive medications (Breen, 2008). In addition, frequent patient-nurse interactions can lead to increased medication adherence among hypertensive patients (Bengtson & Drevenhorn, 2003; Bosworth et al., 2005; Chummun, 2011; Clark et al., 2000; Hill, 2003). While interacting with patients, nurses can assess patients for side effects and suggest modifications to their treatment plan (Breen, 2008). Nurses can also help patients to self-manage side effects while adhering to their current treatment plan (Rudd et al., 2004; Bosworth et al., 2007).

Education

Patients with hypertension require education related to both the disease process and to the treatment (Chobanian et al., 2003; McLean et al., 2007). Important concepts to emphasize with these patients are the chronic nature of the disease as well as the need to continue therapy after one's blood pressure is reduced to a safe range (Chobanian et al., 2003). However, poor knowledge of the disease process is a barrier to treatment among African Americans with hypertension (Odedosu et al., 2012). Some African American patients do not realize that they must continue treatment to maintain a safe blood pressure, as many view hypertension as an

acute problem (Hekler et al., 2008). However, it is within nursing's scope of practice to identify gaps in the patient's knowledge of hypertension and provide education that meets their needs (McLean et al., 2007).

Chobanian and colleagues (2003) recommended that regimens to reduce hypertension be tailored to the specific characteristics of each patient. Medication adherence, exercise patterns, and dietary choices are all important components of self-management of blood pressure (Valderrama et al., 2012). But patients have different beliefs, levels of knowledge, and cultural factors that may influence how they wish to control their blood pressure (Scisney-Matlock, 2009). Treatment will only be effective if the patient is motivated and committed to participating in the treatment plan (Chobanian et al., 2003).

Studies have shown that patients are more active in their treatment during interactions with nurses compared with interactions with physicians (Aminoff & Kjellgren, 2001; Bengtson & Drevenhorn, 2003). Therefore, it appears likely that nurses have an increased awareness of patient-specific factors and can help them organize care and revise choices according to their current lifestyle (Chummun, 2009; Clark et al., 2000; McLean et al., 2007). Patients have viewed nurses as available and approachable and believed they were afforded longer periods of time with them (Aminoff & Kjellgren, 2001; Bengtson & Drevenhorn, 2003; Chummun, 2011). In addition, nurses have been able to increase blood pressure awareness in those who were previously unable to identify hypertension (Clark et al., 2000; Hill, 2003). Due to increased awareness, patients may have visited a healthcare professional to address their elevated blood pressure, but prior to nursing intervention, they would not have sought care (Clark et al., 2000).

Patient Outcomes With Nursing

Several positive patient outcomes are related to receiving education and care from nurses. In fact, studies have shown that nurse-managed clinics have been more successful in assisting patients with blood pressure reduction and control than physician-run clinics (Bengtson & Drevenhorn, 2003; Chang, Fritschi, & Kim, 2012; Pheley et al., 1995). Advanced practice nurses have been shown to have provided patient care with similar or better blood pressure control compared to that of physicians (Wright, Romboli, DiTulio, Wogen, & Belletti, 2011). However, some studies show that the majority of patients seen by nurse practitioners are White (Wright et al., 2011). This suggests that there is an opportunity to further explore nurse practitioner care for African Americans with hypertension. Promising research by Hill (2003) found that a nurse practitioner led intervention was successful in lowering blood pressure and left ventricular mass in African American men. Similar studies are needed among African American women.

Patients have shown an increased knowledge of hypertension because of nurses (Bengtson & Drevenhorn, 2003). Nurse-led care has also increased patients' feelings of empowerment (Chang et al., 2012). Even if blood pressure reduction was not statistically significant, patients reported increased confidence in their ability to follow their treatment regimen after receiving education on blood pressure from a nurse (Bosworth et al., 2005). Also, after interacting with a nurse, patients are more likely to actively participate in their own care and return for follow-up care (Bengtson & Drevenhorn, 2003; Chummun, 2011).

Summary

There are health disparities among those with hypertension and nursing has been challenged to find methods to reduce those differences (Chobanian et al., 2003; Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, 2011; Heidenreich et al., 2011). The nursing profession has demonstrated skills that can make significant contributions

towards helping patients to successfully self-manage their blood pressure. Through implementing evidence-based practices, nurse-directed care will continue to decrease morbidity and mortality related to hypertension (Breen, 2008; Chummun, 2009; Peters & Flack, 2000). However, to further advance care provided by nurses, nursing must consider new intervention methods, especially those that can be tailored to meet the needs of vulnerable populations in order to continue to reduce the health disparity gap. The Internet can be used as an information technology for nurses to educate and interact with patients, although little is known about preferences among patients who seek health information through this medium. After reviewing the significance of individualized care for patients with hypertension, and the potential for nursing intervention and education, the Internet may be an innovative tool for nurses – it is an important topic that deserves further study.

Purpose

In general, the purpose of this dissertation study is to examine information behaviors, in order to determine innovative ways to improve blood pressure control among African American women, diagnosed with and at risk for hypertension.

This introduction has described hypertension in the United States: among the general population, among the African American population, among African American women, and costs related to hypertension. Currently recommended therapies were reviewed, presenting specific concerns for African Americans and implications for nursing's role for each therapy. What follows in Chapter 2 is an integrative literature review on Internet health information seeking. The literature review was conducted to (a) determine the evidence available on patients who use the Internet to find health information and (b) evaluate key themes identified in the literature review among a sample of African American women. Chapter 3 focuses on describing

Internet behaviors, as well as information behaviors in a sample of African American women. Chapter 3 also explores the relationships among information behaviors: information seeking, information sharing, and information use. Chapter 4 provides a statistical analysis that explores how information is used to self-manage blood pressure in a sample of African American women. The results of this study have the potential to highlight opportunities to extend the reach and effectiveness of interventions aimed to help reduce disparities in hypertension among African American women. Therefore, this project is an initial step in a program of research focused on use of information to self-manage hypertension.

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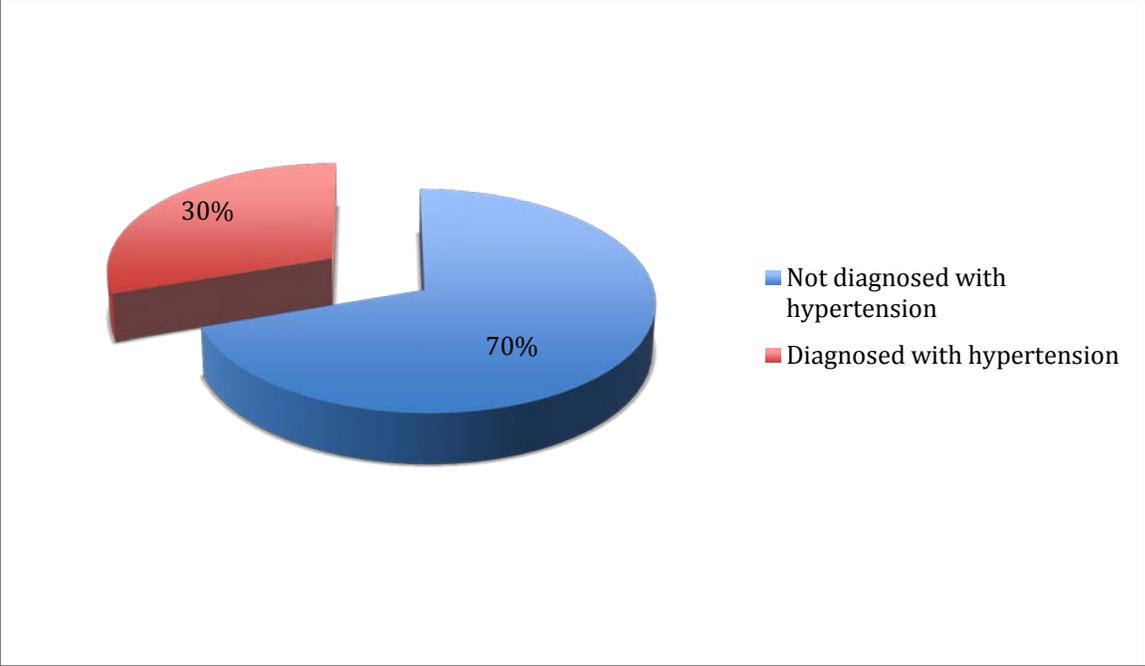


Figure 1. Prevalence of Hypertension in the U.S. (General population)

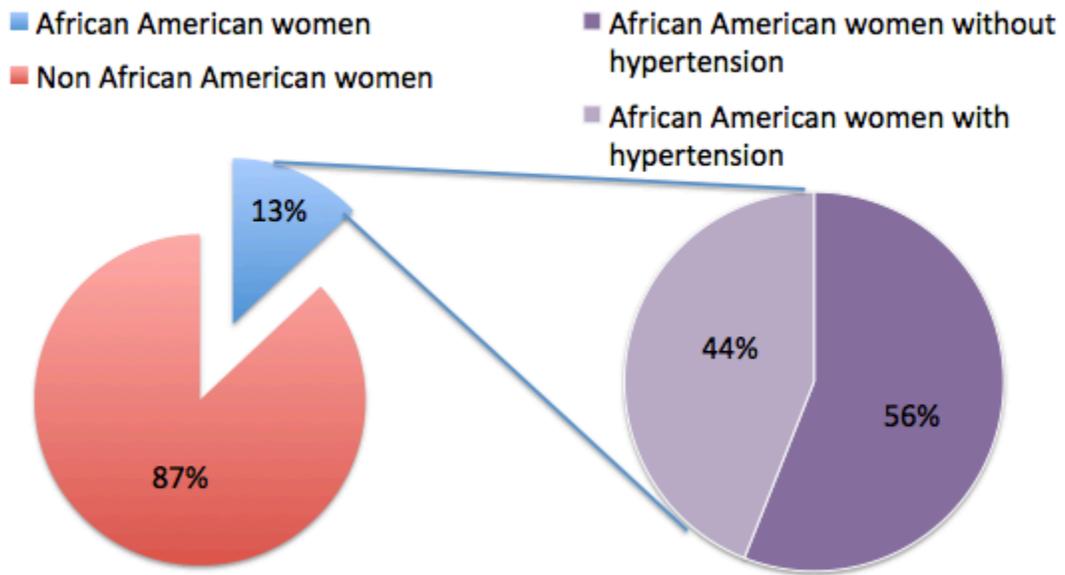


Figure 2. Percentage of African American Women in the U.S. vs. Prevalence of Hypertension among African American Women

CHAPTER 2

Internet Health Information Seeking: An Integrative Review of the Literature

Due to scarce resources, all healthcare professionals have been challenged to find unique, but evidence-based and effective ways to deliver care. The Institute of Medicine (2011) has made specific recommendations for nurses to meet some of the critical health needs in the United States. Many patients have unmet healthcare needs, but those with chronic illness are particularly vulnerable, and it is estimated that one in every four Americans are living with multiple chronic illnesses (Ward et al., 2014). Care for a chronic illness, such as hypertension, is complex, and a patient's needs may change over time (Schoen, Osborn, How, Doty, & Peugh, 2009). Chronic illness is a long-term problem, and patients require adequate information along with professional health care to effectively self-manage their disease over time (Holman & Lorig, 2004). Yet there are times when patients' information needs are not met. African American women with hypertension, a particularly vulnerable group, may benefit from blood pressure information that addresses their specific needs.

Emergence of the Internet as a Health Information Source

In the past, leaflets, booklets and other print materials have been provided to patients as reference sources to help them understand their condition or illness (Arthur, 1995). Some patients have preferred these kinds of materials, as they have time to read and absorb them (Timms, Ramsay, & Byfield, 2008). However, some written materials may not be cost-effective, may be outdated, lack interactivity, and may not be appropriate for all readers, especially those with low literacy skills (Coulter & Ellins, 2007). Therefore, such sources may be insufficient for

meeting patients' information needs. Today, considerable medical information is available on the Internet, and those with access can utilize it at any time of day or night (Diaz et al., 2002). Many patients with chronic illnesses are open to using the Internet; at least half report using it to find health information (Ayers & Kronenfeld, 2007; Fox & Purcell, 2010; Fox, 2011). Therefore, the Internet is a potential medium for meeting the health information needs of those who are chronically ill. In fact, one goal of the federal strategy document, Healthy People 2020 is to increase reports of easily accessed health information among those who use the Internet for this purpose (United States Department of Health and Human Services, Healthy People 2020, 2011). Although there is some evidence that patients are using the Internet to find health information, little is known about their preferences for seeking it through this medium. Some evidence of patients' health information seeking is available in the literature.

Health information seeking is defined as a conscious effort to obtain health information to meet a need or knowledge gap (Case, 2012). However, health information behavior may also include avoidance of information as well as information seeking (Case, 2012). Health information seeking behaviors are dynamic; they are dependent on the type and amount of information needed and the means by which the information is obtained (Lambert & Loiselle, 2007). In general, a preference is a like, want, or choice; preferring one thing to another (preference, *n.d.*). According to Krumholz (2013), healthcare is being redesigned and customized, based on patient's needs and values. It is critical to consider patient preferences, and to ensure that treatment goals are aligned with the patients goals, otherwise patient's may not be interested in adhering to treatment (Krumholz, 2013).

A modest number of studies have been conducted to determine patients' perceptions and use of the Internet for health information seeking, but few have considered patient preferences.

Therefore, the aims of the literature review for this study were to (a) examine the available evidence on patient preferences for health information seeking on the Internet, in the context of decision making, (b) synthesize the findings across studies, and (c) identify and discuss implications for nursing practice and research. Only one related literature review was found during the search. However, the years it covered were limited (2006 to 2010), the implications were specific to Europe, and no specific implications were provided for nursing practice.

This literature review study was designed to answer the following research questions (RQ):

RQ1: Have specific preferences, wants, needs, or desires for health information been identified among those who seek health information on the Internet, and who plan to use the information to aid in their decision making?

RQ2: To compare previous findings and assess for disparities, what are the characteristics of those who seek health information on the Internet? Are these findings relevant to African American women, in particular those with hypertension?

Rationale for Conducting the Literature Review

Studies on Internet health information seeking (IHIS). The Internet offers health information to patients with various illnesses and sociodemographic characteristics, as information can be tailored to meet individual needs (Kreps & Neuhauser, 2010). Some patients are open to using the Internet as a source of health information, and many have rated the information they have found on the Internet as equal to or better than what they receive from their physicians (Diaz et al., 2002). Besides, the more frequently patients had used the Internet to search for health information, the more likely they were to change healthcare behaviors (Ayers &

Kronenfeld, 2007). Therefore, African American women with hypertension may benefit from Internet health information seeking.

Studies have shown that typical Internet health information seekers are usually younger, female, with more education, a higher income, and private insurance (Ayers & Kronenfeld, 2007; Fox & Purcell, 2010; Lee, Ramírez, Lewis, Gray, & Hornik, 2012; Tian & Robinson, 2008). Adults with chronic illness are less likely to access the Internet for health information than those who do (Fox & Purcell, 2010; Fox, 2011). Some patients with chronic illness, such as African American women with hypertension, may not realize the potential benefits of health information seeking on the Internet, therefore they may be less likely to participate in information-supported behavior changes (Ayers & Kronenfeld, 2007; Fox & Purcell, 2010).

Studies on the digital divide. Disparities in access to technology such as the Internet have been termed “the digital divide.” Differences have been noted based on income, race and ethnicity, education, disability, living in a rural area, computer use, and Internet access and use (Ayers & Kronenfeld, 2007; Fairlie, 2004; McConnaughey, Sloan, & Nila, 1995). For example, Bertot and colleagues (2008) noted that 73% of libraries are the only source of free Internet access in their communities. Although specific programs were designed to target these disparities, and there were some improvements, some disparities remained unchanged or worsened. Moreover, although not statistically significant, the gap between African Americans and Whites who sought health information on the Internet widened after programs targeting the divide were implemented (Lorence, Park, & Fox, 2006b). African American women with high blood pressure may suffer from both disparities in hypertension, as well as disparities in Internet access.

Although the pre-existing disparities in accessing technology have remained constant and helped to create the digital divide, recent recommendations describe the potential for the Internet and other health technologies to bridge this divide (Lopez, Green, Tan-McGrory, King, & Betancourt, 2011). Lopez and colleagues (2011) suggested that the current structure of and access to information technologies, such as the Internet, may contribute to the digital divide. New interventions created with the knowledge of inequities and designed to reduce the division among different populations are needed. Recommendations were suggested at three levels: the system, the provider, and the patient (Lopez et al., 2011). Nurses have the potential to contribute to health information access at all three levels. Therefore, all nurses should be aware of these recommendations and participate in activities to meet them, as new HIT strategies will influence and be influenced by the nursing profession. In order to determine where nursing's efforts might be most useful in this regard, a review of the relevant literature was conducted.

Methods

The methodology for an integrative literature review as described by Whittemore and Knafl (2005) was used to guide this study. This formal methodology includes: problem identification, literature search, data evaluation, data analysis, and presentation. Integrative reviews allow inclusion of both experimental and non-experimental research. Therefore, both quantitative and qualitative studies were reviewed to determine their relevance to the aims of the current study (Whittemore & Knafl, 2005). This design was chosen to broadly review the literature, in order to explicate what is known about health information seeking via the Internet. The findings from this review intend to provide an evidence-based foundation for nursing research and practice regarding patients' health information seeking via the Internet.

Problem Identification

A modest number of studies have been conducted to determine patients' perceptions and use of the Internet for health information seeking; however, few have considered patient preferences for seeking health information, which could be used for their healthcare decision making.

Electronic Database Search

A literature search was conducted in the following databases: ERIC, Communications Abstracts, Communication and Mass Media Complete, CINAHL, PsychINFO, Web of Science, Embase, Scopus, EconLit, Sociological Abstracts, LISA, Medline, and LISTA, Business Abstracts, and Social Sciences Abstracts. Search terms included: patient* or consumer* AND prefer* or need* or want* or desire* and inform* AND information w/3 seek* or information w/3 look* or information w/3 acquisition and information w/3 search AND learn* or educat* or knowledge* AND decision* or choice* AND Internet or online or web-based. The searches were conducted through February 24th, 2013.

Studies were reviewed according to the following criteria: (a) described self-initiated Internet health information seeking, (b) were from the patient or consumer's perspective, (c) described the patients' preferences, wants, needs, or desires for health information, (d) described at least one outcome of Internet information seeking from the patient's perspective, (e) was written in English, and (f) was primary research. Studies were excluded if they did not meet these criteria. One narrative review, one case study, and one viewpoint paper are briefly mentioned in the results of the study, as these publications were reviewed during the data analysis, but not included in the data synthesis.

Database Search Outcome

The search yielded a total of 447 publications from these databases: ERIC (19), Communications Abstracts (6), Communication and Mass Media Complete (10), CINAHL (37), PsychINFO (28), Web of Science (83), Embase (36), Scopus (111), EconLit (9), Sociological Abstracts (10), LISA (15), Medline (62), LISTA (18), Business Abstracts (2), and Social Sciences Abstracts (1). After 218 duplicates were excluded, 229 abstracts were retrieved and reviewed to determine if they met the inclusion criteria. Due to their limitations in the search terminology and indexing, 149 abstracts were excluded, as they were unrelated to the topic of patient/consumer health information seeking on the Internet. When the remaining 80 publications were reviewed in their entirety, an additional 68 publications were eliminated, as they did not meet the study criteria. The references in the remaining 12 publications were directly searched and 5 more were retrieved and reviewed. However, none of these met the inclusion criteria. Therefore, only 12 publications were finally included in the review. (See Figure 3 for a flow diagram of this process.)

