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The Sociocultural Basis of Epidemiology of Hypertension Among Residents of Ogun State

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Walden University
2014

Abstract

The Sociocultural Basis of Epidemiology of Hypertension Among Residents of

Ogun State

by

Vernon E. Norman

MA, La Sierra University 1996

BS, Oakwood College, 1980

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Epidemiology

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Abstract

There is a high prevalence of hypertension in Nigeria. Limited knowledge of hypertension, how to prevent it, its outcomes, rapid urbanization, and the adoption of Western eating habits are implicated. Hypertension is an important issue because chronic disease places economic, social, and disease burdens on society. The purpose of this mixed-methods study was to investigate lifestyle practices, knowledge, and attitudes on risks and prevention of hypertension among residents of Ogun State, Nigeria ($N = 79$). The conceptual framework for this study focused on how knowledge, attitudes, and practices influence the dietary habits, behaviors, and ultimately blood pressure . The PEN-3 model was also used as the theoretical framework for research. The general linear regression model with sums of squares and Pearson's product correlation were used in quantitative analysis of diet, blood pressures, educational attainment, height, physical exercise, and weight to determine the factors that were predictive of hypertension. The main predictors of hypertension were age ($p < 0.03$), BMI ($p < .024$), and educational attainment ($p < 0.02$). Deductive analysis of qualitative data from focus group discussions revealed mothers are a primary source of health knowledge. Also, Babcock University has made a major impact on community health by providing free health lectures. This study contributes to social change by extending the PEN-3 model with two new domains, *support for health behavior,* and *power to change health behavior*. This information can be used to help focus government health outreach programs for improved support of individual and community change.

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Dedication

This dissertation is dedicated to my lovely wife and best friend, Margaret Bernard-Norman, who has been a constant source of strength and encouragement; one without whose love, care, and support I never could have attempted or completed this journey. To Marven, Alven, and Vernee, thanks for your hugs, support, understanding, and working valiantly through the realization that I could not always be there as I wanted to be. A dedication is also made to my father Richard S. Norman and my late mother and Mabel R. Norman, who kept before me the mottos, "Higher than the highest human thought can reach is God's ideal for His children," and "Make us proud."

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Chapter 1: Introduction to the Study

Introduction

Diseases of the heart and blood vessels—for example stroke, arrhythmias, myocardial infarcts, and atherosclerosis—are known collectively as cardiovascular disease (CVD). There are many causes of heart disease, including genetics, congenital abnormalities, environment, and infection (American Heart Association, 2012; Cardiovascular Disease Foundation, 2009). Globally, the health care community is inundated with the growing epidemic of CVD; it is a leading cause of morbidity and mortality in developed countries and sub-Saharan Africa (SSA). Worldwide, Latin America, parts of Asia, and the African continent have the highest global burden of chronic disease. Among these countries, CVDs are ranked as the main cause for morbidity and mortality from noncommunicable disease. The majority of the nations on the African continent have mortality rates from CVD of at least 342 per 100,000 persons (Kreatsoulas & Anand, 2010; Onwubere et al., 2011; WHO Global Infobase, 2011).

CVD is implicated in approximately 12% of deaths in SSAand ranks as high as 35% of all chronic diseases in SSA (BeLue et al., 2009; Kreatsoulas & Anand, 2010). Many SSA nations face a combined threat of infectious disease (especially HIV/AIDS), vector borne disease, and chronic disease. SSA nations have spent billions to counter vector and infectious diseases. Noncommunicable diseases are beginning to rank on a par with infectious disease in nations where per capita health expenditures range from $3 to $51 (Gaziano, Bitton, Anand, & Abrahams-Gessel, 2010). In nations where per capita health expenditures are are

set at levels high enough to adequately infectious diseases, properly funding adequate treatment for those who have or are developing hypertension will place an additional strain on resources. Resources are strained because in addition to attacking infectious disease, the prevention and treatment of chronic diseases such as hypertension require a sustained approach over many years. In some cases treatment lasts for the rest of the patient'slife. Added to governmental or institutional costs for treatment are the direct costs to the patient for treatment, travel, and medication. For some, these costs pose an extreme personal hardship; they also posea huge financial burden on nations (Hendriks et al., 2011).

Hypertension is recognized as a primary risk factor for CVD. The force of blood against the arterial walls produces what is known as blood pressure. When that force exceeds 140mm/90 mm Hg it is defined by The Joint National Committee 7 (2004) as hypertension. Hypertension is an asymptomatic disease of the circulatory system with blood pressure readings above accepted normal values. For every additional 20/10 mm Hg increase in blood pressure above 115/75 mm Hg the odds ratio (OR) is 7.0 and results in a doubling of CVD risk.

Of particular concern is the steady increase in the prevalence of hypertension in SSA nations to levels almost on par with those of developed nations (Agyemag, Redekop, Owusu-Dabo, & Bruijnzeels, 2005; Ekwunife, Aguwa, Adibe, Barikpaoar, & Onwuka, 2011). Hypertension, called "silent killer," due to its asymptomatic presentation, was responsible for mortality in over 7.1 million cases in 2001; it also played a part in 92 million disability-adjusted life years (Addo, Smeeth, & Leon, 2009; Cardiovascular Disease Foundation,

2009). This portends increased morbidity and mortality from hypertension and attendant complications such as stroke, heart attack, and renal failure in African nations whose resources are stretched thin from the impact of treatment programs for infectious diseases such as HIV (Addo et al., 2009).

There is too little research exploring how Nigerian residents' sociocultural contexts determine their relationship to information on hypertension risks. Additional research is needed on how sociocultural contexts guide personal desire for knowledge of hypertension risks. How that knowledge affects eating and physical exercise habits, and personal attitudes toward hypertension risk is instructive in learning how this population addresses hypertension.