The publications were grouped into four categories: Group 1: viewpoint paper (1), Group 2: narrative review (1), Group 3: case study (1), and Group 4: data-based publications (9).

Quality Appraisal

According to Whitemore and Knafl (2005), there is no gold standard for evaluating and interpreting the quality of research in reviews. However, the guidelines of Burns and Grove (2009) for the critical appraisal of qualitative and quantitative research were used to evaluate the 9 data-based publications. More detail about the design, sample size, and analysis can be found in Tables 1 and 2.

Data Abstraction and Synthesis

A total of 9 data-based articles of the 12 publications met the final inclusion criteria. Each study included in the review was entered into an evidence table (See Appendix A). All studies were reviewed for similarities and differences. These findings were reviewed to identify themes that were consistent across the studies.

Results

Nine data-based articles met the criteria for inclusion: 5 qualitative studies and 4 quantitative studies. A range of sample sizes, health conditions, and study-specific aims was found. Health conditions represented were cancer (5) and pregnancy (1). Three studies did not target a specific population. Sample sizes ranged from 20 (a qualitative study) to 987 (a quantitative study). Samples had been recruited by a variety of means: community settings, telephone, and online. Most samples included both men and women. The subjects' ages ranged from 19 to 86. Some of the samples included African American participants, however the majority were non-Hispanic, White participants.

Group 1: Viewpoint Paper

One publication identified during the search had been submitted as a viewpoint article. The content of this article is briefly noted here, but was not included in the data synthesis. A number of factors were identified in the literature that have been shown to influence searches related to information on healthcare associated infections: search engine used, technology used, usability of the Web site, availability of the information, learning style, personality traits, situational context, emotional context, and psychological context (Reid & Borycki, 2012). They suggested that consideration of these factors in creating Internet health information sources for patients will allow them to find information best suited to aid their decision making.

Group 2: Narrative Review

One narrative review was found during the search. Its content is briefly noted here, but also was not included in the data synthesis. Most patients who seek health information online indicated that they seek information to clarify or gather additional information – after speaking with a health professional (McMullan, 2006). Health information found on the Internet has the potential to increase knowledge of a medication condition, as well as increase the user’s self efficacy (McMullan, 2006).

Group 3: Case Study

One case study was found that reported a description of four patients’ Internet use. This article is briefly noted here, but not included in data synthesis either. Three key components related to Internet health information seeking were presented. First, the information sought was specific to the patient’s information needs, as it related to their own health. Therefore, Internet seeking allowed patients to “personalize” the knowledge they would gain (Kivits, 2009). Next, the concept of an “informed user” was discussed. Although patients may not know all the information about a condition, knowing that they can search the Internet if they want additional information made them feel “informed” (Kivits, 2009). Finally, this article emphasized the issue of information overload. Although the Internet can be easily accessed and searched alone, at times it may be useful to have guidance from a health professional to help sort through the large quantity of information accessed (Kivits, 2009).

Group 4: Data-based Publications

There were 9 data-based papers (4 quantitative and 5 qualitative studies). The findings were reviewed for common themes among the studies. First, three of the authors of this study reviewed the findings separately to discover themes that were consistent across studies. Next, the authors met to examine and discuss the themes. Finally, after all authors reached a mutual

agreement, the findings were categorized under the following 7 themes to provide a structured, systematic way to present the data (see Figure 4).

Theme 1: Self-management of Medical Condition

Five studies showed that those who participated in IHIS wanted to be able to self-manage their medical condition – to feel informed and to address their health information needs (Balka et al., 2010; Lagan et al., 2011; Lorence et al., 2006b; Taha et al., 2009; van de Poll-Franse & van Eenbergen, 2008). Two studies reported that participants were searching for information because they needed to feel informed and as if they were in control (Balka et al., 2010; Lagan et al., 2011). Two of these studies reported that Internet health information seekers wanted to address their own information needs (Lagan et al., 2011; Taha et al., 2009). Two of the studies found that participants reported an increased ability to self-manage their medical condition, as well as improved health after using the Internet to obtain health information (Lorence et al., 2006b; Taha et al., 2009).

Subtheme: Health information needs. Seven studies revealed the content of health information that the participants were searching for (Balka et al., 2010; Gaie, 2006; Lagan et al., 2011; Maddock, Camporesi, Lewis, Ahmad, & Sullivan, 2012; Taha et al., 2009; van de Poll-Franse & van Eenbergen, 2008; Xie, 2009). Two of these studies reported that participants wanted information on general health and well-being (Taha et al., 2009; van de Poll-Franse & van Eenbergen, 2008). Six of the studies reported that participants were also interested in information on their medical condition, treatment choices, and the side effects of treatments (Balka et al., 2010; Lagan et al., 2011; Maddock et al., 2012; Taha et al., 2009; van de Poll-Franse & van Eenbergen, 2008; Xie, 2009). Another study found that participants were interested

in using the Internet to access their medical record and test results, as well as request appointments and prescriptions (van de Poll-Franse & van Eenbergen, 2008).

A few of the reports discussed needs related to others' experiences and wanting to know what to expect (Balka et al., 2010; Lagan et al., 2011; Xie, 2009). Three of the studies found that participants were interested in information on lifestyle changes, such as nutrition and exercise (Maddock et al., 2012; Taha et al., 2009; Xie, 2009). One study found that participants needed to determine if changes related to their medical condition were significant (Balka et al., 2010).

Some participants were interested in health information for the purpose of planning. Four of the studies found that participants wanted information for financial planning (finances, continuing work, leave of absence, insurance, or Medicare) (Balka et al., 2010; Maddock et al., 2012; Taha et al., 2009; van de Poll-Franse & van Eenbergen, 2008). One study found that participants wanted information on how to tell associates and family members that they had cancer (Balka et al., 2010).

Theme 2: Psychosocial Needs Related to IHIS

Some participants had psychosocial needs they were aiming to fulfill. Some of the studies reported positive psychosocial outcomes, while others found negative psychosocial outcomes.

Subtheme: Positive outcomes. Six of the studies described positive psychosocial outcomes (Balka et al., 2010; Gaie, 2006; Lagan et al., 2011; Maddock et al., 2012; van de Poll-Franse & van Eenbergen, 2008; Xie, 2009). Three of the studies reported that participants felt better informed, in control, and satisfied as a result of finding health information on the Internet (Balka et al., 2010; Lagan et al., 2011; van de Poll-Franse & van Eenbergen, 2008). Three of the studies found that participants were able to cope, felt reassured or comforted, and avoided feeling isolated after finding health information on the Internet (Gaie, 2006; Lagan et al., 2011; Xie,

2009). Four of the studies found that participants were able to make decisions after obtaining the health information they needed from the Internet (Balka et al., 2010; Lagan et al., 2011; Maddock et al., 2012; Xie, 2009).

Subtheme: Negative outcomes. Six of the studies described negative psychosocial outcomes (Balka et al., 2010; Gaie, 2006; Kim & Kwon, 2010; Lagan et al., 2011; Taha et al., 2009; van de Poll-Franse & van Eenbergen, 2008). Three of the studies found that participants felt stressed, anxious, or frustrated as a result of searching for health information on the Internet, some to the point that they lacked motivation to continue the search (Gaie, 2006; Kim & Kwon, 2010; Lagan et al., 2011). One study found that some participants were overwhelmed by the amount of health information they found on the Internet; for this reason half decided to seek assistance from a librarian to help sort through the information that they found (Balka et al., 2010). One study reported that participants wanted to find health information more quickly (Taha et al., 2009). One study found that a small percentage of participants had even more questions after seeking health information on the Internet (van de Poll-Franse & van Eenbergen, 2008).

Theme 3: Relationships with Healthcare Providers

Five studies presented findings on preference, trust, and utilization of health information sources among participants (Kim & Kwon, 2010; Lagan et al., 2011; Maddock et al., 2012; Taha et al., 2009; Xie, 2009). All five found that participants preferred, valued, and trusted their physician or provider as their primary and most important source of health information (Kim & Kwon, 2010; Lagan et al., 2011; Maddock et al., 2012; Taha et al., 2009; Xie, 2009). One study showed that participants identified the Internet as the second most trusted source, and the most utilized source (Kim & Kwon, 2010). Another study found that participants reported their nurse (oncology) as the second most important source of information, whereas the Internet was shown

to be the fourth most important source (Maddock et al., 2012). This was the only study that identified nurses to be a source of health information (Maddock et al., 2012). Four of the studies reported that participants felt confident, empowered, and better prepared to interact with their provider (Balka et al., 2010; Lagan et al., 2011; Maddock et al., 2012; Xie, 2009).

Theme 4: Perceived Benefits of IHIS

Six studies described benefits that participants perceived of IHIS. Two studies showed that the Internet is flexible, convenient, easy to use and understand, and familiar (Lagan et al., 2011; Xie, 2009). Four of the studies found that participants were able to make decisions after obtaining the health information they needed from the Internet (Balka et al., 2010; Lagan et al., 2011; Maddock et al., 2012; Xie, 2009). Two studies found that participants wanted to validate information they received from other sources (Lagan et al., 2011; Xie, 2009). Only one study discussed the finding that participants preferred a sufficient amount of information to make decisions (Gaie, 2006). One study reported that when compared with those who utilized other sources, participants were less likely to report that it took a lot of effort to obtain health information (Kim & Kwon, 2010).

Theme 5: Pattern of Search behaviors and Preferred Search Method and Frequency

Four studies presented findings on behaviors used for the search process (Balka et al., 2010; Lagan et al., 2011; Maddock et al., 2012; van de Poll-Franse & van Eenbergen, 2008). One study determined that most participants preferred to enter key words into a search engine (Lagan et al., 2011). Another study found that participants wanted to learn more specific search terms in order to retrieve results with the most relevant information (Taha et al., 2009). One study determined that participants identified one site that was used to aid in decision making (Maddock et al., 2012). Another study found that one third of participants preferred to communicate via

email, one third preferred to communicate through forums, and less than 10% used social networking to communicate about their medical condition (Maddock et al., 2012).

Two studies discussed findings related to timing and frequency of seeking information on the Internet (Lorence, Park, & Fox, 2006a; van de Poll-Franse & van Eenbergen, 2008). One study found that participants with chronic illness were more likely to search the Internet for health information on a daily basis (Lorence et al., 2006a). Another study determined that health information seeking was highest after being diagnosed with a medical condition (e.g., cancer), followed by the time period when the participants were receiving medical treatment (van de Poll-Franse & van Eenbergen, 2008).

Theme 6: Quality of Information

Six reports presented findings on quality of information (Balka et al., 2010; Gaie, 2006; Kim & Kwon, 2010; Lagan et al., 2011; Maddock et al., 2012; van de Poll-Franse & van Eenbergen, 2008). Five studies showed that participants preferred or trusted Web sites that were endorsed or created by health professionals or the government (Balka et al., 2010; Gaie, 2006; Lagan et al., 2011; Maddock et al., 2012; van de Poll-Franse & van Eenbergen, 2008). One study reported that some participants were concerned about the quality of some of the health information they found (Kim & Kwon, 2010).

Theme 7: Sociodemographic Characteristics

To compare the samples of the reviewed studies to previous samples of participants and to assess for disparities, the sociodemographic characteristics of each sample were reviewed (see Appendix A).

Three of the studies presented significant findings related to gender (Kim & Kwon, 2010; Lorence et al., 2006a; van de Poll-Franse & van Eenbergen, 2008). Two of the studies reported

that females were more likely than males to seek health information on the Internet (Kim & Kwon, 2010; Lorence et al., 2006a). In contrast, one study reported that men were more likely to seek information on the Internet (van de Poll-Franse & van Eenbergen, 2008).

Two of the studies reported results that were age-related (Kim & Kwon, 2010; Lorence et al., 2006a). Both found that participants were more likely to be younger than those who did not use the Internet to obtain health information (Kim & Kwon, 2010; Lorence et al., 2006a).

Two studies found a significant relationship between health information seeking on the Internet and level of education and that participants were mostly likely to have higher levels of education (Kim & Kwon, 2010). In contrast, one study reported no significant differences in education between those who participated in IHIS and those who did not (Taha, 2009).

One study reported findings regarding race and IHIS (Lorence et al., 2006a), reporting a significant association between race and health information seeking activity. Only two studies provided the racial composition of their samples, one sample was 86% non-Hispanic White (Kim & Kwon, 2010; Lorence et al., 2006a).

Discussion

This review of selected studies from a number of electronic databases has presented patients' preferences, needs, and wants among those who search for health information on the Internet. Both positive and negative outcomes of Internet use were presented, and the findings indicated that there are still disparities in patients' ability to obtain health information. This review revealed that certain information needs among those who those IHIS have not been met; some studies found that participants reported feeling overwhelmed by the amount of information retrieved in their results. Also, some studies contained participants who stated that after IHIS they were left with unanswered questions or even more questions than they began with. Of equal

importance, this review found that most participants still valued and wanted interaction with a healthcare provider.

Nurses are well positioned to address many of the identified issues related to IHIS. First, nurses are fully capable of meeting the needs of IHIS, both on and off the Internet. Nurses have excellent assessment skills, and can use them to determine patient-specific information needs and preferred medium. Further, nurses can provide an individualized, tailored plan in a manner preferred by the patient. For example, nurses can provide services from ordering “Internet prescriptions” to directing patients to relevant, reliable information (McMullan, 2006). Thus, both the care provided and the prescriptions are tailored to individual patient needs (Kreps & Neuhauser, 2010).

A search and critique of the available literature indicated that those whom IHIS apparently have some of the same complaints about the Internet as nonusers. This means that although a person may have experience with Internet use, it may be difficult for them to navigate through all the health information available. Nurses can thus facilitate patients by helping them organize health information and by providing education in terms the patient may not understand (Cline & Haynes, 2001). By designing information that meets patients’ specific needs, they can be spared frustration due to Internet information overload. Nurses can help prevent patients’ anxiety and frustration by directing them to reliable, well-organized sites (Cline & Haynes, 2001).

Another finding from this review was that some participants sought health information on the Internet because they did not have enough time with a provider. However, the participants in these studies still valued healthcare providers as the most reliable and trustworthy source of health information. This is consistent with other studies, which also found that participants

identified healthcare providers as the most important source (Fox & Duggan, 2013). Since nurses have frequent interactions with patients, they may use the additional time to educate those who have unanswered questions and direct them to Internet health information as an additional resource. Patients who are unaware of the benefits of health information seeking could also benefit from increased attention from a nurse. Although nurses may have limits on the time they can interact with patients, there are still opportunities for the nurse to assist patients with IHIS. For example the nurse can educate patients on the benefits of seeking and using information available on the Internet, as it can fill their knowledge gap and assist them with behavioral changes (Ayers & Kronenfeld, 2007). In addition, the nurse can direct patients to information that would be useful and help to meet information needs, instead of overwhelming or frustrating them.

In regard to demographics, the majority of the literature available on IHIS has been primarily addressed to White cancer patients. The studies in this review support these findings, as most samples lacked racial and ethnic diversity. Thus, specific themes identified in this review may not apply to all populations. These findings do not reflect African American women, nor patients diagnosed with hypertension. Therefore, there are additional efforts needed to assess IHIS in diverse populations. First, nurses must be aware that not all patients have equal access to care and find ways to ensure that their information needs are met (Dickerson, 2006). Second, nursing researchers have an opportunity to study health information needs and preferences among other racial and ethnic populations, as well as populations with other health conditions. Finally, facilitating IHIS allows the nursing profession to work towards meeting technology goals outlined in Health People 2020. Not only will nursing have the opportunity to increase the number of those who find health information on the Internet with ease, but designing innovative

interventions with all populations in mind will also allow nursing to help bridge the digital divide (Lopez et al., 2011).

Most researchers who had conducted the studies reviewed here had to create their own proxy or questionnaire to measure preferences related to health information seeking on the Internet. Moreover, only one study mentioned nurses as an information source, which presents an opportunity for nurse scientists to design and test nursing-specific instruments for IHIS. Instruments that measure these concepts, in a valid and reliable manner, will help to advance both nursing science and health information seeking science.

Studies have reported that some nurses struggle with technology and may be intimidated by using the Internet themselves, directing patients on its use, and/or discussing information patients have obtained using the Internet (McMullan, 2006). Nurses must therefore work to achieve technological competency, in preparation for assisting patients to successfully obtain information via the Internet (Gilmour, Scott, & Huntington, 2008). In addition, nurses could partner with health information professionals to offer joint educational programs and collaboratively develop appropriate and useful Internet resources.

In summary, there is untapped potential for providing health information to patients via the Internet, especially by nurses. It provides flexibility and availability, because a patient can seek information whenever desired. Internet Web sites or mobile applications can be easily updated to ensure that information is current, and it is a cost-effective medium to deliver health information compared to other methods of health information delivery, such as printed materials. Digital information sources can also be more readily tailored to individual needs and issues (Strecher, 2007). Additionally, social media have been understudied for their potential use for health information delivery. Given that 73% of Internet users are members of one or more social

networking sites (Duggan & Smith, 2013), social media could be an effective channel for reaching patients. However, additional studies are needed to develop strategies (a) to tailor Internet health information to the specific needs and preferences of African American women, who are already using the Internet for social purposes, and (b) to deliver effective Internet health information to those with hypertension, as the Internet may be a useful tool to increase the likelihood that patients participate in lifestyle modifications.

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Table 1
Results of the Critical Appraisal of the Qualitative Studies

First author (year)	Balka (2010)	Gaie (2006)	Lagan (2011)	Taha (2009)	Xie (2009)
Research question presented	+	+	+	+	+
Study design	Qualitative, descriptive	Qualitative, descriptive	Qualitative, descriptive	Qualitative, descriptive	Qualitative, descriptive
Descriptive vividness	+	-	+	-	+
Methodological congruence	+	+	+	+	+
Analytical preciseness	+	+	+	+	+
Theoretical connectedness	+	+	+	+	+
Heuristic relevance	+	+	+	+	+
Data analysis	Constant comparative method	Microcoding	Coding	Grounded theory approach - coding	Grounded theory approach - coding

Note: + = yes; - = no

Table 2
Results of the Critical Appraisal of the Quantitative Studies

First author (year)	Kim (2010)	Lorence (2006)	Maddock (2012)	van de Poll-France (2008)
Research question presented	+	+	+	+
Theoretical framework	-	-	-	-
Study design	Descriptive, correlational	Descriptive, correlational	Descriptive, correlational	Descriptive, correlational
Power analysis included	-	-	-	+
Recruitment reported	+	RE	+	+
Response rate %	+	RE	+	+
Demographic of the sample presented	+	+	-	+
Sample size (n)	252	987	476	261
Instrument development described	+	RE	+	+
Reliability data of the instruments reported	RE	RE	-	-
Validity of the instrument established	RE	RE	-	-
Data analysis	Multivariate logistic regression	Logistic regression	Frequencies & percentages	Multivariate logistic regression

Note: + = yes; - = no; RE = reported elsewhere

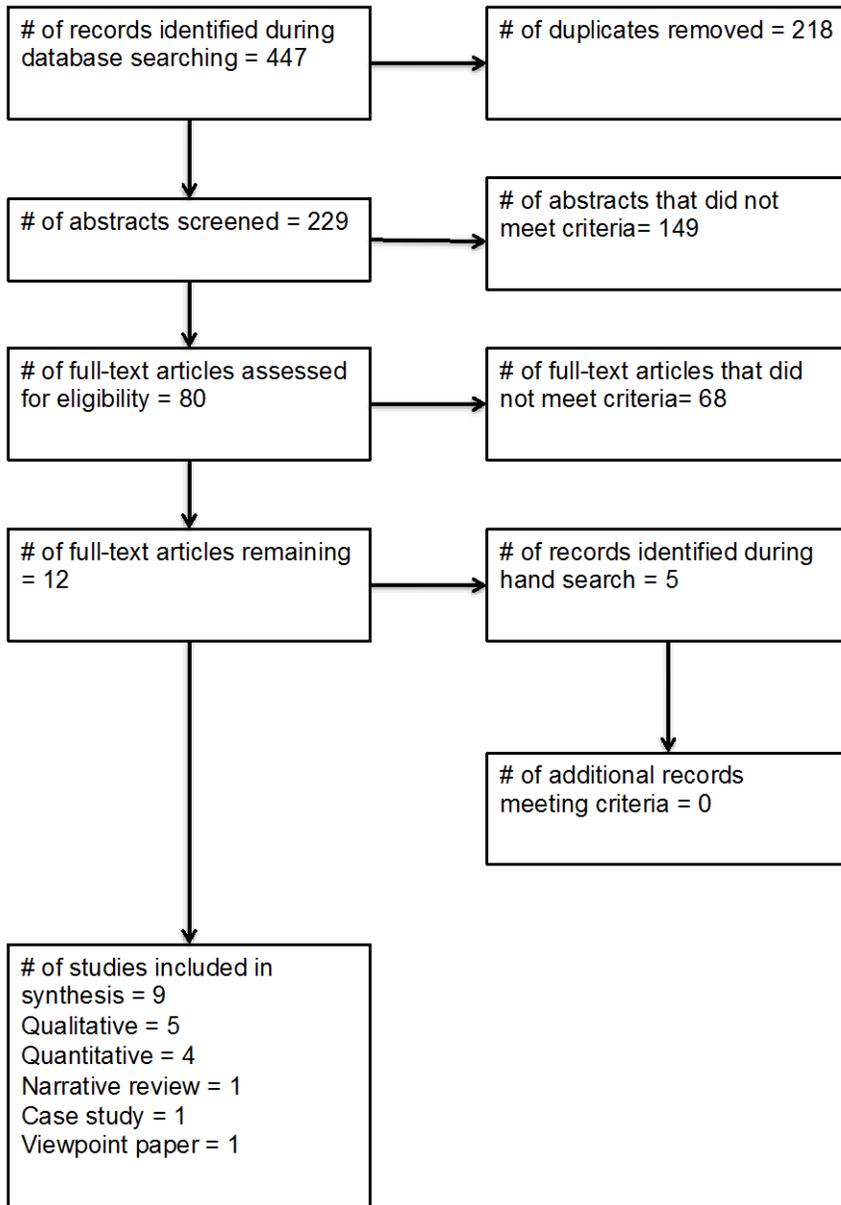


Figure 3. Article Flowchart

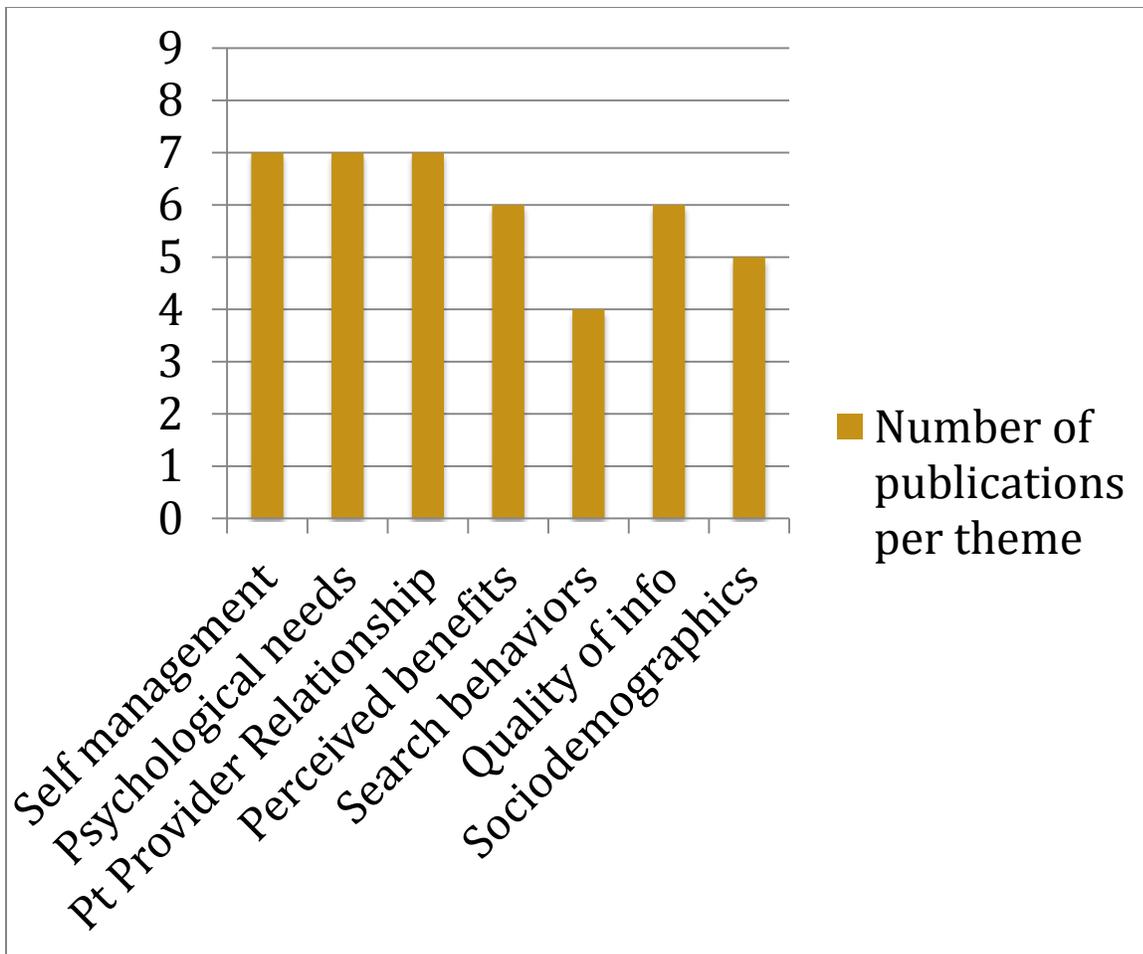


Figure 4. Number of Publications per Theme

CHAPTER 3

Internet Use and Blood Pressure Information Seeking

Among a Sample of African American Women

According to Roger and colleagues (2011), African American women have the highest prevalence of hypertension of any group in the world. They are diagnosed with hypertension at a younger age, have additional negative consequences from living with it, (such as stroke, etc.), and die earlier from its complications, when compared to White women in the United States (CDC, 2011). Those with hypertension need education in order to obtain the knowledge needed successfully manage the disease (Chobanian et al., 2003; McLean et al., 2007). Adequate health information can reinforce knowledge of hypertension, as well as guide and remind them to practice the skills needed to self-manage blood pressure. The Internet has the potential to significantly inform African American women about this disease and help them manage it. The literature is scant regarding health information seeking among this population in general. Few studies have examined African American women's health information seeking patterns, and none describe the circumstances under which African American women would seek blood pressure information. One of the Healthy People 2020 goals is to both health communication and information technology to improve health outcomes and achieve health equity (United States Department of Health and Human Services, Healthy People 2020, 2011). Working towards this goal would be one step in decreasing the health disparities gap between African Americans and Whites with hypertension. However, little is known about Internet use and related information-seeking behaviors among African Americans. Therefore, the purpose of

this study was to explore African American women's Internet use and their health information seeking behaviors, in general and specifically related to blood pressure information.

In order to self-manage one's blood pressure, people with hypertension must realize that it is a chronic disease and therapy must continue over time. (Chobanian et al., 2003). Poor knowledge of hypertension is a barrier to treatment among African Americans, as some women do not conceptualize the disease as a chronic problem (Hekler et al., 2008; Odedosu et al., 2012). A vast amount of health information is available on the Internet, including information on blood pressure (Diaz, 2002; Kreps & Neuhauser, 2010). The Internet has information that can reinforce a patient's knowledge about hypertension, including the disease progression, the safe range of blood pressure, and the way to take medications to control it.

James et al. (2014) recommended treatment regimens that are tailored to each patient's specific needs. Beliefs, knowledge, and cultural practices all influence how patients decide to self-manage their blood pressure (Scisney-Matlock, 2009). The Internet is a flexible medium – it can be accessed at any time of the day. In addition, information can be easily tailored to meet specific needs. Chobanian and colleagues (2003) highlighted the need to keep patients engaged and motivated to adhere to a treatment regimen. In line with this, the Internet may provide a familiar platform that is already being utilized by many African American women. According to Smith (2014), 72% of African Americans have access to the Internet, through a broadband connection or through a smartphone.

Some studies have shown that those who seek health information on the Internet are more likely to change their behavior (Ayers & Kronenfeld, 2007). Therefore, seeking blood pressure information on the Internet could be beneficial for African American women, since they have the highest prevalence of hypertension. However, the majority of the evidence available on seeking

health information on the Internet pertains to young, non – Hispanic, White women (Jones et al., 2014). Given that African Americans are just as likely as Whites to access the Internet for social purposes, using social media such as Twitter (Smith, 2014), it is important to understand why they might access the Internet less for health information seeking, information on blood pressure and hypertension.

It would be advantageous for healthcare providers, to consider the following so that interventions can be designed and implemented to meet the needs of African American women related to hypertension. Given (a) the prevalence of hypertension and poorer outcomes among African American women, (b) the information needs required for them to successfully self-manage their blood pressure, (c) the availability of quality healthcare information on the Internet, and (d) the improved health outcomes when one participates in online information seeking activities, this is an important problem that deserves further attention.

According to the Pew Research Center’s Internet and American Life Project, African Americans are most likely to use the Internet for social reasons, somewhat likely to use cell phones to seek general health information, and the least likely to seek blood pressure information by these means (Fox & Purcell, 2010). Given the lack of evidence on African American women’s health information seeking on the Internet, the purpose of this study was to describe their Internet use, their health information seeking about blood pressure, and other information behaviors among a sample of this population. Therefore, the following were the aims of this study:

Aim1: Determine blood pressure information needs by assessing the blood pressure and knowledge about hypertension among a sample of African American women.

Aim 2: Describe the Internet behaviors of the sample.

Aim 3: Describe the sample's general health and blood pressure information seeking behaviors.

Aim 4: Describe the relationship between the sample's blood pressure information seeking behaviors and other information behaviors.

Aim 5: Compared findings between women who are undiagnosed, but at risk for hypertension and women who are diagnosed with hypertension.

In order to meet the aims outlined here, African American women were invited to participate in the study. The study was guided by the theoretical principles outlined in the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 2011). The TRA states that behavior is guided by attitudes, subjective norms, and behavior intention. This study focused on information behaviors related to self-management of blood pressure.

Significance

In general, the recommended interventions to manage hypertension include medication and lifestyle changes (diet, exercise, and smoking cessation) (Chobanian et al., 2003; Roger et al., 2011). Although interventions are available, only 50% of those being treated for hypertension can maintain control of their blood pressure (Egan, Zhao, & Axon, 2010; Go et al., 2013). Hypertension is a chronic disease that requires consistent behavior changes that are maintained over time. In order to self-manage hypertension, one must have an accurate knowledge and understanding of the condition. Gaining an awareness of the differences in patients' knowledge of hypertension is important to reduce their knowledge deficits. Among the ways to assist patients with self-managing their hypertension is to help them access information using technology, including the Internet, email, and smartphones.

A literature review conducted by Jones et al. (2014) showed that most of the information available on Internet health information seekers show that they are young, non-Hispanic, White women. According to Smith (2014), there are racial differences in Internet access (broadband/home), but there is no significant difference in Internet access via smartphones. Approximately 90% of African Americans own a cellular phone, and 59% own a smart phone that can be used to access the Internet (Smith, 2014). Again, although African Americans have Internet access, most Internet activity is described as social (Smith, 2014). However, healthcare interventions that incorporate technology, cell phones in particular, may be useful in reaching African American women who have hypertension. African Americans suffer some of the worst health outcomes and could benefit from interventions aimed at providing health information that meet their needs. Nonetheless, little is known about Internet use for health information seeking, the information needs and information seeking behavior of this population.

First, the results on hypertension knowledge and blood pressure control in a sample of African American women could help determine opportunities for improvement in their knowledge about and control of blood pressure control. Results could determine if the Internet behaviors of this sample are consistent with those of previous studies. Further, these findings would describe the blood pressure information seeking behaviors of the sample, which very few studies have done. The results could also be an initial step in establishing a foundation for Internet hypertension intervention development. Finally, the results of this study would identify the associations between the sample's blood pressure information seeking and individual contextual factors. The findings of this study could assist healthcare professionals to determine the most appropriate ways to reach African American women, meet their healthcare information needs, and increase their search for helpful blood pressure information via the Internet.

Measures

The survey included questions on their use of the Internet, general health information seeking, blood pressure information seeking, blood pressure information sharing, and their use of blood pressure information. The measures used in the analysis are shown in Table 3. See Table 3 for reliability, range, and mean scores.

At risk for hypertension vs. Diagnosed with hypertension. There could be differences in the way hypertension is conceptualized among women diagnosed with hypertension versus women who are at risk. Due to these potential differences, the women will be analyzed separately and the findings from each group will be compared.

Blood pressure. The Omron Elite 7300W – Women’s Advanced blood pressure monitor was used to measure the each participant’s blood pressure. This monitor had been validated in previous studies (Grim & Grim, 2009).

Hypertension knowledge. The participants’ knowledge of hypertension was assessed with the 12 questions outlined in the *Check Your High Blood Pressure Prevention IQ* survey (National Heart Lung and Blood Institute, 1994). This survey asks questions about topics such as the cause, management, and familial history of hypertension. Participants could select either “true” or “false”. Possible scores range from 0 – 12, with higher score indicating more accurate knowledge about hypertension. In this sample KR-20 reliability was .24.

Internet behaviors. Internet use was considered any activity that takes place online. This included, but was not limited to, checking email, social networking, searching for information, and instant messaging. Participants were queried about frequency of accessing the Internet and devices they used to access it. Additional questions were asked regarding cell phone use,

considering the increased likelihood of African American's using the smart phones to access the Internet (Smith, 2014).

Attitude. An attitude is the beliefs one has regarding the outcome of a behavior (Fishbein & Ajzen, 2011). In this study, attitude referred to the participant's beliefs regarding outcomes of self-managing blood pressure. Three items asked about the women's attitudes towards their blood pressure management. Their responses were ranked on a five-point, Likert-type scale and ranged from "strongly disagree" to "strongly agree". Possible scores ranged from 3 – 15, with higher scores indicating a more favorable attitude towards blood pressure management. In this sample, Cronbach's alpha was .59.

Social Norms. According to Fishbein and Ajzen (2011), social norms describe what behaviors are acceptable within a group. In this study, social norms referred to behaviors that were deemed acceptable (or not) to self-manage one's blood pressure. Five items asked about the women's thoughts about social norms regarding blood pressure management. Their responses were ranked on a five-point, Likert-type scale and ranged from "strongly disagree" to "strongly agree". Possible scores ranged from 5 – 25, with higher scores indicating a higher degree of perceived acceptance of blood pressure management among peers. In this sample, Cronbach's alpha was .88.

Information Behavior

Information behavior includes a number of behaviors that describe how people interact with information (Case, 2012). Information behaviors of interest in this study were health information seeking, health information sharing, and health information use.

Information seeking. Information seeking is a "conscious effort to acquire information in response to a need or gap in knowledge" (Case, 2012, p. 5). Lambert and Loiselle (2007)

identified two dimensions of health information seeking behaviors: information and method. The information dimension refers to the type and amount of information sought, while the method dimension focuses on the actions taken to obtain health information and the sources selected (Lambert & Loiselle, 2007). This study measured both dimensions of health information seeking. While the type (blood pressure information) and amount (frequency of seeking) were measured, the present report focuses on the method – examining the actions the participants took when seeking blood pressure information. In examining the method of information seeking, three different manners were considered: (a) purposive (intentional) and (b) incidental (serendipitous or by chance), as well as (c) collaborative (with one or more persons) or (d) alone. Overall health information seeking is the combination of purposive and incidental, as well as collaborative and individual seeking.

To measure information seeking frequency, one item was adapted from the National Cancer Institute's Health Information National Trends Survey (HINTS) (Rutten, 2007). This item asked how often the participant sought blood pressure information from any source (frequency). Their responses were ranked on a five-point, Likert-type scale and ranged from "strongly disagree" to "strongly agree".

Eight items questioned the women regarding information seeking were adapted to reflect blood pressure information. These questions asked incidental, purposive, independent, and collaborative manners of information seeking. The responses ranged from "never" to "very often" on a five-point, Likert-type scale. Possible scores ranged from 8 – 40, with higher scores indicating higher degree of information seeking. In this sample, Cronbach's alpha was .84.

Information sharing. Lambert and Loiselle (2007) stated that the exchange of information with others is an activity classified in the method dimension of health information

seeking. However, Fox and Purcell (2010) considered health information sharing a social activity and Veinot (2010) found that participants enjoyed information exchange with their peers.

Therefore, this study defined health information sharing as a collaborative activity, separate from collaborative information seeking.

One item queried the women about sharing of blood pressure information with others. Each individual participant selected as many responses that applied from the 0 – 6 items on the multiple-response scale. Their responses were summed to reflect a total individual score. (See Table 9 for more details on each response).

Information use. For this study, health information use was defined as use of information related to understanding hypertension or blood pressure management. The information was used to evaluate blood pressure status, make decisions to control blood pressure, and/or take action to maintain or improve one's blood pressure control.

One item queried the women about sharing of blood pressure information with others. Each individual participant selected as many responses that applied from the 0 – 8 items on the multiple-response scale. Their responses were summed to reflect a total individual score. (See Table 10 for more details on each response).

Methods

A non-experimental descriptive correlational design was used for this study. The University of Michigan Institutional Review Board granted an IRB exempt status (see Appendix C for the exemption letter). In addition, the administrators of the church conference granted permission for the study to be conducted.

Participants

The sample was derived from women attending the church conference. Women who self identified as an African American woman and were age 18 or older were eligible to participate in the study. Women who were not aged 18 or older were excluded from this study. Questionnaires that were not at least 75% complete were excluded from analysis. The final sample size for the study was 151.