The purpose of this explanatory mixed-methods study was to investigate how sociocultural contexts shape the knowledge, attitudes, and practices (KAP) of the study participants toward hypertension risks. It is expected that this inquiry will yield greater understanding of the role of sociocultural contexts in health behaviors.

Chronic diseases such as hypertension are long lasting. The full impact of hypertension outcomes occurs many years in the future. It is important for health professionals and program planners to address the rising prevalence of hypertension with primary and secondary prevention campaigns that consider local cultures. In the long term, improved interventions that take culture and economic status into account will demonstrate greater effectiveness and decrease the burden of healthcare costs for individuals, communities, and all levels of the government, (Steyn, 2006; Yach, 2002).

The next section of the chapter includes a brief summary of the literature on hypertension in SSA and Nigeria in particular. The summary highlights studies on the extent of the problem, on sociocultural impacts on the treatment of hypertension, and explains why this study was needed to address these issues.

This summary is followed by a statement of the problem, the purpose of the study, research questions and hypotheses, and an introduction to the theoretical and conceptual frameworks that focus the study. The remainder of the chapter includes a discussion of the nature of the study, definitions, assumptions, scope and delimitations, and limitations. Chapter 1 concludes with the significance of the study, including potential impacts on policy, and the implications for social change.

Background

Onwubere et al. (2011) described hypertension as the most common cardiovascular disease among Nigerians. Echoing Oke and Bandele (2004), Ekore, Ajayi, and Arije (2009) placed the prevalence rates of hypertension among rural Nigerians at 5-10% and 10-12% in urban areas. They also stated a prevalence rate of 17-20% for some unspecified communities of Nigeria. One of the most troubling aspects of this hypertension epidemic in Nigeria is that up to 33% of people with hypertension are unaware of their hypertensive status (Ekore et al., 2009). BeLue et al. (2009) showed that hypertension prevalence rates vary widely from various studies done within Nigeria. In the Niger Delta, the prevalence rate is 16% for males and 12% for females; in an unnamed semi-urban community a study of 2,097 adults had a prevalence rate of 36.6%; and in a

prospective study in rural Nigeria the projected rate was 7.4%. In some hospitals, rates are as high as 20% (Busari et al., 2010). WHO (2011) reports placed Nigerian hypertension prevalence for both sexes at ages greater than 25 at 48.6%. This rate is among the highest in the world. By way of contrast, Prashant and Sunil (2011) found prevalence rates of 23.4% for females and 14.4% for males in a rural community. To highlight the dissimilarity with a nation to the north, a systematic review on hypertension in Ghana reported prevalence rates among women as high as 54.6%. Other studies the review reported rates of hypertension as 24-48%. Agyemag et al. (2005) noted that among Ghanaian children blood pressure increased by 2.0 mm Hg per year. Regardless of area of residence— rural, semi-urban, or urban—the authors noted that this trend, if continued, would place hypertension as the major contributor to negative CVD outcomes in the near future.

The rise of hypertension in Nigeria can be traced to an epidemiologic transition (Onwubere et al., 2011), where the major causes of mortality shift from infectious to noncommunicable disease. These changes are the result of urbanization, increasingly sedentary lifestyles, adoption of new dietary habits, smoking, and high alcohol consumption. Individually or collectively, these risk factors contribute to CVD, diabetes, cancers, and many other diseases (BeLue et al., 2009). The changes in lifestyles mentioned above are risk factors for CVD because all contribute to an increase in the body mass index (BMI), a ratio of height and body mass. An increase in BMI has been shown by many researchers

to have a positive relationship with CVD and an increased disposition toward hypertension (Adedoyin et al., 2008). As the number of cases of hypertension increases, the Nigerian government must develop health intervention programs to counter the burgeoning epidemic.

This study was based on research demonstrating low knowledge of hypertension among visitants at a major hospital in Lagos, Nigeria, and attendees at a market in Enugu, Nigeria (Oke & Bandele, 2004; Ulasi et al., 2011). Other studies of patient knowledge of hypertension supported the basis for this study. Support was also found in research by Abdullah and Amzat (2011), indicating that among university lecturers holding masters and PhD degrees, knowledge about hypertension outcomes of stroke, heart attack, and death is greater than 75%, yet the knowledge of risk factors is below 40%.

As can be seen from the studies presented, many document the prevalence of hypertension among Nigerians, most detail the extent of the problem, and its prevalence and outcomes among the population. Among the studies found, only Busari et al. (2010) described the effects of patients' KAP on adherence to a treatment regimen. Iyalomhe and Iyalomhe (2010) considered sociocultural factors, KAP of persons with respect to their blood pressure status and risk factors for hypertension. Aubert et al. (1998) reviewed hypertension KAP among residents of Seychelles (an Island in the Indian Ocean) during a period of epidemiological transition, and Sabouhi et al. (2011) noted the impact of KAP on patient disposition toward adopting a lifestyle for preventing hypertension and decreasing risk factors for hypertension. These four studies addressed

hypertension and related KAP in Nigeria, Seychelles, and Iran; three nations with widely divergent cultural contexts. There is an obvious need to extend the research in the area of understanding to explain how and why residents in Nigeria hold on to or foster certain ideas regarding hypertension KAP—ideas that may preclude attention to the disease.

This mixed-methods study will investigate the KAP of residents of Ogun State, Nigeria, and the effect they have on personal efforts for reducing the risks for hypertension. The theoretical foundations that guide understanding the role that KAP have on respondents' efforts to address hypertension are discussed in Chapter 2.