Procedures

Women attending the conference were invited to participate in the study. All women interested in participating were seated in a quiet area. The women (n = 156) who agreed to participate in the study completed a 72-question, paper and pencil questionnaire. The first page of the questionnaire provided written information about the study, and the principal investigator was available to speak with any participant who had questions regarding the study. Given the IRB exemption status, completion of the survey signified consent to participate in the study. The survey had been pilot tested with 5 African American women prior to use with the sample, to test its feasibility and clarity. The survey took approximately 20 minutes to complete, although the participants' completion time ranged from 11 to 30 minutes.

Upon completion of the survey, each participant blood pressure measured. Guidelines outlined by Pickering and colleagues (2005) were used when designing this study. Each participant's right arm (unless contraindicated) placed at heart level and positioned so that it was resting comfortably on a table. All blood pressure measurements were taken after the participant had been sitting for at least five minutes. Each participant was seated in a chair with back support. Each participant was asked to uncross her legs before her blood pressure was measured. Each participant was asked to remove all clothing that covered her right arm, where the blood pressure cuff would be placed. The size of each participant's arm was assessed to ensure the

proper cuff size was selected. The Omron Elite 7300W – Women’s Advanced blood pressure monitor was used to measure each participant’s blood pressure. This model had been validated in previous studies (Grim & Grim, 2009). Either the principal investigator or one of two research assistants obtained all blood pressure measurements. The principal investigator trained both of research assistants. Research assistants completed two trainings sessions, demonstrated competency on a written test and through return demonstration of blood pressure measurement.

Each participant received her blood pressure measurement results. She was advised if it was safe, slightly elevated and required follow up with a provider, or was dangerously elevated and required immediate follow up with a provider. Each participant received a \$10 gift card for completing the survey and having her blood pressure measured.

Statistical Analyses

Data analyses of the participants’ responses to the survey were conducted with SPSS version 21. The data were assessed for normality. Factor analyses were done for each variable to determine how well the measure performed in this sample (See Appendix B). Means, standard deviations, frequencies, and percentages were used to provide a description of the demographics of the sample (See Table 4). Aim 1 was achieved by calculating the mean of hypertension knowledge and blood pressure mean scores. Aim 2 was achieved by calculating the frequency and percentage of each response. Aim 3 was achieved by calculating the mean, frequency, and percentage of each response. Aim 4 was achieved by calculating Pearson’s product moment correlation coefficients between information seeking, information sharing, and information use.

Results

Demographics

All the women in the sample self-identified as Black or African American. The total number of women meeting the “at risk for hypertension” criteria was 57. The total number of women meeting the “diagnosed with hypertension” criterion was 94. The mean age was 55 years, ranging from 19 to 82. The women who were diagnosed ($M = 59.13$, $SD = 11.34$) were older than the women who were at risk for hypertension ($M = 48.13$, $SD = 14.19$); $t(97.23) = -4.93$, $p < .001$. This was the only statistically significant difference between the groups. The women in the sample were well educated; over 75% of the sample had earned at least a 4-year college degree. Approximately 44% of the women were married or partnered, while 16% were single and 27% were separated, widowed, or divorced. (See Table 4 for more demographics of the sample.)

Aims

The following shows the results according to the study’s stated aims. Each aim compares women at risk to women who were diagnosed (Aim 5).

Aim 1: *To determine blood pressure information needs by describing the blood pressure mean and hypertension knowledge mean scores in the sample.* The average blood pressure reading for the overall sample was 136/82 (which is elevated, and considered prehypertension), and 62% of the sample stated that they had been diagnosed with hypertension. The average blood pressure reading for women diagnosed with hypertension was 143/84. For women at risk for hypertension, the mean blood pressure reading was 125/77. (See Table 5 and Figure 5 for more details). The median blood pressure of the overall sample was 134/81.

Eighteen of the women (14%) of the sample had a systolic reading of greater than 160. Sixteen of then women had been diagnosed with hypertension, two had not been diagnosed. Most of the women (55%) had had their blood pressure measured within the past two months.

The average score for hypertension knowledge was 73%. The scores ranged from 50% to 92%. The majority of the sample (97%) answered seven questions (questions 1, 2, 3, 6, 7, 8, and 10) correctly, which is a score of 58% and higher. Thirty-five percent of the sample answered question 9 incorrectly. The majority (72%) of the sample answered questions 4, 5, and 12 incorrectly. (See Table 7 for more detail.)

Aim 2:: *To describe the Internet behaviors among a sample of African American women.* *Internet use.* Some 96% of the sample responded that they access the Internet, at least occasionally – with 64% accessing it daily or several times a day. Most of the participants (92%) used their computers to access the Internet. The majority of the women (more than 95%) owned a cell phone and 63% used it to access the Internet. Some of the women (21%) had posted a health related question or experience online within the past year.

Aim 3:: *To describe the women's general health and blood pressure information seeking behaviors.* (See Table 8 for a description of information seeking frequency). Of those with no history of hypertension, 98% owned a cell phone, 58% used their cell phone to seek general health information, and 18% used their cell phone to seek blood pressure information. Even fewer women with hypertension participated in these activities. While 96% owned a cell phone, only 31% used their cell phone to seek general health information, and 12% used their cell phone to seek information about blood pressure (see Table 6).

Of those who did search for health information using their cell phones, over half did not share or discuss it with a healthcare provider. Over half of the sample (51.7%) stated that they did not seek blood pressure information from any source. Focusing only on those with hypertension, most stated that they rarely (12%) or sometimes (33%) sought blood pressure information from any source.

Purposive information seeking. Four of the eight information seeking questions asked specifically about intentionally seeking information about blood pressure. The mean score on purposive information seeking was 8.67 (3.03), meaning that the women in the sample were less likely to purposely seek blood pressure information, rather than to serendipitously find it.

Incidental information seeking. Four of the eight questions asked about incidental information seeking, or accidentally finding blood pressure information. The mean score on incidental information seeking was 10.55 (3.23), meaning that the women in the sample were more likely to find blood pressure information by chance, than to look for it.

Collaborative information seeking. Five of the eight information seeking questions asked about collaborative information seeking, or the preference for seeking blood pressure information with others. The mean score on collaborative information seeking was 10.88 (3.47), meaning that the women in the sample were more likely to prefer seeking blood pressure information with others than to seeking it alone.

Aim 4: *To describe the relationship between blood pressure information seeking behaviors and other information seeking behaviors.* Approximately 75% of the sample had shared their blood pressure status with someone else.

Among the women at risk for hypertension, there was a small, positive correlation between collaborative information seeking and information sharing, $r = .289$ ($p < .05$). There was a moderate, positive correlation between overall information seeking and information sharing $r = .389$ ($p < .01$). According to Cohen (1988), a moderate correlation ranges from .30 to .49. There was a moderate, positive correlation between overall information seeking and information use, $r = .453$ ($p < .01$). There was a strong, positive correlation between information sharing and information use $r = .765$ ($p < .01$).

Among those diagnosed with hypertension, there was a moderate, positive correlation between collaborative information seeking and information sharing, $r = .388$ ($p < .01$). There was a moderate, positive correlation between total information seeking and information sharing, $r = .416$ ($p < .01$). There was a moderate, positive correlation between overall information seeking and information use, $r = .334$ ($p < .01$). There was a strong, positive correlation between information sharing and information use $r = .548$ ($p < .01$).

Discussion

Recent studies continue to show that healthcare knowledge does not necessarily translate to changes in behavior (Konicki, 2012). However, accurate knowledge is needed in order to successfully self-manage hypertension. There are opportunities to improve knowledge among the women in this sample, particularly among women diagnosed with hypertension. The overall average hypertension knowledge score was 73%, suggesting that this sample of African American women had some knowledge about the condition. Although their overall knowledge was average, the women in this study could benefit from additional education on the cause, lack of symptoms, and options for the management of hypertension.

The findings of this study are consistent with others, as fewer than half of the women with hypertension who were on medication had control over their blood pressure (Egan et al., 2010; CDC, 2011; Go et al., 2013). The mean systolic blood pressure of women diagnosed with hypertension was greater than 140. Therefore, there are opportunities to improve blood pressure control among the women in the sample who had been diagnosed with hypertension and were already receiving treatment.

The women in this sample were using the Internet in a consistent manner for their ethnic group. The findings are consistent with those of the Pew Research Center's Internet and

American Life Project that showed that African Americans are using the Internet (Smith, 2014). These findings are consistent with other evidence that African Americans are less likely than Whites to use the Internet for health information seeking purposes (Smith, 2014; Lee, Ramírez, Lewis, Gray, & Hornik, 2012; Tian & Robinson, 2008). In contrast, Smith (2014) showed that African Americans were more likely to access the Internet from a smartphone, while the women in this sample were more likely to access the Internet from a computer. However, African American women are accessing the Internet, there are opportunities to encourage their use of it as a health information source and direct them to a specific, high quality sites that would inform them about hypertension and blood pressure management.

The women in the sample were more likely to find blood pressure information by chance and preferred to seek it with others. There was a moderate correlation between total information seeking and information sharing in both groups. This finding highlights the opportunity to disseminate education through social groups in this sample. Previous studies show that importance of interpersonal sources to meet unexpressed information needs (Veinot, 2009). It is possible that information seeking and sharing meets both information needs, as well as emotional needs.

Nevertheless, it is important to reiterate that it is critical that current knowledge be assessed for two reasons. First, women may or may not have based their blood pressure self-management on accurate information. Secondly, given the social nature of information seeking and sharing in this sample, the women could potentially share inaccurate information within their social network. However, social relationships are important predictors of the use of information, and healthcare information interventions could target social networks as a way to disseminate

accurate healthcare information (Veinot et al., 2013). Understanding these relationships would provide key data for nursing and healthcare information science.

Some of the measures used in this study were developed from qualitative findings from studies on HIV testing among men who have sex with men (Veinot et al., 2013). The measures were adapted for this study, to be used with African American women and measure information behaviors related to hypertension. Although these are newer measures, the findings of this study highlight the importance of measuring both information sharing and information use. The measures used in this study are a first step in creating appropriate measures among African American women and deserve further study, for both refinement and testing.

This study is one of the first steps toward understanding the Internet behaviors of African American women in the context of a specific health condition (hypertension). It is innovative as it is assessing the potential use of an existing tool – the Internet, for informing African American women about hypertension and helping them manage the disease. Moreover, the Internet is already being used by African American women and can be conveniently accessed whenever it is convenient.

Limitations

There are a few limitation of this study that are worth discussion. One limitation was that this sample was a convenience sample. This limits the generalizability of the findings. Small sample size was another limitation, therefore the study will need to be repeated in order to demonstrate the findings are valid. A third limitation was that some of the measures were adapted specifically for this study, for use with African American women and measure information behaviors related to hypertension. However, both factor analyses and instrument reliability testing were conducted to demonstrate validity and reliability in this population. Both

information sharing and information use require further refinement. Given these possible limitations, this study was one of the first steps to gain a better understanding of African American women, their blood pressure control and related information behaviors.

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Table 3***Measures Included in Chapter 3***

Measure	# of Items	Alpha	Scale type	Score range (Actual score range)	Mean (SD)	Valid n =
Hypertension Knowledge	12	-	Categorical	0 – 12 (6 – 12)	8.76 (1.05)	150
Attitude	3	.59	Likert	3 -15 (10 -15)	14.34 (1.09)	150
Total Information Seeking	8	.84	Likert	8 – 40 (8 – 34)	19.13 (5.44)	150
Incidental Information Seeking	4	.81	Likert	4 – 20 (4 -20)	10.55 (3.23)	151
Purposive Information Seeking	4	.75	Likert	4 – 20 (4 – 18)	8.67 (3.03)	151
Collaborative Information Seeking	5	.80	Likert	5 – 25 (5 – 20)	10.88 (3.47)	150
Blood Pressure Social Norms	5	.88	Likert	5 – 25 (17 – 25)	23.79 (1.90)	151
Information Sharing	6	-	Summary	0 – 6 (0 – 6)	1.70 (1.12)	151
Information Use	8	-	Summary	1 – 9 (1 – 8)	2.05 (1.46)	151

Table 4*Sample Characteristics*

	Overall Sample % (n)	At risk (n = 57)	Diagnosed (n = 94)	χ^2 or t value, p-value
Age Range	19 – 82	19 – 73	31 – 82	t (df=97.23) = -4.93, p<.001
Mean	55.2 (SD = 13.3)	48.13 (SD = 14.19)	59.13 (SD = 11.34)	
Income				χ^2 (df=10)=6.23, p =.796
Less than 30,000	19.8% (31)	17.6% (10)	22.3% (21)	
30,000 – 59,999	30.7% (48)	29.8% (17)	32.9% (31)	
Greater than 60,000	30.7% (48)	31.5% (18)	31.9% (30)	
Preferred not to say	11.5% (18)	14.0% (8)	10.6% (10)	
Relationship Status				χ^2 (df=6) = 9.96, p =.127
Single or Never Married	15.4% (24)	21.1% (12)	12.8% (12)	
Married, Partner, or Living with Another	43.6% (68)	45.6% (28)	42.6% (40)	
Separated, Widowed, or Divorced	33.3% (52)	26.4% (15)	39.4% (37)	
Education				χ^2 (df=7) = 5.54, p =.594
High School Graduate or Some College	29.5% (46)	33.4% (19)	28.7% (27)	
College Graduate	29.5% (46)	33.4% (19)	28.7% (27)	
Advanced Degree	30% (47)	29.8% (17)	30.4% (30)	
Occupational Status				χ^2 (df=1) = 3.12, p = .078
Full time	43.7% (66)	52.6% (30)	38.3% (36)	
Part time	9.6% (15)	7.0% (4)	11.7% (11)	
School	10.9% (17)	21.1% (12)	5.3% (5)	
No work, no school, disability, or retired	38.6% (57)	22.9% (13)	46.8% (44)	

Table 5***Blood Pressure Means***

	Mean SBP (SD)	Mean DBP (SD)	Range	(n)
Overall Sample	136 (19.91)	82 (12.65)	96 – 239	151
At Risk	125 (15.67)	77 (9.89)	96 – 164	57
Diagnosed	142 (19.41)	84 (13.49)	108 - 239	94
Taking Medication	142 (20.73)	84 (14.14)	108 - 239	78
Non – medicated	128 (16.17)	79 (10.39)	54 – 112	70

Table 6*Internet Use Characteristics*

	At Risk (n = 57)	Diagnosed (n = 94)
	% (n)	% (n)
Own a cell phone	98.2% (56)	95.7% (90)
Use cell to search for health information online	57.9% (33)	30.9% (29)
Use cell to search for BP info online	17.5% (10)	11.7% (11)
Access the Internet	96.5% (55)	95.7% (90)
Once a week or less	7.0% (4)	8.5% (8)
Several times a week	17.5% (10)	26.6% (25)
Everyday or several times a day	72.0% (41)	58.5% (55)
Posted or Shared online		

Table 7***Hypertension Knowledge Characteristics***

	At Risk (n = 57)		Diagnosed (n = 94)	
	Inaccurate % (n)	Accurate % (n)	Inaccurate % (n)	Accurate % (n)
1. There is nothing you can do to prevent high blood pressure.	n/a	100% (57)	6.4% (6)	93.6% (88)
2. If your mother or father has high blood pressure, you'll get it.	3.5% (2)	96.5% (55)	25.5% (24)	73.4% (69)
3. Young adults don't get high blood pressure.	1.8% (1)	98.2% (56)	1.1% (1)	97.9% (92)
4. High blood pressure has no symptoms.	98.2% (56)	1.8% (1)	79.8% (75)	19.1% (18)
5. Stress causes high blood pressure.	84.2% (48)	15.8% (9)	91.5% (86)	7.4% (7)
6. High blood pressure is not life threatening.	1.8% (1)	98.2% (56)	3.2% (3)	95.7% (90)
7. Blood pressure is high when it is over 140/90 mm Hg.	14.0% (8)	86.0% (49)	7.4% (7)	91.5% (86)
8. If you are overweight, you are 2 to 6 times more likely to develop high blood pressure.	3.5% (2)	96.5% (55)	5.3% (5)	94.7% (89)
9. You have to vigorously exercise every day to improve your blood pressure and health.	35.1% (20)	64.9% (37)	64.9% (61)	35.1% (33)
10. Americans eat 2 to 3 times more salt and sodium than they need.	n/a	100% (57)	n/a	100% (94)
11. Drinking alcohol lowers blood pressure.	1.8% (1)	98.2% (56)	1.1% (1)	98.9% (93)
12. High blood pressure has no cure.	77.2% (44)	22.8% (13)	69.2% (65)	30.9% (29)

n/a = not applicable

Table 8

Information Seeking Frequency

	At Risk (n = 57)	Diagnosed (n = 94)
	% (n)	% (n)
Never	68.4% (39)	41.5% (39)
Rarely	14.0% (8)	11.7% (11)
Sometimes	12.3% (7)	33.0% (31)
Often	1.8% (1)	9.6% (9)
Very often	1.8% (1)	3.2% (3)

Table 9***Information Sharing Characteristics***

	At Risk (n = 57)	Diagnosed (n = 94)
	% (n)	% (n)
None	21.1% (12)	13.8% (13)
1 way	56.1% (32)	51.1% (48)
2 or more ways	22.9% (15)	35.1% (33)
Give documents, links, or email others	15.8% (9)	13.8% (13)
Tell things I know about high blood pressure	29.8% (17)	56.4% (53)
Give advice or encouragement about high blood pressure prevention or treatment	36.8% (21)	37.2% (35)
Organize events where high blood pressure is discussed	10.5% (6)	11.7% (11)
Recommend MD or HCP to those with high blood pressure, or who think they may have high blood pressure	12.3% (7)	24.5% (23)
Other	21.1% (12)	8.5% (8)

Table 10***Information Use Characteristics***

	At Risk (n = 57)	Diagnosed (n = 94)
	% (n)	% (n)
None	15.8% (9)	10.6% (10)
1 way	57.9% (33)	40.4% (38)
2 or more ways	26.3% (15)	48.9% (46)
Evaluate my risk for high blood pressure	20.2% (19)	23.2% (35)
Decide whether to see a doctor, nurse or other health care professional	10.6% (10)	10.6% (16)
Monitor and track your blood pressure at home	33.0% (31)	22.5% (34)
Understand my blood pressure test results	30.9% (29)	26.5% (40)
Decide how to treat high blood pressure	17.0% (16)	12.6% (19)
Plan or make high blood pressure – friendly meals	27.7% (26)	23.2% (35)
Change my overall approach to maintaining my health	46.8% (44)	39.1% (59)
Ask a doctor questions, or get a second opinion from another doctor	17.0% (16)	12.6% (19)
Other	15.8% (9)	3.2% (3)