Problem Statement

Previous research done in Nigeria has demonstrated that knowledge of hypertension and its outcomes is at low levels among the population. Attitudes demonstrate in available research are possibly life threatening to individuals who have hypertension. Urbanization has resulted in the adoption of behavioral and dietary practices that are known risk factors for hypertension. Hypertension is directly linked to cardiovascular disease, target organ damage, health related quality of life issues, stroke, heart failure, and higher mortality (Ogunlana et al., 2009; Okeahialam & Obeka, 2006; Onwuchekwa & Chinenye, 2010). Many studies have investigated hypertension among Nigerians from a strict epidemiological perspective of person, place, and time and then have made recommendations based on studies done in Western societies. The current discussion in the literature is dominated by quantitative designs that describe the

magnitude of issues associated with hypertension. An in-depth discussion on how local sociocultural contexts influence the knowledge of, attitudes toward, and practices regarding hypertension was not available. Iyalomhe and Iyalomhe (2010) investigated KAP using qualitative interviews of people with hypertension at a clinic, but no study has used health- related theory to investigate the KAP of people with hypertension, whether quantitatively or qualitatively, from a sociocultural perspective.

Purpose of the Study

In the literature, the preferred method for studying hypertension is quantitative ; no qualitative studies were found. However, neither approach alone can explain the sociocultural phenomena that are the focus of this study. Therefore, the mixed-method approach was used to understand how people deal with hypertension. This mixed-methods study addressed the sociocultural aspects of the epidemiology of hypertension among residents of Ilishan-Remo, Ogun State, Nigeria. Quantitative and qualitative data were gathered sequentially. The quantitative data were used to test the theory that knowledge of hypertension risk factors, attitudes toward hypertension, dietary practices and physical exercise practices in light of hypertension, and socioeconomic status would lower the blood pressure for residents of Illishan-Remo in Ogun State, Nigeria. Qualitative data were used to explain the role sociocultural factors play in the decisions people make regarding hypertension.

Null hypothesis: There is no significant difference between urban dwellers and rural dwellers in terms of hypertension knowledge, attitude toward

hypertension, and hypertension risk reduction, and dietary and physical exercise practices, as measured by the survey.

The qualitative portion of this mixed-methods design used focus group discussions to gather information that could explain the observed phenomena in anthropometric data and hypertension status in answering the following research questions:

RQ1. To what extent, and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?

RQ2. To what extent and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?

RQ3. How does knowledge gained about hypertension and its risk factors influence the dietary and physical exercise practices?

Answers to these questions were sought via integrative mixed-methods analysis that investigated feelings and perceptions on how high blood pressure is managed. How those feelings and perceptions within the sociocultural context of knowledge, attitude, and practices shaped views and predicted the likelihood of adherence to any type of regimen designed to reduce morbidity.

Theoretical Basis of the Study

Theoretical Basis

[(a) models not used on reviewed studies] Within the health research community, often theoretical models have been used to provide conceptual frameworks. Theoretical framework seems to be used interchangeably with concepetual framework. The studies reviewed for this research on blood pressure in Nigeria were conducted without the research author naming a theoretical or conceptual framework.

Some of the extant theories are the health belief model developed by the U. S. Public Health Service in the 1950s, the social cognitive theory, and the the theory of reasoned action (TRA), created by Fishbein and Azjen.Another is the theory of planned behavior which is a modification of TRA created by Azjen and Driver (National Cancer Institue, 2005). These theoretical models are used by researchers to clarify relationships observed between variables.

Additionally, the sources of theories used in health research are typically from the social or psychological science fields. Theories use aspects of anthropology, consumer marketing, sociology, epidemiology, psychology, and biology to formulate a system for bringing some order reasoning to explain choices and decisions made by peopled in the pursuit of health. The development and application of theory to research must take into consideration diverse fields of research and meld them into a coherent statement that provides an explanation of observed behavior. Through this process understanding self-efficacy and its

relation to outcome prospects can be seen as one of the greatest thrusts of theories (NIH, 2005; Sirur et al., 2009).

All theories named were developed within a Western mindset. Consequently, the total environment (community, family, and cultural constructs) is prominent in the application of a theoretical model to the study participants (Airhihenbuwa, 2010).

Health belief model. This model seeks to explain how people relate to the perceptions they hold of a disease, the barriers to healthy action, and personal ability to take health related action.The health belief model is briefly mentioned because of its possible use in a study of hypertension among Nigerians in Auchi. I say possible use because the concept of health seeking behavior is noticed among the participants in this study. Iyalomhe and Iyalomhe (2010) conducted a quantitative study of health seeking behaviors in terms of personal KAP. Newell, Modeste, Marshak, and Wilson (2009) used the health belief model, because of its more than 50-year history of application among various cultures and health related issues to be consistent in predicting health related behaviors at the preventive level. The study population consisted of African diaspora living in the United Kingdom, meaning their behaviors were on a divergent cultural path from their native lands and more in harmony with Western cultural norms. Therefore, application of the health belief model to this study would be reasonably consistent with its use in previous studies. However, this study focuses on Nigerians in Africa; therefore, it is important to use a model that begins with a cultural context

for African understandings and practices regarding their health (Airhihenbuwa, 2010).

The PEN-3 Model Proposed by Airhihenbuwa

Conducting research within an effective theory-based, culture-rich paradigm requires the use of a theory that allows understanding of the respondents' knowledge, attitude, and practices and a culturally relevant approach. This theoretical lens, PEN-3, has the following elements: (a) personal, extended family, and neighborhood constructs of health education; (b) perceptions, enablers, and nurturers of practiced health behavior; and (c) the cultural appropriateness of positive, existential, and negative health behaviors (Airhihenbuwa, 1995). PEN-3 was first used by Airhihenbuwa (1989) to move in research health education away from what he termed "Otherizing," in order to validate the positive aspects of a culture and to use those positive aspects to gain information about the culture before attempting to change it. Since the first publication of the PEN-3 model in 1989, it has been used in many studies to address issues within a cultural framework. The PEN-3 model was the theoretical framework for the study; it will be discussed in detail in Chapter 2.

This study sought to explain how personal knowledge of, and attitudes toward, hypertension influences the exercise and dietary practices people choose to reduce the risk of hypertension. A person's connection to family, community, and neighborhood forms the basis of acculturation to a common concept of health education. The use of the PEN-3 model provides an avenue to approach the answers to the research questions "What?" and "To what extent?" in the context

of the cultural identity of the person. This acknowledges the role of the family, community, and neighborhood in making individuals who they were at the time of the study.

The development of one's personal growth in culture has its share of perceptions, enablers, and nurturers of health behaviors that may or may not have been appropriate. All adopted behaviors are socio-culturally appropriate and are positive, negative, or existential. Regardless, perceived health behaviors, and those who enabled and nurtured them, are all part of the cultural environment and will hold sway in the acquisition of knowledge of, adoption of attitudes toward, and establishment of health related behaviors (Airhihenbuwa, 1995). This study sought an explanation of observed, reported, and adopted health behaviors within a sociocultural context. The use of a mixed-method study was designed to gain anthropometric data as well as qualitative data on personally held KAP, and an explanation of sociocultural influences that encouraged the adoption of current attitudes, and practices. Use of qualitative data provides explanation of who, how, and why a person adopted a particular set of health behaviors.

Conceptual Framework of the Study

KAP, born out of the sociocultural context, forms the conceptual framework for this study. All data collected and all analyses conducted were constrained by these concepts. Studying the sociocultural context in which a person gains health education provided a clearer understanding of: (a) how that context forms the basis of health knowledge, (b) how one's attitude toward health is expressed in behaviors regarding health, and (c) how health related practices

are chosen based upon national, regional, community, and familial ideas of what are deemed culturally appropriate practices—all of these provided a deeper and more thorough explanation for observed health-related practices.

Within this mixed-methods study, the qualitative portion allowed for participant reponse to be unconstrained by forced choices among words and ideas as provided in quantitative instruments. Questions for the focus group guide were developed using the conceptual framework as the overall structure guiding questions through the domains of the theoretical framework. The conceptual framework was used to inform the deductive approach used in analysis of qualitative data.

Although the concept of KAP appears widely used in the health research field, only six articles were found that specifically addressed KAP within a hypertension context. Five used a quantitative approach and one used a qualitative approach. These articles will be given a greater review along with the KAP conceptual framework in the literature review in chapter 2.

There are many studies on the prevalence and incidence of hypertension among the populations of SSA nations (see, for example, Steyn (2005), Soni et al. (2010), Erhun et al. (2004), Onwubere et al. (2011), and BeLue et al., 2009). Research conducted in Nigeria was conducted by Onwubere et al. (2011) and Erhun et al. (2004). What all of these studies do well is person(s), place, and time research that showed evidence of the epidemiological transition in SSA and Nigeria. To answer the research question —to what extent does knowledge about hypertension and associated risk factors in adopting attitudes and practices

mitigate the outcomes associated with hypertension—an exploration of population knowledge, attitudes, and resulting practices was required. The initial exploration of the concept was done by collecting data with the WHO STEPS Instruments for Chronic Disease Risk Factor Surveillance. This was followed by focus group discussions that gave respondents the opportunity to verbally express how they came to learn about hypertension and the part that information gained played in the development of their attitudes and practices. These ideas are developed in Chapter 2.

Nature of the Study

Study Design

The choice of the mixed-methods approach was made as all available research of hypertension in Nigeria used the quantitative design. The use of the mixed methods design provided support for existing quantitative findings and add new knowledge via the qualitative approach. This research supports some of the broad concepts of health promotion set forth by the Nigerian Federal Ministry of Health (NFMH) as target areas for health education, including "awareness/knowledge, decision-making, beliefs/attitudes, empowerment, action/behaviour change, individual and community, and community change" (NFMH, 2005, p. 4). Information gained on respondents' knowledge of hypertension risk factors, attitudes toward prevention and control of hypertension, and behaviors or practices associated with their acquired knowledge, and attitudes formed toward hypertension can provide a framework for developing

interventions and programs that can help them monitor and control their blood pressure.

The variables for knowledge, attitude, and practices were drawn from the work of Iyalomhe & Iyalomhe (2010), Aubert et al. (1998), and James (2004). I wrote the definitions of these variables for application in this study. This list of definitions is limited to the main variables.

The method for investigation is discussed in Chapter 3. (The survey instrument details are found in Appendix F; the focus group questions are found in Appendix B.)

There are two hypotheses for this study. The alternative: It is hypothesized there is a significant difference between urban dwellers and rural dwellers in terms of hypertension knowledge, attitude, and hypertension risk reduction dietary and physical exercise practices as measured by the survey. The null hypothesis: There is no significant difference between urban dwellers and rural dwellers in blood pressure and anthropometric indicators.

Research Variables

The independent variable, knowledge about hypertension risk factors, prevention, and control, was defined as adequate if one knew hypertension risk factors and the basic methods for prevention and control of hypertension that particularly diet and exercise. Knowledge was defined as inadequate if one had heard of hypertension but was not clear what it was or about methods of prevention and control.

The independent variable, practices, was defined as adequate if, regardless of the level of knowledge about hypertension, one ate fresh fruits and vegetables more than 3 days per week and exercised intentionally at least three times a week. Practices were defined as inadequate if, regardless of level of knowledge of hypertension and methods of prevention and control, fresh fruits and vegetables were eaten fewer than three days per week and intentional physical exercise was omitted four or more days per week.

The independent variable, attitudes toward hypertension, was defined as favorable if the knowledge—regardless of how minimal—lead to actions, behaviors, or practices intended to prevent or control hypertension. Attitudes were defined as unfavorable if, regardless of the level of knowledge of hypertension risk factors, no efforts were made to determine personal status or initiate practices to prevent hypertension, and monitor, or control blood pressure.