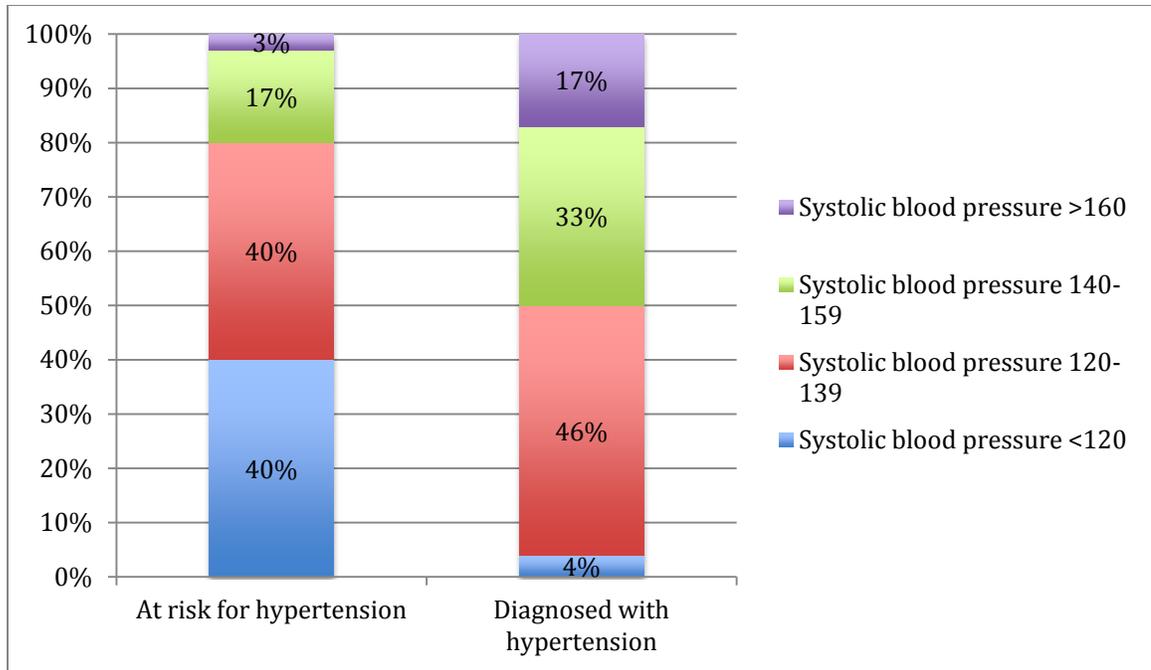


Figure 5. Histogram Display of Blood Pressure Results

CHAPTER 4

Explaining Information Use to Self-manage Blood Pressure in African American Women

African American women have the highest prevalence of hypertension of any other group in the world (Roger et al., 2011). Hypertension is a chronic disease that requires long-term management. Although improvements have been made among hypertensive patients who need to control their blood pressure, approximately one of every two patients who are receiving treatment have uncontrolled blood pressure (Egan et al., 2010; Centers for Disease Control, 2011; Go et al., 2013). The recommended ways to lower and maintain blood pressure include diet, exercise, medication, and smoking cessation (Roger et al., 2011). However, using these recommended lifestyle changes requires learning new information and skills (Chobanian et al., 2003). While acquiring adequate healthcare information is the first step in gaining the needed knowledge to manage hypertension, little is known about how African American women use information in order to self-manage their blood pressure.

Self-management of Hypertension

Self-management of hypertension requires that one use information in a way they have understood it (their knowledge) to complete specific actions: medication adherence, dietary changes, and exercise behaviors. Information is the basic component of the self-management process. A literature review conducted by Jones et al. (2014) found that those who seek health information were interested in managing their health condition.

Objective

The purpose of this study was to examine the use of information to take action to self – manage blood pressure in a sample of African American women. The outcome of the analysis was information used for taking action to self-manage blood pressure.

Research question 1: Among African American women at risk for hypertension, which variables (attitude, social norms, information seeking, information sharing, sense of community, and interaction with the healthcare system) identify women who do use and women who do not use information to take action to self-manage blood pressure?

Research question 2: Among African American women diagnosed with hypertension, which variables (attitude, social norms, information seeking, information sharing, sense of community, and interaction with the healthcare system) identify women who do use and women who do not use information to take action to self-manage blood pressure?

Understanding how African American women use information to self-manage their blood pressure is extremely important in nursing, as well as in other healthcare disciplines. The findings from this study would allow healthcare practitioners and nurse scientists to determine which variables explain information use. This will inform clinical practice and design of future interventions, by identifying where intervention efforts should be focused. This study was unique because this population was homogenous – this sample was pursued because they had similar education, racial background, and social network (church). It allowed the detection of independent explanatory variables of attitude, social norms, information seeking, information sharing, sense of community, and interaction with the healthcare system, while other factors remained constant. The results of this study will inform the development of appropriate risk assessment and guide the creation of interventions that will successfully target this population.

Conceptual Model

This study was guided by Fishbein and Ajzen's (2011) Theory of Reasoned Action, which purports that the strongest predictor of a behavior is behavioral intention, that is, the intent to perform a behavior is guided by both attitudes and subjective norms regarding performing the behavior. In the current study, the focus was on the behaviors an individual performs to self-manage their blood pressure. Thus, the sample's attitude and social norms regarding blood pressure management were assessed. Information behaviors were added because in past studies, these variables significantly increased the amount of variance explained in health behaviors. For example, Meadowbrooke and et al. (2014) found that the addition of information behaviors to a similar model significantly increased the explanatory power of the model - explaining intention to obtain HIV testing in a sample composed of 166 men (87 were African American men). Finally, contextual factors were added to the model to further examine the influence of behaviors on blood pressure management. These factors were organized according to the Bronfenbrenner's Socio ecological Model (1986). According to Bronfenbrenner (1986), complex problems, such as self-management of blood pressure, are influenced by many factors in the environment, such as peers and interactions with healthcare providers. Scisney-Matlock et al. (2009) suggested the ecological model as a framework that acknowledges contextual factors that influence self-management of hypertension. (See Figure 6 for a diagram of the conceptual model used to guide this study.)

Attitude. According to Fishbein and Ajzen (2011), an attitude is an individual's beliefs about the outcomes of performing a behavior, and is positive or negative. Attitudes are formed by behavioral beliefs, which predict behavioral intent (Fishbein & Ajzen, 2011). In this study,

attitude was defined as the participant's beliefs regarding outcomes of self-managing blood pressure.

Social norms. An individual's social norms regarding a behavior are formed by their thoughts about what others think is normal and expect them to do (Fishbein & Ajzen, 2011). In this study, social norms were conceptually defined as the participants' thoughts about what others deemed acceptable behaviors to self-manage blood pressure.

Behavioral intention. In this study, information seeking is conceptualized as a behavioral intention to use information once it is found. The focus is on specific actions taken to obtain information on self-managing blood pressure (Lambert & Loiselle, 2007). Information seeking is a "conscious effort to acquire information in response to a need or gap in knowledge" (Case, 2012, p. 5). Some authors purport that information seeking does not have to be a conscious action; therefore, this study included both purposive seeking and incidental acquisition. Overall health information seeking is therefore defined as the combination of purposive and incidental, and solo and collaborative seeking.

Information Behaviors

Case (2012) suggested the use of the term "information behavior" to encompass a broad range of terms regarding how people interact with information. Specific information behaviors that were included in this study were health information seeking, health information sharing, and health information use.

Contextual factors. Individual contextual factors were organized according to Bronfenbrenner's Socio ecological Model (1986). There are many ways that contextual factors might affect one's intent to perform a behavior related to managing their blood pressure. The

contextual factors considered in this study were individual, group, community, and healthcare factors.

Group factors. Information sharing and church involvement are group contextual factors. To differentiate individual from group information seeking, this study defined information sharing as a group activity. Information sharing refers to an interaction between two or more individuals in which information is exchanged. These components were organized into the group level of the conceptual model. Olphen et al. (2003) found that African American women who were active in a church setting where they could share information, could extend their social network – which had a positive impact on their health. This study took into account specific information exchanges regarding the participants’ blood pressure information as well as their involvement within the church in regard to managing their blood pressure.

Healthcare system. This contextual factor measures the degree to which one is interacting with the healthcare system. According to Hill (2011), the healthcare system is part of a dynamic “process” that reflects patient adherence.

Women at risk for hypertension vs. Women diagnosed with hypertension. Women who were at risk for hypertension were analyzed separately from women who were diagnosed with hypertension; given the potential theoretical differences in their information seeking and their use of information to self manage blood pressure.

Measures

The questionnaires administered to the participants included questions on information use to self-manage blood pressure, attitude, social norms, information seeking, information sharing, and sense of community. (See Table 11).

Information Use. The behavior of interest, or outcome variable, of this study was information use related to hypertension and blood pressure management. There were several ways that respondents could answer the question regarding information use: not using, evaluating, decision-making, and taking action. However, this study focused only on information use to take action to manage one's blood pressure. (See Figure 7 for more detail.)

One item queried the women about use of information to self-manage blood pressure. Each individual participant selected as many responses that applied from the 0 – 8 items on the multiple-response scale. This item was adapted from a previous qualitative study conducted with African American participants regarding information use and HIV testing (Veinot et al., 2013). The participant used information to take action if one or more of the following responses was selected: “Monitor and track my blood pressure at home”, “Plan or make high blood pressure – friendly meals”, “Change my overall approach to maintaining my health”, or “Ask a doctor questions, or get an opinion from another doctor”. All responses from the item were then transformed into a binary variable: either “yes” – meaning the participant used information to take action or “no” – meaning the participant did not use information to take action. (See Table 10 for more details on each response).

Attitude. Three items asked about the women's attitudes towards their blood pressure management. Their responses were ranked on a five-point, Likert-type scale and ranged from “strongly disagree” to “strongly agree”. Possible scores ranged from 3 – 15, with higher scores indicating a more favorable attitude towards blood pressure management. In this sample, Cronbach's alpha was .59.

Social norms. Five items asked about the women's thoughts about social norms regarding blood pressure management. Their responses were ranked on a five-point, Likert-type

scale and ranged from “strongly disagree” to “strongly agree”. Possible scores ranged from 5 – 25, with higher scores indicating a higher degree of perceived acceptance of blood pressure management among peers. In this sample, Cronbach’s alpha was .88.

Information Seeking. Eight items questioned the women regarding information seeking were adapted to reflect blood pressure information. These questions asked incidental, purposive, independent, and collaborative manners of information seeking. The responses ranged from “never” to “very often” on a five-point, Likert-type scale. Possible scores ranged from 8 – 40, with higher scores indicating higher degree of information seeking. In this sample, Cronbach’s alpha was .84.

Contextual factors

Group factors – Information sharing. One item queried the women about sharing of blood pressure information with others. Each individual participant selected as many responses that applied from the 0 – 6 items on the multiple-response scale. Their responses were summed to reflect a total individual score. This item was adapted from a previous qualitative study conducted with African American participants regarding information use and HIV testing (Veinot et al., 2013). (See Table 9 for more details on each response).

Sense of community. Each participant’s sense of community was assessed for its influence on the participant’s information use. Bronfenbrenner (1986) discussed the importance of understanding the interaction between an individual and activities in their immediate environment. Scisney- Matlock and colleagues (2009) presented the importance of these interaction in the ecological hypertension model. In this study, both the church community and the African American community as a whole were considered.

Four items queried the participants' sense of community. The responses ranged from "never" to "very often" on a five-point, Likert-type scale. Possible scores ranged from 4 – 20, with higher scores indicating a greater sense of belonging to the African American community. In this sample, Cronbach's alpha was .72.

Healthcare system. This study considered the following as indicators of interactions with the healthcare system: reports taking of prescription medication for blood pressure control, length of time since last blood pressure measurement, whether or not current blood pressure measurement (obtained after completion of the questionnaire) was controlled or uncontrolled, and length of time since the last appointment with a healthcare provider. Possible scores ranged from 0 – 4, with higher scores indicating a more frequent interaction with the healthcare system. In this sample, the KR-20 was .40.

Methods

A non-experimental descriptive correlational design was used for this study. The University of Michigan Institutional Review Board (IRB) granted an IRB exempt status (see Appendix C). In addition, conference administrators granted permission for the study to be conducted.

Sample

A power analysis was conducted using G*power 3.2. The highest level of analysis was a multivariate logistic regression. It was determined that in order to reach 80% power with an alpha of .05, a minimum sample size of 112 participants was needed for analysis (Peng & So, 2002). A total of 156 women participated in the survey. Surveys missing more than 25% of responses were excluded from analysis (Ware et al., 2000). The final sample size for the study was 151.

Procedures

Women who attended the church conference were offered the opportunity to participate in the study. Women who were interested in participating were invited to sit in a quiet area, designated for the study. Written information describing the study was provided to each potential participant. If there were any questions regarding the study, the principal investigator or trained research assistant answered them. Consent to participate in this IRB exempt study was signified by completion of the questionnaire. All consenting participants completed a 72- item, paper and pencil questionnaire, including questions about demographics at the end. The time to complete the questionnaires was approximately 20 minutes (range 11 to 30 minutes).

Guidelines outlined by Pickering and colleagues (2005) were followed when obtaining blood pressures. Each participant was seated in a quiet environment. Upon completion of the survey, each participant's blood pressure was measured using her right arm (unless contraindicated). The right arm was positioned at heart level, resting comfortably on a table. All measurements were obtained after the participant had been sitting for at least five minutes. The participant was seated in a chair with her back supported and legs uncrossed before her blood pressure was measured. The participant was asked to remove all clothing that covered the area where the blood pressure cuff would be placed. The size of each participant's arm was assessed to ensure the proper cuff size was selected. The Omron Elite 7300W – Women's Advanced blood pressure monitor was used to measure the participants' blood pressure. This specific model had been validated in previous studies (Grim & Grim, 2009). The principal investigator and two research assistants obtained all blood pressure measurements. The principal investigator trained both research assistants. Both research assistants completed two trainings sessions. They

demonstrated competency on a written test and through return demonstration of blood pressure measurement.

Each participant received their blood pressure measurement results and was advised if it was safe, slightly elevated and required follow up with a provider, or was dangerously elevated and required immediate follow up with a provider. Each participant received a \$10 gift card for completing the survey and having her blood pressure measured.

Statistical Analysis

The data were analyzed using the software SPSS 21.0. Factor analyses were done for each variable to determine how well the measure performed in this sample (See Appendix B). Preliminary analyses were conducted to examine the normality and linearity of the variables through the interpretation of descriptive statistics and visually examining graphs and plots. Frequencies and percentages were used to describe the demographic characteristics of the sample. All analyses were conducted using two-tailed tests with an alpha of .05. Frequencies, percentages, means, and standard deviations were used to describe the sample.

Logistic regression was used to assess the ability of the conceptual model to explain information use to take action to self-manage blood pressure. Preliminary analyses were conducted to ensure no violation of the assumptions of normality and multicollinearity. The variables were entered into the regression in steps, in order to determine the influence of individual factors from the Theory of Reasoned Action first (Step 1 – behavioral intention; Step 2 – attitude and social norms). Then, the socio-ecological variables were entered (Step 3 – group factors: information sharing, sense of community and Step 4 – interaction with the health care system).

Results

Demographics

All the women in the sample self-identified as Black or African American. The mean age was 55 years, ranging from 19 to 82. The women who were diagnosed ($M = 59.13$, $SD = 11.34$) were older than the women who were at risk for hypertension ($M = 48.13$, $SD = 14.19$); $t(97.23) = -4.93$, $p < .001$. The women in the sample were well educated; over 75% of the sample had earned at least a 4-year college degree. Approximately 44% of the women were married or partnered, while 16% were single and 27% were separated, widowed, or divorced. (See Table 4 for more demographics of the sample.)

Sixty-two percent of the sample stated that they had been told that they have hypertension, and 54% of the sample stated that they take medication for hypertension. Approximately 70% of the sample had 1, 2, or 3 relatives with hypertension. More than half of the sample had their blood pressure measured within the past month, and more than 80% had their blood pressure measured by a healthcare professional (See Table 4 for additional details on demographics of the sample).

At risk for hypertension vs. Diagnosed with hypertension. Considering that women with hypertension may think differently about their disease, as well as behave differently once they have been diagnosed, women who were diagnosed were analyzed separately from those who were not diagnosed. Women were considered “at risk” for hypertension according to the following criteria: (a) responded no to the following item: “Have you ever been told that you have high blood pressure or hypertension?” and (b) had one or more first – degree relatives with hypertension ($n = 49$) or (c) scored 75% or less hypertension knowledge measure ($n = 40$). The total number of women meeting these criteria was 57. Women were considered “diagnosed” if

they responded yes to the following item: “Have you ever been told that you have high blood pressure or hypertension?”. The total number of women meeting this criterion was 94.

Descriptives of the outcome variable

Information Use. Thirty-eight percent ($n = 58$) of the women reported that they did not use information to take action to self-manage blood pressure. Sixty-two percent ($n = 93$) of the women reported using information to take action to self-manage blood pressure.

Descriptives of explanatory variables

Attitude. The mean score on the attitude measure was 14.34 (SD = 1.09) (range 10 – 15). This score reflects that in general, the women in the sample had a positive attitude towards self-management of blood pressure.

Social norms. The mean score on the social norms measure was 23.79 (SD = 1.90) (range 17 – 25). This score reflects that in general, the women in the sample thought their peers would find self-management behaviors of hypertension to be social acceptable.

Information Seeking. The mean score on the information seeking measure was 19.13 (SD = 5.44) (range 8 – 34). This score reflects that women in the sample were participating in some information seeking activities.

Information Sharing. The mean score on the information sharing measure was 1.70 (SD = 1.12) (range 0 – 6). This score reflects that women in the sample were participating in sharing blood pressure information with others.

Sense of Community. The mean score on the sense of community measure was 15.23 (SD = 1.72) (range 4 – 18). This score reflects that women in the sample did feel as sense of belonging to their community.

Summary of Regression Models

Women at risk for hypertension – taking action to self-manage blood pressure

(Model 1). Step 1. Information seeking was a significant independent variable, recording an odds ratio of 1.24 ($p = .005$). This means that women who participated in information seeking were 1.24 times more likely to be members of the group of women who reported to taking action to self manage blood pressure, compared to women who did not. The model was statistically significant, $\chi^2(1, n=53) = 10.724, p = .001$, and correctly classified 73.6% of cases. The model as a whole explained between 18.3% (Cox and Snell R^2) and 24.7% (Nagelkerke R^2) of the variance in the use of information to self-manage blood pressure. As shown in Table 12, only one independent variable (information seeking) made a unique statistically significant contribution to the model.

Step 2. Information seeking was a significant independent variable, recording an odds ratio of 1.23 ($p = .010$). This means that women who participated in information seeking were 1.23 times more likely to be members of the group of women who reported to taking action to self manage blood pressure, compared to women who did not. The model was statistically significant, $\chi^2(3, n=53) = 12.388, p = .006$, and correctly classified 75.5% of cases. The model as a whole explained between 20.8% (Cox and Snell R^2) and 28.1% (Nagelkerke R^2) of the variance in the use of information to self-manage blood pressure. As shown in Table 12, only one of the independent variables (information seeking) made a unique statistically significant contribution to the model.