Socioeconomic status (SES) is a measure of material possessions, income, living arrangements, and education, or a representation of personal situation within society. It was an independent, discrete variable in this study, which used reported annual income and educational attainment as a measure of SES. SES has been shown in numerous studies to be directly related to overall health status. Recent research over the link between SES and health was conducted by Smith (2007) that concidered the lifecourse impact on health of SES. Also Everson, Maty, Lynch, and Kaplan (2002) conducted and epidemiologic study of the manner in which SES contributes to depression, obesity, and diabetes. SES is divided into quintiles to represent overall levels of household wealth. The discrete

categories are Q1-lowest, Q2-second, Q3-middle, Q4-fourth, Q5-highest (Rutstein & Johnson, 2004). Hypertension was the outcome or dependent variable of interest. BMI was a continuous predictor variable calculated from the anthropometric indicators of height and weight. Ibhazehiebo et al. (2007) used a similar method in their study of hypertension among university students.

Place of residence was a predictor variable with two categories, urban and rural. Where a person lives is a social determinant of health and can predicthealth outcomes (Ompad et al., 2007; Uthman & Kongnyuy, 2008). Educational attainment was an explanatory variable with five categories: never, primary (elementary), secondary (high school), tertiary (college), post-baccalaureate or graduate (Uthman & Kongnyuy, 2008).

This research used a transformative, sequential, mixed methodology. Data for these variables were collected from adult survey respondents using WHO STEPS in the quantitative phase and focus group discussions based on the theoretical and conceptual frameworks in the qualitative phase. The data from WHO STEPS were analyzed in SPSS 18. Data from the focus group discussion were analyzed in NVivo 10.

Definitions

To aid understand of this study, the following terms are defined according to how they were purposed and used during this work:

Anthropometric indicators. Human body measurements used to study variations. In this study, height and weight data were collected. Procedures for collecting anthropometric measurements conformed to protocols outlined in

National Health and Nutrition Examination Survey Anthropometry Procedures

Manual (2004).

     Hypertension. According to the *7th Report of the Joint National Committee*

on Prevention, Detection, Evaluation and Treatment of High Blood Pressure

(2003), blood pressure has four categories, normal (≤120/≤ 80 mm Hg

systolic/diastolic), pre-hypertension (121-139/80-89 mm Hg), stage 1 (140-

159/90-99 mm Hg), and stage 2 (≥ 160/≥100 mm Hg).

     Rural. Defines an area of less than 20,000 where the primary occupation is

agriculture (Aluko, 2010).

     SES. The Measure DHS definition of wealth quintiles in the continuum

from least wealthy to most wealthy, coded as lowest quintile (Q1), second quintile

(Q2), middle quintile (Q3), fourth quintile (Q4), and highest quintile (Q5)

(Rutstein & Johnson, 2004).

     STEPS. An abbreviation for WHO STEPwise Approach to Surveillance.

This is a simple instrument that has been standardized for the collection of health,

anthropometric, and lifestyle data in WHO member states. It is designed to collect

useful data in an efficient and simple manner to support initial and continuing

efforts at collecting public health surveillance data for research and comparison

(WHO, 2012).

     Transformative mixed-method design. A study design that seeks to explore

a problem from the view of and to give voice to the study participants. This

design employs both quantitative and qualitative phases for data collection

(Creswell, 2009). This study, done from a transformative (ethnographic)

framework, sought to identify those behaviors, attitudes, and practices developed and held by hypertensive persons of Nigeria.

Urban. Defines a region having a population in excess of 20,000. The region should also have administrative, service, and commercial centers (Aluko, 2010).

Assumptions

This study assumed previous inquiry in this area of Nigerian health behavior was incomplete as all research has been quantitative in nature. Theory not bounded or grounded by the local sociocultural environment only provided a partial understanding of relationships between variables. Therefore the use of mixed-methods research would provide the sociocultural underpinnings of hypertension research in Nigeria.

Participants were open and honest in their answers to questions in the STEPS and within focus group discussions. This was assumed because sociocultural norms may have inhibited some from answering honestly.

Using the conceptual framework of KAP would provide a clear insight of the cultural issues that define how participants think about hypertension as adisease and the things they do to treat hypertension. This is assumed because it was impossible to gain a complete understanding of the cultural influences that impact the study within in the short time in the field. The environments people inhabit are the result of larger political, systemic, and structural contexts over which the population typically has little influence or control. Though the study provided insight on the KAP regarding hypertension in a small community in

Ogun Sate, Nigeria, it is important to realize information on knowledge, attitudes, practices, and SES for this community does not represent the totality of thinking for the peoples of Nigeria as a nation or of the African continent. Information gained is instructive for researchers, medical practitioners, and health educators in the treatment of hypertensions and development of primary and secondary interventions.

Scope and Delimitations

From the statement of the problem this study focused on the knowledge of hypertension found among the study population. From the background hypertension knowledge was shown to be low among many Nigerians. This study investigated the knowledge level of hypertension among the study population and how that knowledge was acquired. By gaining and understanding of what was known about hypertension and how that knowledge was acquired information was gained that can be used to develop more effective health education programs.

The foundation for this study was consideration of the sociocultural contexts (person, extended family, and neighborhood) in which knowledge about hypertension and its outcomes is gained and to what extent that knowledge is used by the holder of the knowledge within that context. The phrase, "to what extent knowledge is used," referred to how the sociocultural contexts (perceptions, enablers, and nurturers) determined the how and why of attitudes toward hypertension and its outcomes. The acquisition of knowledge and the development of attitudes will lead to the adoption of socioculturally based practices that are positive, existential, or negative in their effect on personal

health. It is a well-researched phenomenon that SES plays an important role in the health of individuals; therefore, the impact of its influence on health outcomes was also included in the data collected for this study. Health does not occur in isolation from one's environment, the social structures, or the political contexts in which one lives. The PEN-3 model was chosen to study the sociocultural contexts of hypertension and how people respond to hypertension in their lives.