Step 3. Information sharing was a significant independent variable, recording an odds ratio of 2.09 ($p = .051$). This means that women who participated in information sharing were 2.09 times more likely to be members of the group of women who reported to taking action to self manage blood pressure, compared to women who did not. Information seeking was a

significant independent variable, recording an odds ratio of 1.19 ($p = .037$). This means that women who participated in information seeking were 1.19 times more likely to members of the group of women who reported to taking action to self manage blood pressure, compared to women who did not. The model was statistically significant, $\chi^2 (5, n=53) = 18.509$, $p = .002$, and correctly classified 69.8% of the cases. The model as a whole explained between 29.5% (Cox and Snell R^2) and 39.7% (Nagelkerke R^2) of the variance in the use of information to take action to self-manage blood pressure. As shown in Table 12, two of the independent variables made a unique statistically significant contribution to the model (information seeking and information sharing).

Step 4. Information sharing was a significant independent variable, recording an odds ratio of 2.16 ($p = .042$). This means that women who participated in information sharing were 2.16 times more likely to be members of the group of women who reported to taking action to self manage blood pressure, compared to women who did not. The model was statistically significant, $\chi^2 (6, n=53) = 20.541$, $p = .002$, and correctly classified 71.7% of the cases. The model as a whole explained between 32.1% (Cox and Snell R^2) and 43.3% (Nagelkerke R^2) of the variance in the use of information to actively self-manage blood pressure. As shown in Table 12, one of the independent variables made a unique statistically significant contribution to the model (information sharing).

Summary – women at risk for hypertension (Model 1). In summary, Information seeking ($p = .04$, OR = 1.19) and Information Sharing ($p = .05$, OR = 2.09) both had an independent, significant effect on use of information to take action. Step 3 had the best goodness of fit index (overall $\chi^2 = 18.509$, $p = .002$, Nagelkerke $R^2 = 0.40$) the best model for predicting use of information to take action regarding self-management of blood pressure among those who

were at risk, as step 4 did not add a significant contribution. Both individual and group factors were independent variables in this model.

Women diagnosed with hypertension – taking action to self-manage blood pressure (Model 2). Step 1. The model was not statistically significant, $\chi^2 (1, n=89) = 2.012, p = .156$, indicating it was unable to distinguish between respondents who reported using information to take action to self-manage their blood pressure and those who did not.

Step 2. The model was not statistically significant, $\chi^2 (3, n=89) = 3.526, p = .317$, indicating it was unable to distinguish between the respondents who reported using information to take action to self-manage their blood pressure and those who did not.

Step 3. Information sharing was a significant independent variables, recording an odds ratio of 1.98 ($p = .032$). This means that women who participated in information sharing were 1.98 times more likely to be members of the group of women who reported to taking action to self manage blood pressure, compared to women who did not (See Table 13). The model was not statistically significant, $\chi^2 (5, n=89) = 9.561, p = .089$ (although the step was), indicating it was unable to distinguish between respondents who reported using information to actively self-manage their blood pressure and those who did not.

Step 4. Information sharing was a significant independent variable, recording an odds ratio of 1.89 ($p = .048$). This means that women who participated in information sharing were 1.89 times more likely to be members of the group of women who reported to taking action to self manage blood pressure, compared to women who did not (See Table 13). The model was not statistically significant, $\chi^2 (6, n=89) = 11.062, p = .086$, indicating it was unable to distinguish between respondents who reported using information to actively self-manage their blood pressure and those who did not.

Summary – women diagnosed with hypertension (Model 2). In summary, Information Sharing ($p = .048$, $OR = 1.89$) had an independent, significant effect on use of information to take action. The overall model did not work well in the African American women diagnosed with hypertension, as it was unable to predict the women who took action to manage their blood pressure.

Overall model performance

Reviewing the models to assess overall performance, the model shown in step 3 was the best fit to the data for women at risk for hypertension. The model was statistically significant, $\chi^2(5, n=53) = 18.509$, $p = .002$, and correctly classified 69.8% of the cases. This means the model was able to correctly classify women who reported taking action to self-manage blood pressure and women who did not. The model as a whole explained between 29.5% (Cox and Snell R^2) and 39.7% (Nagelkerke R^2) of the variance in the use of information to take action to self-manage blood pressure. In contrast, the model for women diagnosed with hypertension taking action to self manage blood pressure was not statistically significant.

Discussion

Active management of blood pressure includes some of the following activities: making dietary changes, exercising, taking medication, and limiting alcohol intake, speaking with a healthcare provider (Eckel et al., 2013). These activities are necessary to establish blood pressure control: both in preventing hypertension and in managing hypertension (Eckel et al., 2013).

Active management among women at risk for hypertension

The findings of this study indicate that information behaviors are important to consider in this group. Many of the women (60%) in this group were already prehypertensive or hypertensive, although they had not been diagnosed. Therefore, they need to take action to self-

manage their blood pressure. The importance of contextual factors was revealed in this model. Information seeking was a significant independent variable, which explained information use to take action to self-manage blood pressure. Therefore, it seems useful to target some intervention efforts at this individual level. Information sharing was a significant independent variable, which explained information use of information to take action to self-manage blood pressure. This finding is useful to guide information intervention development that is appropriate for women in this group. According to these findings, the creation of social blood pressure information networks may be useful in helping women to take action to manage their blood pressure. Since these women are not being treated for hypertension, their interactions with blood pressure and each other can be a unique time to engage women with healthcare professionals, specifically if additional care is needed (i.e. diagnosis of hypertension, suggestion of lifestyle changes, initiating medication therapy).

Active management among women diagnosed with hypertension

Women diagnosed with hypertension are at an increased risk for stroke and end stage renal disease (Chobanian et al., 2003; Roger et al., 2011). It is important for this group to use information to take action. The mean blood pressure among women with hypertension was not controlled in this sample (142/84). The finding that the model was unable to explain any of the variance among women with hypertension that used information to take action to self-manage was surprising. However, this finding is supported by the literature; less than 50% of patients receiving treatment for hypertension are successful in controlling their blood pressure (Valderrama et al., 2012). Again, African American women are particularly vulnerable and are more likely to suffer a negative outcome, such as stroke or renal failure. Therefore, it is extremely important that scientists determine what predicts taking action to self-manage blood pressure

among this group. These findings highlight that current interventions and education may not be effective or useful to these women, who need them the most. Therefore, future studies are needed to design and test theories that explain variables that would promote African American women diagnosed with hypertension to take action.

We need to better understand the quality of the information women are seeking and retrieving. Future studies should aim to understand what information sources African American women utilize and access, as well as if specific sources were preferred over others.

With the exception of age, there were no statistically significant differences between women who were at risk and those who were diagnosed with hypertension. This group was uniquely homogenous, which allowed for the detection of significant independent variables, other than demographic differences. Although the women who were diagnosed were statistically older than the women who were at risk, when age was entered into the models as a covariate, neither the individual performance of the significant variables (information seeking and information sharing), nor the overall fit of the models to the data changed. Therefore the age difference between the groups is not an important factor to consider. The differences were due to another factor, which is unknown at this time. (See Table 15 for a comparison of findings by group).

Limitations

There are several limitations of this study. One limitation of was that the sample was obtained by convenience, which limited the generalizability of the findings. Another limitation was the small sample size. This study will need to be repeated to demonstrate the validity of the findings. A third limitation was that these questionnaires and scales were adapted for this study for use with hypertensive patients. However, both factor analyses and instrument reliability

testing were conducted to demonstrate validity and reliability in this population. The information sharing score was calculated from one-item summary score. This measure needs further development, such as placing each response on a Likert scale. It also requires further testing and refinement. Given these possible limitations, this study was a unique opportunity to access African American women and their use of information to self-manage blood pressure. This innovative study was an initial step, as it highlights important findings in a population that continues to suffer poor outcomes related to uncontrolled blood pressure.

Conclusion

The results yielded new evidence from exploring aspects of self-management of hypertension that had not been previously studied in African American women. These findings could help form a scientific basis with which to understand the relationship between blood pressure control, information seeking, information sharing, and information use. These findings can help guide future studies intended to determine specific information needs for African American women, both diagnosed with and at risk for hypertension. These findings can also guide the creation of interventions focusing on information exchange at the individual, group, and health care system levels.

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Table 11***Measures Included in Chapter 4***

Measure	# of Items	Alpha	Scale type	Score range (Actual score range)	Mean (SD)	Valid n =
Attitude	3	.59	Likert	3 -15 (10 -15)	14.34 (1.09)	150
Total Information Seeking	8	.84	Likert	8 – 40 (8 – 34)	19.13 (5.44)	150
Blood Pressure Social Norms	5	.88	Likert	5 – 25 (17 – 25)	23.79 (1.90)	151
Information Sharing	6	-	Summary	0 – 6 (0 – 6)	1.70 (1.12)	151
Information Use	8	-	Summary	1 – 9 (1 – 8)	2.05 (1.46)	151
Sense of African American Community	4	.715	Likert	4 – 20 (4 – 18)	15.23 (1.72)	150
Healthcare system	4	.400	Summary	0 – 4 (0 – 4)	2.70 (0.81)	148

Table 12

Logistic Regression Predicting Information Use to Take Action to Self-manage Blood Pressure – At Risk (Model 1)

Step	Variable	Beta	Standard Error	P Value	Odds Ratio	95% Confidence Interval for Odds Ratio	
						Lower	Upper
1	Information Seeking	.214	.076	.005	1.239	1.068	1.437
2	Information Seeking	.204	.079	.010	1.227	1.050	1.433
	Attitude	.461	.369	.212	1.585	.769	3.270
	Social Norms	-.139	.210	.508	.870	.577	1.312
3	Information Seeking	.172	.083	.037	1.188	1.010	1.396
	Attitude	.255	.411	.534	1.291	.577	2.887
	Social Norms	-.167	.218	.445	.846	.552	1.298
	Information Sharing	.735	.377	.051	2.086	.997	4.366
	Sense of Community	.341	.267	.202	1.406	.833	2.375
4	Information Seeking	.146	.084	.082	1.157	.982	1.364
	Attitude	.474	.472	.315	1.607	.637	4.053
	Social Norms	-.133	.227	.558	.876	.562	1.365
	Information Sharing	.771	.380	.042	2.161	1.027	4.549
	Sense of Community	.517	.313	.098	1.677	.908	3.098
	Health Care System	-1.069	.797	.180	.344	.072	1.638

Step 1: $\chi^2 = 10.724$, df = 1, p = .001, Nagelkerke $R^2 = 0.25$

Step 2: $\chi^2 = 12.388$, df = 3, p = .006, Nagelkerke $R^2 = 0.28$

Step 3: $\chi^2 = 18.509$, df = 5, p = .002, Nagelkerke $R^2 = 0.40$

Step 4: $\chi^2 = 20.541$, df = 6, p = .002, Nagelkerke $R^2 = 0.43$

Table 13

Logistic Regression Predicting Information Use to Take Action to Self-manage Blood Pressure – Diagnosed (Model 2)

Step	Variable	Beta	Standard Error	P Value	Odds Ratio	95% Confidence Interval for Odds Ratio	
						Lower	Upper
1	Information Seeking	.063	.046	.168	1.065	.974	1.166
2	Information Seeking	.073	.048	.126	1.076	.980	1.182
	Attitude	-.361	.352	.304	.697	.350	1.388
	Social Norms	.161	.151	.287	1.175	.873	1.580
3	Information Seeking	.028	.052	.588	1.028	.929	1.138
	Attitude	-.452	.370	.221	.636	.308	1.313
	Social Norms	.131	.151	.384	1.140	.849	1.532
	Information Sharing	.682	.317	.032	1.978	1.062	3.683
	Sense of Community	.034	.137	.802	1.035	.792	1.352
4	Information Seeking	.037	.053	.485	1.038	.935	1.152
	Attitude	-.444	.377	.239	.641	.306	1.343
	Social Norms	.127	.153	.406	1.136	.841	1.534
	Information Sharing	.634	.320	.048	1.885	1.006	3.529
	Sense of Community	.036	.136	.791	1.037	.794	1.355
	Health Care System	-.547	.453	.227	.579	.238	1.406

Step 1: $\chi^2 = 2.012$, df = 1, p = .156

Step 2: $\chi^2 = 3.526$, df = 3, p = .317

Step 3: $\chi^2 = 9.561$, df = 5, p = .089

Step 4: $\chi^2 = 11.062$, df = 6, p = .086

Table 14***Comparison of Logistic Regression Results At Risk vs. Diagnosed***

	At Risk	Diagnosed
Use of Information to Take Action		
Variance Explained	39.7%	Model not significant
Significant Independent Predictor	Info Seeking (p = .04, OR - 1.19) Info Sharing (p = .05, OR - 2.09)	Model not significant

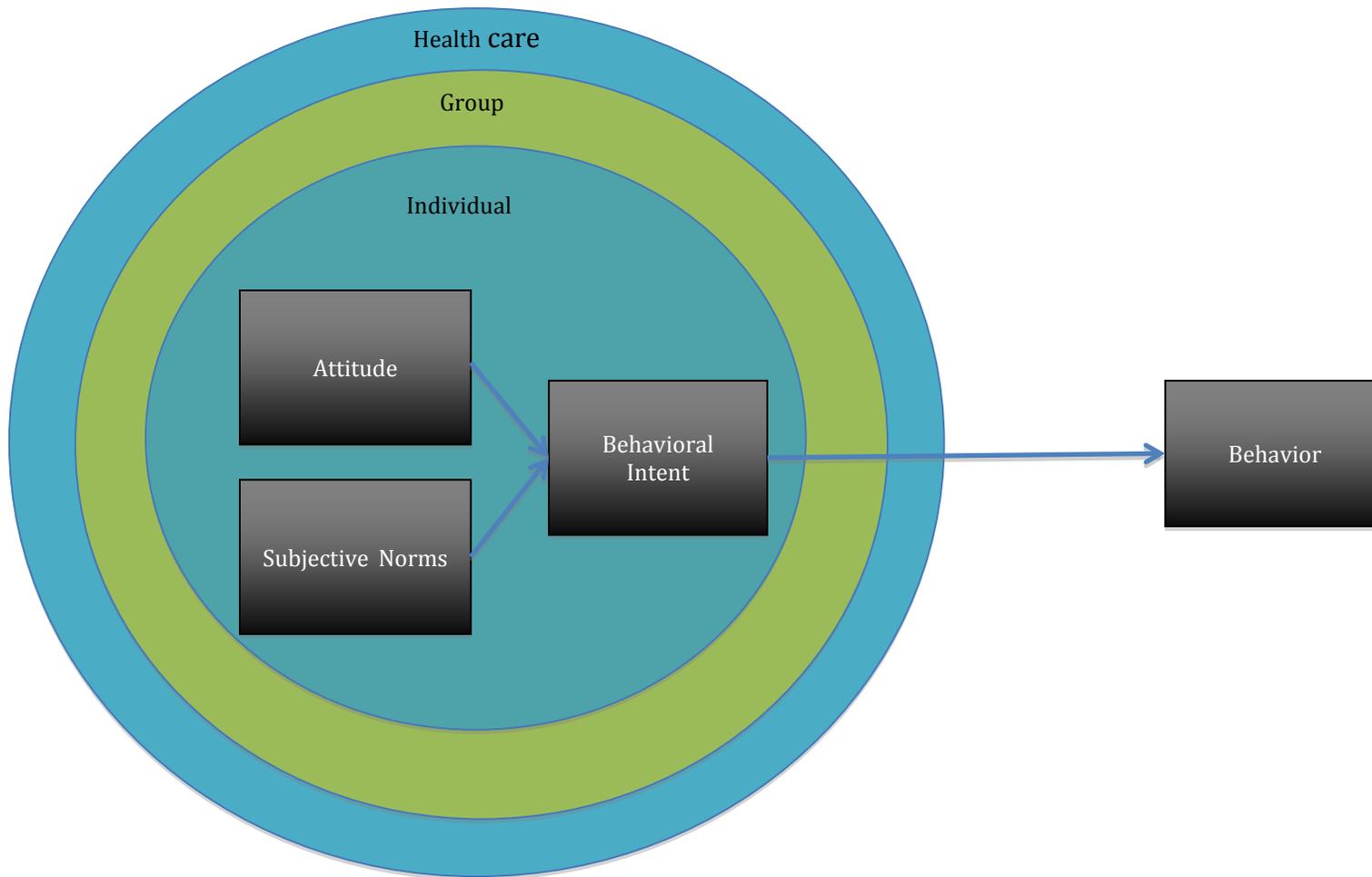


Figure 6. Conceptual Model

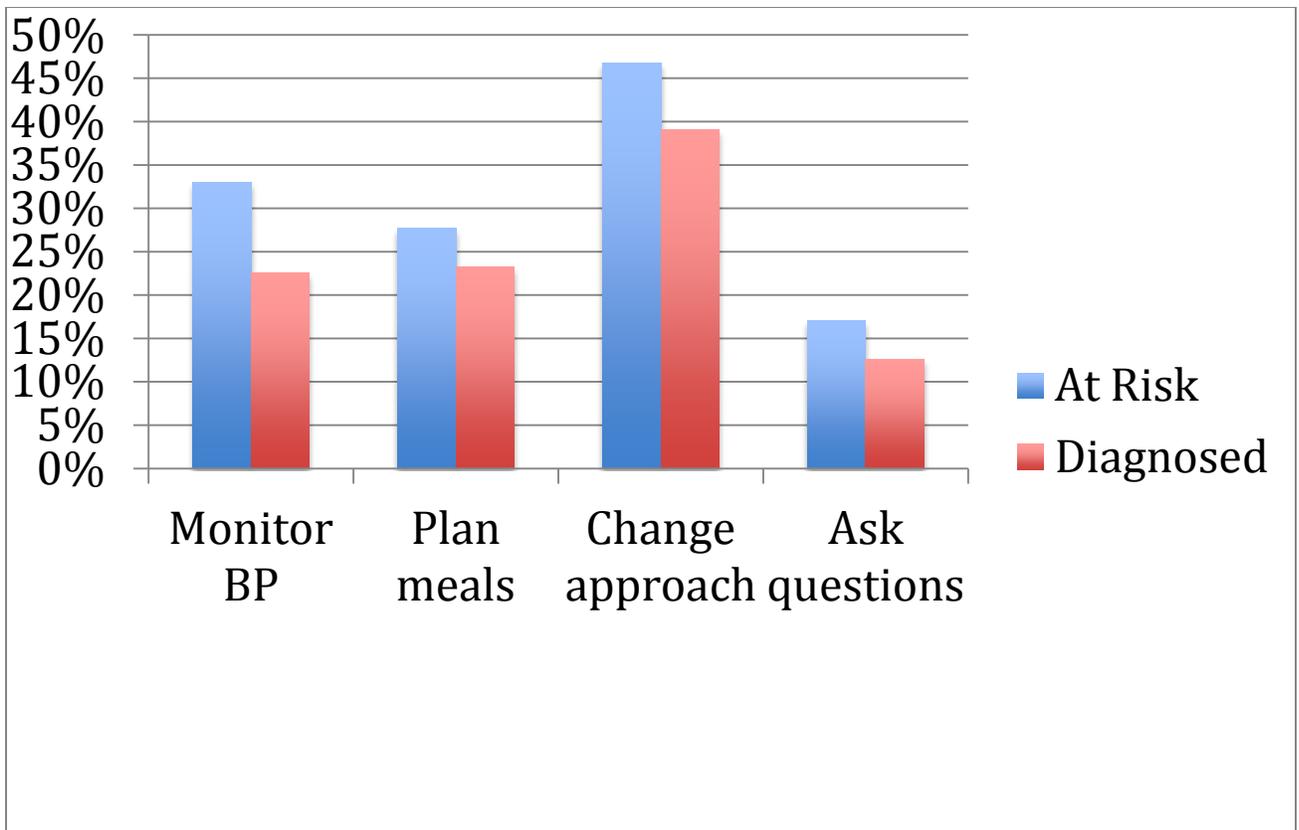


Figure 7. Percentage of Responses Reflecting Information Use to Take Action

CHAPTER 5

Summary of the Three Manuscripts

Hypertension is a serious global issue, African American women in the United States have the highest prevalence of hypertension – higher than any other group in the world (Bakris & Ritz, 2009; Roger et al., 2011). In fact, African Americans are: a) 1.3 times more likely to suffer a non-fatal stroke, b) 1.8 times more likely to suffer a fatal stroke, c) 1.5 times more likely to die from a cardiac related death, and d) 4.2 times more likely to be diagnosed with end-stage renal disease when compared to Whites in the United States (Chobanian et al., 2003; Roger et al., 2011). Although hypertension is preventable and one can successfully self-manage this illness, only about half of those who are receiving treatment for hypertension have maintained blood pressure control (Egan et al., 2010; CDC, 2011; Go et al., 2013). In addition, despite efforts to reduce the health disparities gap between Whites and African Americans, African Americans continue to suffer disproportionately higher rates of hypertension.