This investigation confined itself to rural or urban visitants at a market area within Ilishan Remo, Ogun State, Nigeria. The quantitative portion of the study included randomly selected people who, for purposes of the study, were identified as hypertensive or normotensive. Qualitative data were drawn from a purposive sample of identified people with hypertension.

Within public health research, the ecological approach looks at the total array of factors that influence one's life course and approach toward health at the intrapersonal, interpersonal, and community level. This study focused on the individual response to a health threat. The health belief model was the theoretical or conceptual framework from the intrapersonal theories that most directly relates to this study in terms of areas not investigated. Those areas are the perceived threats to and susceptibility to disease, barriers to, and benefits from action, and cues to action and self-efficacy. However, because the aim of this study was to understanding how one's culture directly affects the response to health from a unified and community based perspective, the PEN-3 Model was chosen as the theoretical basis for this study. This model is explored in detail in Chapter 2.

Quantitative data provided additional support for the findings of many quantitative studies conducted on hypertension within Nigeria. This support is limited to comparison of statistical measurements of knowledge of hypertension, attitudes toward hypertension, and practices toward diet and physical exercise by other studies considering similar variables. Qualitative data is only illustrative of the experience of those included in the focus groups and cannot be considered generalizable to other populations. The experiences of those interviewed may be instructive for purposes of designing studies to see whether similar experiences exist among other populations.

Limitations

English is the official language of the government in Nigeria, some preferred to communicate in their native language or dialect. Prior to my visit I spent many hours watching Nigerian movies to become familiar with the accent and rythms of spoken Enhglish among Nigerians. While in the field, the help of qualified translation services for those who preferred to speak in their native tongue made the effect of any real or perceived language gap on the study practically non-existent. Though responses were translated, it might have been impossible for the full meaning of Yoruba words or expressions, and idioms to be adequately expressed in English.

The STEPS instrument is designed for use in developing nations and is available in English. As such, the instrument should measure what it is intended to measure based upon previous validation as reported by Tesfaye et al. (2007, 2008), Tesfaye, and previous use among the Nigerian population (WHO, 2003).

The STEPS questions were not modified for the study, thus addressing any issues possibly related to construct validity.

This study used a systematic sample for the quantitative portion; in the qualitative portion of the study a purposive sample of six to nine people with hypertension was used for each of the three focus groups. The premise of this study was that quantitative data do not accurately portray the sociocultural influences upon personal KAP concerning hypertension. Consequently, combining quantitative and qualitative data provides a context for greater understanding of populations whose situation is similar in some manner. If possible, comparison of the collected data with previous data collected with the same instrument by the Nigerian Heart Foundation would provide evidence of internal validity and provide a foundation for generalizability of the quantitative data.

Smoking was a possible confounding variable because it can affect BMI and blood pressure. The vast majority of the participants in this study fit the never smoked profile. The use of regression models reduced any effect the few instances of smoking may have had upon the dependent variable, hypertension.

Biases that can occur, particularly within the focus group discussions, are attention bias and recall or memory bias. The attention bias can be a particular issue because I was not a local resident; therefore, answers given by respondents may have been enhanced to provide a favorable impression. Through a discussion of the importance of the research for the group members and to the national effort to combat disease the bias was most likely reduced. Recall bias could have

occurred when participants were asked to report on past events. This bias could have occurred in either portion of the study when information was requested on dietary or physical exercise habits. Limiting the effect of this bias by reducing the period for past events to the last few days should have been sufficient.

Significance

Qualitative data from this study serves to identify patterns of thought, influences of prevailing attitudes and practices on population involvement with prevention methods for hypertension in Nigeria. Differing ideas and views from participants open news ways of understanding and perceiving what is known.

The use of all three domains of the PEN-3 model to analyze qualitative data demonstrates the PEN-3 model's usefulness in research deeper than it serving as a tool to classify data as negative or positive. This alone should encourage researchers to look past the superficial appearances of culturally based habits or practices that appear to be right or wrong. and enable writing cultural support for research recommendatsion.

Beyond the basic benefits to regional and federal government health planners and health educators for program and intervention purposes, the results of this study encourages adoption of personal responsibility for maintenance of attitudes and practices that promote cardiovascular health. Future research can benefit from this study by giving more credence to what the participants think and feel rather than solely defining populations by quantitative data.

From this study, it should be seen that hypertension is deeper than the numbers on a sphygmomanometer. The condition of hypertension is an

expression of the impact of the cultural context in which one lives upon the circulatory system. It is hoped that, as the outgrowth of a significant culture change generated by these findings, the study would promote learning about the risks of hypertension and promote the adoption of attitudes and the beginning of practices that would promote or maintain a healthy blood pressure.This study provides insight on some issues that confirm how economic deprivation and social inequity directly affect individual health. By extension it should not be difficult to imagine some of the effects upon population health, the health care sector, and the long term hits of chronic disease to an economy already struggling with infectious disease.

Summary

Cardiovascular disease is a term for diseases of the heart, veins, and arteries. Hypertension is one of the most important of these diseases because of its potential side effects of renal failure, heart attack, and stroke. Much research has been done in the developed nations documenting the prevalence, incidence, morbidity, and mortality from hypertension. Other recent research has investigated the rising epidemic of chronic diseases, particularly cardiovascular disease and hypertension, and particularly in the developing world. Research has shown that in the developing world, particularly in nations south of the Sahara, the prevalence of hypertension is increasing. Globalization, urbanization, increased sedentary lifestyles, and decreasing levels of physical activity have contributed to the rising prevalence of hypertension. Government programs for health education have not kept pace with the need for education. Consequently,

knowledge levels of hypertension and its side effects are low, attitudes toward

hypertension are not conducive to maintaining optimal blood pressure, and

personal practices themselves? contribute to mortality and morbidity. The study

sought to uncover the roles of knowledge, attitude, and practices of residents of a

small community in Nigeria play in the prevalence and incidence of hypertension.