The purpose of this dissertation study was to examine information behaviors, to determine innovative ways to improve blood pressure control among African American women, diagnosed with and at risk for hypertension.

The introduction described hypertension in the United States: among the general population, among the African American population, among African American women, and costs related to hypertension. Currently recommended therapies were reviewed, and specific concerns for African Americans and implications for nursing's role and other primary

health professionals' roles for each therapy were presented. Chapter 2 was an integrative literature review on Internet health information seeking. The literature review conducted (a) determined the evidence available on patients who use the Internet to find health information and (b) evaluated key themes identified in the literature review among a sample of African American women. Chapter 3 focused on describing Internet behaviors, as well as information behaviors in a sample of African American women. Chapter 3 also explored the relationships among information behaviors: information seeking, information sharing, and information use. Chapter 4 provided a statistical analysis that explored how information was used to self-manage blood pressure in a sample of African American women. The results of this study and its potential to highlight opportunities to extend the reach and effectiveness of nursing interventions aimed to help reduce disparities in hypertension among African American women follow.

Blood Pressure Control

First and foremost, the findings of this study showed that the prevalence of hypertension among the women in the sample was 62%, which is higher than what is published in the literature (44%) (Roger et al., 2011). In addition, of women who had not been diagnosed with hypertension, 40% had a systolic blood pressure between 120 – 139 and 20% had a systolic blood pressure greater than 140. One reason that blood pressure control was poor in the sample may be due to lack of knowledge regarding the disease. In fact, women diagnosed with hypertension, who probably had some education regarding the disease, had mean knowledge scores that were not statistically significantly different than those who were not diagnosed. This finding highlights the need for continued research efforts to improve hypertension knowledge and blood pressure control among African American women. The remainder of this chapter

highlights other findings from this dissertation project, and suggests implications for future work – for practice, for theory, and for future intervention research.

The Internet as a Tool

The findings from the integrative literature review showed that seeking information on the Internet might be useful for patients attempting to self-manage a medical condition. Internet health information seekers were able to seek and acquire health information that they felt was useful and of good quality. After they found the information they were seeking, participants in included studies often felt empowered and were able to make health decisions (Jones et al., 2014). However, it is not clear if the findings of the literature review reflect the perspective of African American women with hypertension. African American women interested in blood pressure control might benefit from seeking hypertension information on the Internet and acquiring quality information that is relevant. Future studies are needed to determine if findings are relevant to health information seeking in other populations and health conditions is representative of the online experiences and behaviors of African American women with hypertension.

Internet Access and Age

According to Pew Research Center's Internet and American Life Project, 72% of African Americans have access to the Internet, through either a broadband connection or through a smartphone (Smith, 2014). The findings of the current study are consistent with Smith (2014), as 96% of the women in the sample reported accessing the Internet at least occasionally. In fact, over 60% of the sample accessed the Internet at least once a day. Smith (2014) found that African Americans were more likely to access the Internet for social purposes than to use the Internet for health information seeking. Also consistent with Smith's (2014) findings, this study

found that a small proportion—only 41%—of the women accessed the Internet to seek general health information. Given that the women in the sample used the Internet with frequency, there is an opportunity to direct African American women to specific, quality sites that are useful in meeting their blood pressure information needs and helping them successfully self-manage their blood pressure.

Smith (2014) found that most African Americans access the Internet through a cellular device, or smartphone. In this study, the majority of the sample (more than 95%) owned a cellular phone, but less than half of the women used their cellular phone to seek general health information, and even fewer women (less than 15%) used their cellular phone to seek blood pressure information. Women who were diagnosed with hypertension were even less likely to use their cellular phones to seek general health or blood pressure information, when compared to women who were not diagnosed. In fact, the women in this study were more likely to access the Internet from a computer than to access the Internet from a cellular phone.

The majority of the women (> 60%) had incomes greater than \$30,000 annually; more the 30% had incomes greater than \$60,000 annually. Perhaps, as many of these women had higher incomes, they could afford computers for their homes during a time when mobile devices were not yet as developed as they are now. Some of these women may not have switched to more contemporary means, such as smartphones, and that may be why they still access the Internet from a computer. Alternatively, they may use both desktop computers and mobile devices to access the Internet. Future studies should be conducted to determine which type of access is used most and if accessing the Internet from different platforms matters when assessing health outcomes. Additional studies are also needed to determine whether certain kinds of information require being stationary versus being mobile, and if successful management of

hypertension requires access to relevant health information throughout the day including when the subject may be away from the computer.

Differences in accessing Internet from a computer rather than a smartphone may be due to the age difference between the groups; the women who were diagnosed were about 11 years older than those who were at risk. Some older African American women may not know how to access the Internet or use the features on a smartphone. Those who own smartphones are more likely to participate in online activities, when compared to those who do not own smart phones Shannon-Missal (2013). Future studies should focus on age differences, as older women may need additional education to use some online features that may benefit them. The integrative literature review included studies that found those who sought health information on the Internet did so because it was available at any time of the day or night (Jones et al., 2014). Similarly, smartphones allow additional flexibility in accessing the Internet. Additional studies are needed to determine when African American women need information to self-manage their blood pressure. Interventions that address needs as they arise may be useful to aid women in making decisions about managing blood pressure.

Information Dynamics

The findings from this study showed that there are unrecognized or unmet information needs (as evidenced by poorly controlled blood pressure and inaccurate knowledge) in this sample of African American women. Nurses who work in practice settings are fully capable of identifying and addressing these information gaps among African American women. Instead of providing general hypertension education, efforts might helpfully be placed on the specific knowledge deficits outlined in this project. Previous studies have shown that messages tailored to women's knowledge about the Dietary Approaches to Stop Hypertension (DASH) were

successful in helping women to improve knowledge about and compliance to the DASH diet (Scisney-Matlock et al., 2006). Providing tailored education to African American women based on their specific knowledge needs might be helpful in helping them to better self-manage their blood pressure, therefore tailored education interventions deserve further study.

Information Seeking. The results of the integrative literature review indicated that there are positive outcomes for patients who participate in Internet health information seeking including: feeling reassured, informed, and/or satisfied (Jones et al., 2014). In line with this, the present research found that information seeking was an independent, significant explanatory variable of use of information among African American women at risk for hypertension. Previous work showed that participants who seek health information might be more likely to improve health behaviors (Ayers & Kronenfeld, 2007). Future studies are needed to explore if the act of information seeking alone is most useful, or if one needs to seek and find information for the process to be effective. These relationships are important, for both theory and practice, and deserve further study.

Social nature of information seeking and acquisition. Previous studies have shown that information is usually sought from interpersonal sources first, regardless of whether or not the information is accurate (Harris & Dewdney, 1994). This may be true among African American women who have access to a social network containing people that they trust and respect. African American women who participated in this study, who had an available social network through the church, were interesting in seeking information collaboratively (with others), rather than seeking alone. Future studies are needed to determine where information is sought, from whom, with whom, and the accuracy of the information. Findings from these studies will guide intervention development. It is also important to note, it remains unclear

whether or not the information sought and found needs to be accurate, which again highlights it may be the seeking process and interaction with others that is helpful for patients. Other results of this dissertation project highlight the social manner in which people interact with information. Some of the remaining key findings that will be discussed include: collaborative information seeking, incidental information acquisition, use of social media, and information sharing.

Collaborative seeking. Previous work has explored collaborative information seeking in the workplace, finding that collaborative seeking is triggered when there is a lack of knowledge and available information for a shared information need (Reddy & Spence, 2008). Veinot (2009) found that people with HIV/AIDS were likely to acquire information from interpersonal sources, often without explicitly expressing a need. Collaborative information seeking was important in this sample of African American women, as many of the women preferred to seek health information with one or more people. It is possible that seeking with someone else who shared an information need also provided emotional support, which is why the women chose to seek collaboratively. Studies included in the integrative literature showed that participants were interested in other's experiences and seeking this information made them feel reassured and satisfied (Jones et al., 2014). Given how the participants were recruited, the women in this sample likely had a dedicated active social network within the church, which may have made it easier to find other people with whom to seek and find information. That is, due to the high prevalence of hypertension among African Americans, they may have already had access to other women who shared similar information needs, who lacked the same information, and who could meet psychosocial needs while obtaining information. Future studies should explore the importance of collaborative seeking among women within non-church networks, as well as among those without an available network. It would also be important to examine the usefulness

of creating or enhancing networks in which African American women can collaboratively seek information, as well as learn and share strategies for successfully accessing information.

Incidental information acquisition. This study found that more of the respondents found blood pressure information by chance than by purposive search. This is similar to results in a study of HIV/AIDS information acquisition in a sample of young men who have sex with men (Veinot et al., 2013). An “information-rich” environment is needed so that one can access information incidentally (Veinot et al., 2013). For women in the sample the church may have been an information rich environment, due to the availability of a social network, as well as, potentially church-based health ministries. Future studies should examine the information environments in which African American women live, work, and socialize; doing so may help researchers to better understand environmental features that facilitate incidental information acquisition. Furthermore, this points to the ability to design interventions that create information rich environments for African American women with, or at risk for, hypertension.

Social media use. As described, 1 in 5 of the women in the sample had posted a health related question or experience online within the past year. Other studies found that 8% of Internet users have posted a health question or experience (Fox & Duggan, 2013). National studies also show that African Americans are particularly high users of Twitter (Smith, 2014). Together, these findings suggest that social media may be a promising platform for hypertension interventions among African American women.

Supporting the concept of social media-based interventions, previous studies have shown that social media can be used to implement successful health behavior change interventions. African American women reported that they would be motivated to get an influenza vaccines after receiving messages through social media (Marsh et al., 2013). Other preliminary studies

show that young African American women endorsed the use of social media sites to create networks among those who are interested in increasing physical activity (Durant et al., 2014).

Despite its promise, it is important to approach the design of social media-based hypertension interventions for African American women carefully. Munson (2011) presented some of the challenges of providing wellness activities on platforms, such as Facebook. Some of the challenges highlighted by Munson (2011) are similar to the negative outcomes identified in the integrative literature review: finding information that was unwanted, scary, or inappropriate to meet patients' needs. These challenges can be mitigated through pilot testing interventions that use social media, as well as use of evidence-based design approaches. For example, research shows that social media can be used to help patients utilize their established, offline network for online support in meeting health goals (Newman et al., 2011). But when creating an online network, it is important to help patients to customize their groups, as well as be selective in what they view and post (Newman et al., 2011). Future research is needed to build the evidence base regarding optimal intervention designs for African American women.

Information sharing. Information sharing was the most prevalent information behavior in this sample; the majority of the sample participated in some form of information sharing. This may be due in part to the fact that women in the sample likely had an available network to share information (their church). Similarly, Veinot et al. (2013) discussed the importance of belonging to a network in order to be able to share information. However, the poorly controlled blood pressure in the sample, coupled with documented knowledge gaps, is suggestive of the possibility that inaccurate information may be part of the information shared regarding hypertension. Again, the results of this study highlight the need for educational interventions to address some of the misconceptions regarding blood pressure management.

Communicating with Healthcare Providers

Also note worthy, of women in the sample who did search for health information (using their cell phones), over half did not share or discuss it with a healthcare provider. In contrast, Fox and Duggan (2013) found that 59% of African Americans followed up with a healthcare provider about information they had found online. Among the women in this sample, there may have been a lack of trust in a provider or lack of access to a provider, which may be the reason the information was not shared with a healthcare professional. Previous studies have shown that African American patients are more likely to distrust the healthcare system when compared to Whites (Armstrong et al., 2008). It is important to note, many of the women did report seeing a healthcare provider within the past 3 months (more than a third of the sample). The integrative literature review showed that some patients felt the need to obtain health information to feel prepared for interactions with a health care provider. Other researchers have highlighted the importance of empowering patients and the benefits of interactions between African American patients and healthcare providers (Scisney – Matlock et al., 2009). Future research is needed to explore the conflicting findings on African American women obtaining health information on the Internet and their follow-up with a healthcare provider. Studies are also needed to determine if directed Internet health information seeking could help African American women feel prepared and empowered to interact with a healthcare provider, and therefore lead to further discussion with health professionals.

Relationship between Information Sharing and Information Use

The most significant contribution of this study was the identification of the strong, positive association between information sharing and information use. In fact, information sharing was a more significant predictor of information use than information seeking. This

relationship might be attributed in part to the increased information interaction that flows from information sharing (Veinot et al., 2013). It is also possible that the women in the sample shared information so frequently in order to meet some of the psychosocial needs outlined in the integrative literature review: feeling reassured, validating information obtained from other sources, or understanding other's experience with hypertension (Jones et al., 2014). Exploration of these potential explanations for the prevalence of information sharing is necessary as it can guide intervention and program development. Additionally, these results raise the interesting hypothesis that creating and facilitating group information interaction among African American women with hypertension may be more appropriate and useful than individual-only interventions. Additionally, future studies are also needed to assess the potential behavioral benefits of information sharing and information use (blood pressure control, lifestyle changes), as well as the potential emotional benefits of information sharing and use (e.g., patient empowerment, decreased anxiety, ability to make decisions).

The Impact of Information Use: Self-Management of Blood Pressure in Diagnosed Women

The conceptual model tested in this study failed to explain active management in the most vulnerable group: women diagnosed with hypertension. The reasons for this are unclear, but it is possible that women who are diagnosed with hypertension are thinking about, and responding to their disease in ways that researchers have not yet conceptualized. Several possibilities are apparent: there may be fear, or the women may feel that they are no longer able to control their blood pressure, since they are diagnosed with hypertension (fatalism). Therefore, further studies are needed to explore how women diagnosed with hypertension conceptualize, process, and use information to self manage. Qualitative inquiry would be important to

determine what women consider important after diagnosis. These exploratory studies are needed in order to supply a foundation for intervention research.

Unaddressed Issues

There were gaps in knowledge identified within the integrative literature review that remain unaddressed in future research with African American women in a hypertension context.

Although this study was not designed to address these issues, they are worth discussion now and should be addressed in future studies. First, the review highlighted many positive outcomes of Internet health information seeking, but the review also identified negative outcomes related to Internet health information seeking. Some studies found that participants were anxious, overwhelmed, and frustrated as a result of seeking (Gaie, 2006; Kim & Kwon, 2010; Lagan et al., 2011). Given the fact that many African American women have first-degree relatives with hypertension, it is also possible that information acquisition about hypertension in this population may be emotionally complex. Again, it was not the purpose of this study to evaluate the content of information available Internet. However, the potential for negative emotional outcomes deserve additional study, so that researchers can determine what make patients feel this way and design interventions that avoid eliciting these feelings.

Also of importance, there were similar concepts that were likely relevant to the content of this study, but were not measured as they were not the focus of this project. Illness representations are beliefs and expectations one has about a disease (Leventhal et al., 1980). Previous studies have shown that illness representations guide health behaviors, some studies have focused specifically African Americans and behaviors to manage blood pressure (Leventhal et al., 1980, Pickett et al., 2014). Therefore, future studies should measure and analyze illness representations to determine their effect on use of information to self-manage blood pressure.

Another concept that would be appropriate to measure in future research is perceived behavioral control. Perceived behavioral control is a strong predictor of behavioral intention as well as performing a behavior (Ajzen & Madden, 1986; Ajzen, 1991). Previous studies among African American participants have shown that thoughts about controlling hypertension were associated with control of systolic blood pressure (Hekler et al., 2008). Therefore, additional studies are needed to explore relationships among perceived behavioral control, use of information to self-manage blood pressure, and systolic blood pressure control.

Future Intervention Opportunities

Patients need help managing their blood pressure; this is clear in light of the fact that 50% of patients receiving treatment do not maintain blood pressure control (Valderrama, 2012). Since this study was conducted, newer technologies have become available to patients who are interested in self-managing their blood pressure. For example, there are now iPhone applications available that store blood pressure readings, send medication reminders, and allow export of data to a healthcare provider (<http://www.pinterest.com/tiffany1578/health-tech-general/>). Such tools could facilitate new technology-enabled strategies to assist patients with blood pressure management. They would also allow tailoring of interventions to specific needs of the individuals, since messages could be tailored to a user's blood pressure status. Future studies should be conducted to determine if these applications are useful and appropriate among African American women who are trying to lower or maintain their blood pressure. Also, additional studies are needed to determine the effects of Internet health information seeking, as well as digital blood pressure management tools, on cardiovascular outcomes such as blood pressure control.

Limitations

There are some limitations of this project that are worth discussion. First, some of the measures were not previously used within this population. However, most of the measures performed well and can be further refined for continued use in this population. Second, perceived behavioral control is a very strong predictor of behavior, but was not included in this study. Although it was not measured during this project, the value of perceived behavioral control is recognized and it will be collected in future studies. Third, the women in this sample were well educated and had access to the church network. Women who have less education, who access other networks, and who do not have access to a network at all deserve further attention. Finally, although the sample sized was deemed acceptable (per power analysis), this population was purposely homogenous. However, because many factors were constant across the sample (e.g. race, income, education) significant predictors of information use were identified. In future studies, women within networks other than churches, with less income, and with less education should be considered, in order to be able to generalize to the larger population of African American women.

Conclusion

This dissertation project is a first step in considering new approaches to mitigating the health disparities in African American women with hypertension. There were many interesting findings from this project, from both the integrative literature review, as well as the information behavior studies. First, the Internet may be tool for African American seeking health information and social support to self-manage their blood pressure. In addition, African American women may benefit from enhanced, tailored education intervention. The findings from this project highlight the importance of the social aspects of information behaviors. Finally, information sharing was shown to be an important factor; it was a significant independent variable that

explained information use. The findings from this dissertation project are promising and deserve additional study.