The review of literature follows in Chapter 2. Chapter 3 includes a

complete description of the design of this study, its participants, instruments, and

procedures for their use, and the tools and processes used for analyzing collected

data. Chapter 3 provides descriptions of the intended research methodology,

including a discussion of the sampling frame and sample selection, the data

collection and validation for quantitative and qualitative phases, and the

prospective tools (ArcGis 10.0 and NVivo 10) used in the research. Chapter 4

presents the demographics, then qualitative findings. A graphic showing the

relationship of the PEN-3 Model to the qualitative conceptual and the participant

responses concludes the qualitative section. Quantitative results are presented

with adhoc tests performed to generate additional support for the observed

assoocations between lifestyle variables and hypertensive. Within Chapter 5 a

discussion comparing the findings of this study to other studies highlights the

similarities and differences between the various studies. The chapter includes

sections on implications for public health research and a section highlighting

implications for social change. Chapter 5 concludes with a summary of the

research.

Chapter 2: Literature Review

Statement of the Problem

Previous research done within Nigeria demonstrated that knowledge of hypertension and its outcomes are not at high levels among the population. Attitudes toward hypertension are possibly life threatening to individuals who have hypertension. Urbanization has resulted in the adoption of behavioral and dietary practices that are known risk factors for hypertension. Hypertension is directly linked to cardiovascular disease, target organ damage, health related quality of life issues, stroke, heart failure, and higher mortality (Ogunlana et al., 2009; Okeahialam & Obeka, 2006; Onwuchekwa & Chinenye, 2010). Many studies have looked at hypertension among Nigerians from a strict epidemiological perspective of person, place, and time and made recommendations based upon studies done in Western societies. The current discussion within the literature is dominated by quantitative designs that describe the magnitude of issues associated with hypertension. An in depth discussion on how local sociocultural contexts influence the KAP of hypertension was not available. Iyalomhe and Iyalomhe (2010) investigated KAP using qualitative interviews of hypertensive attendees at a clinic, but no study has used health related theory to investigate the KAP of people quantitatively or qualitatively from a sociocultural perspective.

The Purpose

This mixed-methods study addressed the sociocultural aspects of the epidemiology of hypertension among residents of Ilishan-Remo, Ogun State,

Nigeria. The study included quantitative and qualitative data gathered sequentially. The quantitative data were used to test the theory that knowledge of hypertension risk factors, attitudes toward hypertension, dietary and physical exercise practices toward hypertension, and SES would positively influence the blood pressure of the residents of Illishan Remo and Town Planning in Ogun State, Nigeria. Qualitative data was used to explain the role of sociocultural factors in the decisions people make regarding hypertension.

Chapter Organization

Chapter 2 will first discuss the literature search strategy. This will include listing databases used and the key terms used in the search. The scope of the literature review is part of the strategy and covers the years searched and the type of literature used. A discussion of the PEN-3 model as the theory used covers the origin of the theory, its major propositions, and its assumptions and how they apply to this study. Next, a literature review describes the method in which the PEN-3 model has been applied in previous research in ways similar to how this study used the theory. After the review of literature, a rationale for use of the theory is given and a description of how the theory relates to the present study. A brief discussion of the conceptual framework includes identification of the concept, a review of a few writings on the concept, and definitions with applications to previous research and in this research. The last major portion of the chapter is a literature review of qualitative key concepts and phenomena and quantitative variables components. The chapter summary rounds out the chapter.

Literature Search Strategy

Initial searches were conducted in CINAHL, Academic Premier, and Sage Health Premier. This proved to be cumbersome, as a simultaneous search could not be done in all databases. Searches in PubMed central provided a wider variety of literature on the topic of interest. African Journals Online, Google, and Google Scholar proved invaluable in locating sources cited by various authors. Literature that was not freely available from PubMed, Google, and Google Scholar were sought f using a citation finder. Some articles were purchased from the providers. In others the article was available from the Walden Library.

As concepts emerged that were not part of the original search terms , new search terms were added. Some literature was chosen after looking at the reference list for some retrieved articles. Using this method, the conceptual and theoretical frameworks were identified. All the literature reviewed was not identified at once. As questions arose, and issues required attention, new searches were undertaken to address the topic. For example, it was not until the methodology section in Chapter 3 was written that articles on focus groups and qualitative methodology were researched. In this chapter, there were times when further clarification was needed to address required portions of the writing process; therefore, new searches were undertaken..

 "Cardiovascular disease Africans" as a search term returned literature almost exclusively on African Americans. African was modified to Africa and the majority of results were now centered on Africans on the continent of Africa. With this change the following keywords were used: *hypertension,*

cardiovascular disease, Africa, hypertension, sub-Saharan Africa, knowledge, attitudes,beliefs, and practices hypertension, Nigeria, KAP hypertension, hypertension knowledge and behavior, KAPhypertension Nigeria, Airhihenbuwa hypertension, PEN-3 model, PEN-3 model hypertension, and *epidemiology hypertension [MeSH] in AfricaNigeria.*

Search parameters were usually set for the years 2003-2012. In the case where an article with an earlier publishing date was needed, the date range was increased. The search strategy focused on cardiovascular disease in SSA. After reading several abstracts, it was decided to narrow the focus from cardiovascular disease, Nigeria appeared to have the largest body of research. This made it easier than imagined to review the literature on Nigeria.