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Appendix A

Internet Health Information Seeking: An Integrative Literature Review Matrix

First Author (year)	Purpose	Sample Size, Source, Medical Condition, & Age	Design	Results - Preferences for Health Information	Participant Outcomes
Balka (2010)	Explore Internet health information seeking among young women with breast cancer	35 women diagnosed with breast cancer prior to age 45 at the time of diagnosis, who were also known to use the Internet for health information seeking. The Young and the Breastless (organization), breast cancer, mean = 39, range 25 – 49	Qualitative descriptive	<p>What drives info seeking? Need to determine meaning and significance of lump or diagnosis</p> <p>Need for control Desire to be informed to question doctors</p> <p>What info is sought? Timeline for survival</p> <p>Info on medical treatment</p> <p>Psychosocial info (how do I tell people I have cancer)</p> <p>Practical info (how long to take off of work, what to tell employers) Tailored info (cancer and careers, children)</p> <p>How was info sought and received? 1/3 Internet first, 1/3 print first, 1/3 face-to-face interaction</p> <p>Online – live chat, website, or surfing the net</p> <p>All had internet access,</p>	<p>Meaning - what did one do with info found?</p> <p>Felt prepared, were able to make decisions</p> <p>Overwhelmed</p> <p>Almost half sought out librarian after searching on Internet</p>

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				<p>but not all used the internet to find info about breast cancer. Found it overwhelming</p> <p>Utility of info? Internet info useful? Some rated it highly, others rated it poorly</p> <p>All found face-to-face contact and information received most useful of all (when compared to internet and print)</p>	
Gaie (2006)	Explores how and why individuals decide to initiate, continue, and end a search, and select and evaluate information, in the context of a grave health threat to themselves or a loved one, using the Internet as a medium	11 patients and 11 caregivers, who and had conducted at least one lung cancer Internet search, University of Wisconsin-Madison lung cancer clinic, lung cancer, 16 subjects were 51 or older	Qualitative descriptive	<p>All had high school degree or higher; most had computer and Internet experience</p> <p>17 were comfortable using the Internet</p> <p>Sufficiency – user wanted more of better info; not too much, not too little</p> <p>Phases (4): search initiation/continuation selective exposure message processing message evaluation</p> <p>Heuristics:</p>	<p>Comfort</p> <p>Lack of motivation to continue IS</p>

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				<p>Motivation – sufficient drive/need existed to perform each phase’s behavior</p> <p>Opportunity – availability of resources needed to search; determined whether initiation and completion of each phase was possible</p> <p>Expected value – comparison of resource requirements or costs; determined whether the resources consumed by the search by search would be worth benefits</p>	
Kim (2010)	<p>Create a profile of cancer e-patients by identifying their sociodemographic characteristics, perceptions of cancer information seeking, and use of social networks</p> <p>Compare and contrast cancer e-patients with other types of cancer info seekers in terms of their use of, preference for, and trust in different types of cancer info sources</p>	n = 1,998 (n of online cancer info seekers = 252), National Cancer Institute (NCI)’s 2005 Health Information National Trends Survey (HINTS), a biannual cross-sectional national survey of the U.S. general adult population, cancer, 71.9% of cancer e-patients were 35-69 yrs old	Descriptive, correlational	<p>(cancer e-patients) 65% were 50 or older, 60% were female, 40% were college grads, 86.4% were non-Hispanic White, 4% were Black</p> <p>E-patients most used source was the Internet</p> <p>Most preferred source was their doctor, then Internet</p> <p>All four groups reported that doctors were their most trusted cancer info source</p>	<p>When comparing e-patients with offline seekers without cancer, e-patients were 4.41 times more likely to be 35 years or older, less likely to be male, 3 times more likely to talk frequently about health to friends and family, and less likely to feel that “getting cancer info took a lot of effort”</p> <p>Frustration</p> <p>Concerned about</p>

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					quality of some info found on the Internet
Lagan (2011)	Build on previous quantitative studies to explore women's experiences and perceptions of the internet for retrieving pregnancy related info, and its influence on their decision making	92 women from 5 countries, who expressed interest after participating in a web-based survey (13 online focus groups), pregnancy, Mean = 29.9 (4.88), Range = 19 -39	Qualitative, descriptive	<p>Central theme: need for info</p> <p>4 broad themes: validate info, empowerment, share experiences, and assisted decision-making</p> <p>Information Need: (professionals did not provide enough info, were too busy, or appointments were to infrequent, not long enough; internet helped to provide reassurance/support between appointments)</p> <p>Majority still valued health professionals opinion</p> <p>Identifying the Internet as an Information Source: Internet was already familiar; anonymity was important; flexible access was highly valued, considered a benefit; criticized books and magazines</p> <p>Retrieving Info from the Internet: most entered key</p>	<p>Empowerment</p> <p>Reassurance</p> <p>Could make decisions</p> <p>Avoided feeling of isolation</p> <p>Confidence to speak to professional</p> <p>Satisfaction</p> <p>Concerns about online information: frightening</p> <p>Anxiety</p> <p>Stress</p> <p>Info overload</p>

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				<p>words into a search engine, preferred sites supported by health authorities/medical or academic institutions, discussed ways to narrow search (by country, used quotations); going to advertised sites or starting a thread on a discussion forum; bookmarked sites they liked; differences on when they stop searching (some when they found 3 articles, others when they felt “satisfaction”)</p> <p>Using Internet to share experiences: Support from other pregnant women/mothers Understand what’s “normal” during pregnancy</p> <p>Appraising information from the Internet: Suffix (.gov) determined if site was trustworthy Use of info retrieved:</p> <p>Internet to validate information</p>	
Lorence (2006)	Identify (a) demographic characteristics of online health information	987, Tracking survey data of the Pew Internet and American Life Project, not specified, 69.1% were 30 – 49	Descriptive, cross-sectional	Demographics: Health info seeking is assoc. with gender ($p < .0001$), age ($p < .0001$),	Impact of the Internet on health: improved health

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	seeking, (b) main factors motivating or impeding Internet users to seek health info, and (c) the relationships of health info seeking activity with other online activities	years old		<p>race and ethnicity (p = 0.0386), Internet experience (p = .0001), frequency of Internet access (p = 0.0484), marital status (p <.0001), health service utilization (p < .0001), health conditions on interviewees (p<.0001) at the .05 level.</p> <p>Frequency of health info seeking: Those with chronic dx were more likely to search daily</p>	
Maddock (2012)	Understand the views of those affected by cancer, focusing on their online info needs and info seeking behaviors	476 people from 20+ countries; highest response was from UK (22.8%), most had cancer (82.9%) and were diagnosed within the past 5 years (53.5%), 46% were aged 18-34 (information on age found at www.eurocancercoms.eu)	Descriptive, Cross-sectional	<p>Wanted a variety of info: treatment choices, side effects, activities promoting recovery, help for daily task, advice on diet and nutrition and for long-term planning (financial advice and legal support)</p> <p>83% agreed or strongly agreed (A or SA) that they searched several sites, 62% A or SA one single site was trusted to aid in decision-making</p> <p>77% A or SA they would have more confidence in a site endorsed by a professional body</p>	Able to make decisions

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				<p>Main factors influencing one to use a particular site were: facility to retrieve info, qualification of authors, type of organization providing the info, and whether the info was considered up-to-date</p> <p>Ways patients communicate about their disease: 33% emails, forums (33%), social networking sites (9%), chat rooms (7%) and blogs (6%)</p> <p>56% online info mostly accurate, 40.5% occasionally or sometimes accurate</p>	
Taha (2009)	Examine the health info needs of older adults and perceived usefulness of various sources in satisfying needs. Determine differences between Internet users and nonusers regarding how access to health information influences health care behaviors	27, local community, not specified, Mean = 68.94 (8.47) Range = 51-85	Qualitative, descriptive	<p>Those who used the internet were more comfortable with computers, felt more competent using them, and had a greater interest in learning about and using computer than those in the non-Internet group.</p> <p>No significant differences in level of education were found between Internet users and nonusers.</p> <p>Those in the Internet</p>	Increased ability to care for themselves

First Author (year)	Purpose	Sample Size, Source, Medical Condition, & Age	Design	Results - Preferences for Health Information	Participant Outcomes
				<p>(52%) had been using the Internet for more than 5 years, frequent use of the Internet (26% >15hr/week, 22% 11-15 hour/week, 26% 6-10 hour/week, 26% 1-5 hour/week)</p> <p>Learn to use the Internet? 44% class, 30% exploring, 19% friend or family</p> <p>48% reported use of the Internet to find health info during the past year; 33% use it frequently to find health info</p> <p>Both internet users and nonusers rely on info from HCP (nonI – 68%, I – 67%); nonI used newspapers, magazines, tv, and friends and family more than I users.</p> <p>Felt responsible to search for info to self-manage (doctor didn't have time)</p> <p>Info on alternative meds wasn't available from doctor</p> <p>Wanted info on: Medical condition</p>	

First Author (year)	Purpose	Sample Size, Source, Medical Condition, & Age	Design	Results - Preferences for Health Information	Participant Outcomes
				<p>Info about a doctor, hospital, nursing home Nutrition</p> <p>Find info more quickly Accurate search terms to narrow results</p>	
van de Poll-Franse (2008)	<p>Evaluated the extent of the internet access, use, and patient characteristics that can be associated with Internet use; investigate in which phase of disease they're searching for info, kind of info searched, which Web sites were visited; self-reported effect of internet info searches on health care use</p>	<p>254, Eindhoven Cancer Registry, cancer, 71% 50 – 69</p>	<p>Descriptive, correlational</p>	<p>Men more likely to use internet by themselves</p> <p>No access or access among other individuals higher among elderly (60-69), women with breast cancer, lower education, those who were retired, those with low SES</p> <p>Cancer survivors with internet access used it for general health info (71%) or cancer (84%)</p> <p>2% had email contact with physician (primary care), 8% with oncologist</p> <p>6% contact with patient support groups via internet</p> <p>Info sources: 91% of sample medical oncologist, oncology nurse (71%), family (68%) and friends (64%)</p>	<p>Better informed (72%)</p> <p>Raised more questions (15%)</p>

First Author (year)	Purpose	Sample Size, Source, Medical Condition, & Age	Design	Results - Preferences for Health Information	Participant Outcomes
				<p>Internet was important source of info to 57% of Internet users</p> <p>Of all internet users (153), 84% had used the Internet to search for info about cancer</p> <p>Wanted to access medical record, tests results, request scripts, request appts on the Internet</p>	
Xie (2009)	Generate new insights into the interplay among age, Internet use, information seeking and decision making in health care	20, senior center in Maryland, not specified, aged 60 or older	Qualitative, descriptive	<p>The concept of HIW (health info that one would like to have and use to make important health decisions that may or may not be directly related to diagnosis or standard treatment)</p> <p>4 types of HIW:</p> <p>Basic: general understanding of conditions and treatment; help with coping Role of Internet? Convenient to search for info, rather than to make an appt</p> <p>Advanced: as detailed as possible; to understand, better interaction with physician</p>	<p>Coping</p> <p>Able to make decisions</p> <p>Prepared to interact with provider</p>

First Author (year)	Purpose	Sample Size, Source, Medical Condition, & Age	Design	Results - Preferences for Health Information	Participant Outcomes
				<p>Role of Internet? Brief info available that is easy to understand</p> <p>Complementary: lifestyle treatments (diet and exercise); can engage in additional helpful activities, doctor may have failed to mention</p> <p>Role of Internet? Sources other than the internet for this info, or verify it with provider</p> <p>Provider related: credentials and reputation of a specific provider; used to select provider, diagnosis, treatment</p> <p>Role of Internet? Easily find info about best providers in the area</p>	

Appendix B

Factor Analyses for Each Measure

Attitude

The three items of the Attitude scale were subjected to principal components analysis (PCA) using SPSS Version 21. Prior to performing PCA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of coefficients of .3 and above. The Kaiser-Meyer-Okin value was .591, which rounds to the recommended value of .6 (Kaiser, 1970). The Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of one component with eigenvalues exceeding 1, explaining 63.6% of the variance. An inspection of the scree plot revealed a clear break after the first component.

Item	Component Matrix	Communalities
Q34	.89	.781
Q35	.64	.731
Q36	.58	.397

Social norms

The five items of the blood pressure social norms scale were subjected to principal components analysis (PCA) using SPSS Version 21. Prior to performing PCA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of coefficients of .3 and above. The Kaiser-Meyer-Oklin value was .875, which exceeds the recommended value of .6 (Kaiser, 1970). The Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of one component with an eigenvalue exceeding 1, explaining 68.4% of the variance. An inspection of the scree plot revealed a clear break after the first component. To aid in the interpretation of the component, oblimin rotation was performed. The rotated solution revealed the presence of a simple structure (Thurstone, 1947).

Item	Component Matrix	Communalities
Q37	.784	.614
Q38	.761	.579
Q39	.858	.737
Q40	.878	.770
Q41	.848	.720

Information seeking

The eight items of the Total Information Seeking Scale were subjected to principal components analysis (PCA) using SPSS version 21. Prior to performing PCAA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Oklin value was .83, exceeding the recommend value of .6 (Kaiser, 1970) and Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of two components with eigenvalues exceeding 1, explaining 61.7% of the variance. Component 1 explained 48.6% of the variance, while Component 2 explained 13.2%. An inspection of the scree plot revealed a clear break after the second component. To aid in the interpretation of these 2 components, oblimin rotation was performed. The rotated solution revealed the presence of a simple structure (Thurstone, 1947), with both components showing a number of strong loadings and all variables loading substantially on one component. There was a strong positive correlation between the two factors.

Item	Pattern Coefficients		Structure Coefficients		Communalities
	Component 1	Component 2	Component 1	Component 2	
Q56	.934	-.109	.877	.381	.777
Q57	.863	-.036	.845	.417	.714
Q55	.665	.101	.730	.596	.523
Q54	.576	.294	.718	.450	.596
Q59	-.071	.859	.379	.821	.678
Q52	-.037	.786	.375	.767	.589
Q53	.042	.744	.433	.766	.589
Q58	.222	.545	.508	.662	.473

Purposive Information Seeking

The four items of the purposive information seeking subscale were subjected to principal components analysis (PCA) using SPSS Version 21. Prior to performing PCA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of coefficients of .3 and above. The Kaiser-Meyer-Okin value was .762, which exceeds the recommended value of .6 (Kaiser, 1970). The Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of one component with an eigenvalue exceeding 1, explaining 57.28% of the variance. An inspection of the scree plot revealed a clear break after the first component. To aid in the interpretation of the component, oblimin rotation was performed. The rotated solution revealed the presence of a simple structure (Thurstone, 1947).

Item	Component Matrix	Communalities
Q52	.768	.589
Q53	.751	.564
Q58	.713	.508
Q59	.793	.629

Incidental Information Seeking

The four items of the incidental information seeking subscale were subjected to principal components analysis (PCA) using SPSS Version 21. Prior to performing PCA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of coefficients of .3 and above. The Kaiser-Meyer-Okin value was .751, which exceeds the recommended value of .6 (Kaiser, 1970). The Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of one component with an eigenvalue exceeding 1, explaining 63.13% of the variance. An inspection of the scree plot revealed a clear break after the first component. To aid in the interpretation of the component, oblimin rotation was performed. The rotated solution revealed the presence of a simple structure (Thurstone, 1947).

Item	Component Matrix	Communalities
Q54	.780	.608
Q55	.736	.542
Q56	.844	.712
Q57	.814	.663

Collaborative Information Seeking

The five items of the collaborative information seeking subscale were subjected to principal components analysis (PCA) using SPSS Version 21. Prior to performing PCA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of coefficients of .3 and above. The Kaiser-Meyer-Okin value was .798, which exceeds the recommended value of .6 (Kaiser, 1970). The Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of one component with an eigenvalue exceeding 1, explaining 53.5% of the variance. An inspection of the scree plot revealed a clear break after the first component. To aid in the interpretation of the component, oblimin rotation was performed. The rotated solution revealed the presence of a simple structure (Thurstone, 1947).

Item	Component Matrix	Communalities
Q53	.759	.576
Q54	.790	.624
Q57	.693	.480
Q58	.711	.506
Q59	.699	.488

Sense of African American Community

The four items of the sense of African American community subscale were subjected to principal components analysis (PCA) using SPSS Version 21. Prior to performing PCA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of coefficients of .3 and above. The Kaiser-Meyer-Okin value was .714, which exceeds the recommended value of .6 (Kaiser, 1970). The Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of one component with an eigenvalue exceeding 1, explaining 55.98% of the variance. An inspection of the scree plot revealed a clear break after the first component. To aid in the interpretation of the component, oblimin rotation was performed. The rotated solution revealed the presence of a simple structure (Thurstone, 1947).

Item	Component Matrix	Communalities
Q42	.701	.492
Q43	.670	.449
Q44	.829	.687
Q45	.782	.611

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Appendix C
Institutional Review Board Exemption Letter

<https://eresearch.umich.edu/eresearch/Doc/0/CV7SQ43HQEH...>



Health Sciences and Behavioral Sciences Institutional Review Board • 540 East Liberty Street, Suite 202, Ann Arbor, MI 48104-2210 • phone (734) 936-0933 • fax (734) 998-9171 • irbhsbs@umich.edu

To: Patricia Coleman-Burns

From:

Richard Redman

Cc:

Tiffany Veinot
Alecia McCall
Patricia Coleman-Burns
Lenette Jones

Subject: Notice of Exemption for [HUM00077802]

SUBMISSION INFORMATION:

Title: Blood Pressure Control, Community Involvement, and Information Use: Model Testing and Refinement

Full Study Title (if applicable): Blood Pressure Control, Community Involvement, and Information Use: Model Testing and Refinement to assess the ability to predict African American women's intention to seek or share information related high blood pressure?

Study eResearch ID: [HUM00077802](#)

Date of this Notification from IRB: 6/25/2013

Date of IRB Exempt Determination: 6/25/2013

UM Federalwide Assurance: FWA00004969 (For the current FWA expiration date, please visit the [UM HRPP Webpage](#))

OHRP IRB Registration Number(s): IRB00000246

IRB EXEMPTION STATUS:

The IRB HSBS has reviewed the study referenced above and determined that, as currently described,

it is exempt from ongoing IRB review, per the following federal exemption category:

EXEMPTION #2 of the 45 CFR 46.101.(b):

Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Note that the study is considered exempt as long as any changes to the use of human subjects (including their data) remain within the scope of the exemption category above. Any proposed changes that may exceed the scope of this category, or the approval conditions of any other non-IRB reviewing committees, must be submitted as an amendment through eResearch.

Although an exemption determination eliminates the need for ongoing IRB review and approval, you still have an obligation to understand and abide by generally accepted principles of responsible and ethical conduct of research. Examples of these principles can be found in the Belmont Report as well as in guidance from professional societies and scientific organizations.

SUBMITTING AMENDMENTS VIA eRESEARCH:

You can access the online forms for amendments in the eResearch workspace for this exempt study, referenced above.

ACCESSING EXEMPT STUDIES IN eRESEARCH:

Click the "Exempt and Not Regulated" tab in your eResearch home workspace to access this exempt study.



Richard Redman
Chair, IRB HSBS