Theoretical Foundation

The PEN-3 model

Since its introduction in 1989, the PEN-3 model has been used in many studies to address issues within a cultural framework. Within this framework, the community is first approached within a qualitative context to gain understanding of how the community feels about hypertension, knowledge of risk factors, attitudes regarding prevention and control, and practices for prevention and control. Airhihenbuwa (2010) postulated that the best questions are positive, negative, and unique in their phrasing. These questions are used by researchers and the community as they work together to eliminate areas of convergence and divergence. The research is informed by the community and better able to determine the true feelings of the community on its KAPtoward hypertension

prevention, management, and control. Scarinci, Silveira, Figuerodo dos Santos, and Bettina, (2007) described Airhihenhuwa's (1995) dimensions of cultural understanding as interrelated and interdependent dimensions of health. These dimensions are health education diagnosis, educational diagnosis of health behavior, and cultural appropriateness of health behavior. Each has three dimensions of knowing (PEN-3; see Figure 1) or understanding the cultural context of the health issue in question. Health education diagnosis is the dimension of defining the target audience and approaches to the person or individual in a manner that acknowledges their right to make informed decisions about their health. For this study, identification of whom to use as respondents and providing them with access to the same information we have as a foundation for making decisions (with exception of private data) is the manner in which this dimension was met. Family is generally greater than the nuclear family, hence health decisions must also include the extended family. The support of extended family may spell the success or failure of any efforts the individual makes toward improving health through blood pressure monitoring or hypertension prevention, management, and control behaviors. The neighborhood where one lives provides the extra-familial social support structure. Community leader support or adoption of blood pressure monitoring or hypertension prevention, management, and control practices provide the necessary local structure critical for success (Airhihenbuwa, 1995).

The second dimension of PEN-3 has three factors, as do the other dimensions. Perceptions one hold encompasses the sum of knowledge, attitudes,

values, and beliefs that are supported by one's culture. Attitudes one holds

regarding hypertension risk factors, its prevention, monitoring, and control are

governed by family, and community perceptions on hypertension. A community

has enablers, that are resource based, social, structural, societal, or similar that can

function as barriers to positive personal, family, or community change. Health

beliefs, actions, and attitudes toward hypertension risk factors, monitoring, and

prevention are encouraged or mediated by the person, family, community, and

other societal nurturers (Airhihenbuwa, 1995).

Figure 1. The PEN-3 model by Airhihenbuwa (1995).
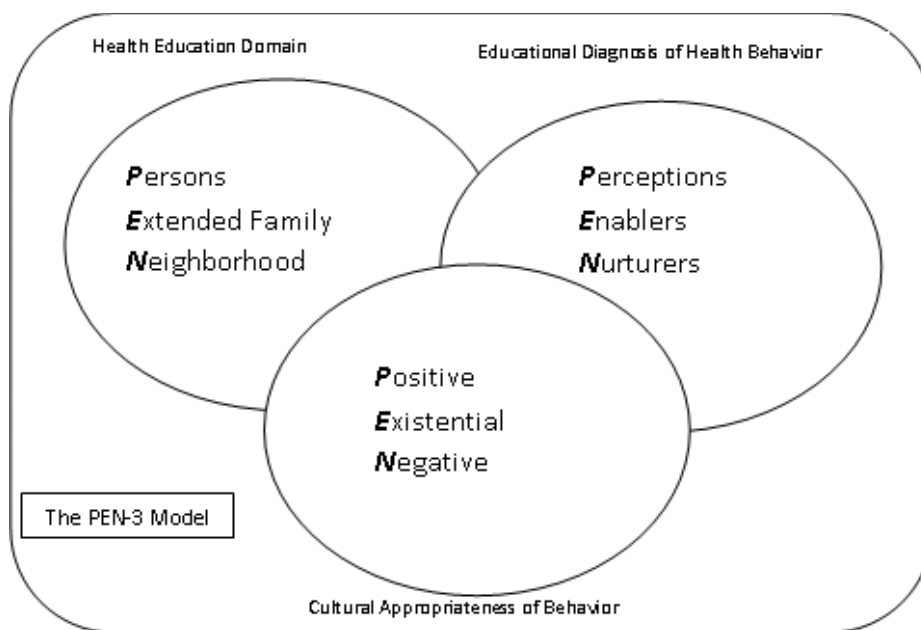
From "Health and Culture: Beyond the Western Paradigm," by C. Airhihenbuwa,
p. 30. Copyright 1995 by Sage Publications. Used by permission of the publisher.

Airhihenbuwa (1995) considered the final dimension the most crucial of

the three, because this dimension examines the culturally appropriateness of

health behaviors. Positive behaviors are those that encourage knowing about

hypertension, and taking steps to reduce personal risks, prevent, and/or monitor practices that must be encouraged for the person, within families, neighborhoods, and communities. Existential behaviors are neither helpful nor harmful but are practiced and need not be discouraged. A behavior that does not promote or reduce hypertension is not discouraged within the study process. Practices that can be matched to study objectives can be encouraged. Health behaviors and practices that are known to be harmful to health such as sedentary lifestyles, meager consumption of green leafy vegetables and fruits, use of tobacco and alcohol, and increased use of sodium are negative behaviors (practices). Efforts must first be directed at understanding cultural, political, and historical contexts before efforts are instituted to address or eliminate them (Airhihenbuwa, 1995; Scarinci et al., 2007). Use of the PEN-3 model affirms the cultural context and its multiple attitudes, beliefs, and practices as practiced personally, within families, the neighborhood, and the community at large.

Application of the PEN-3 Model in Previous Research

I found many studies that use the PEN-3 model. Some of the studies covered smoking (Scarinci et al., 2007), cervical cancer (Scarinci, Bandura, Hidalgo, & Cherrington, 2011), hypertension (Walker, 2000), obesity research (Kumanyika & Obarzanek, 2003), stigma, culture, and HIV (Airhihenbuwa et al., 2009), and decisions mothers make in treating their children for malaria (Iwelunmor et al., 2010). Walker (2000) used the PEN-3 model in his study on hypertension among older African Americans.

PEN-3 moves away from the single story paradigm of Western health theories and encourages the discovery of "all" the stories of a culture, particularly the African culture, which has been stereotyped and seen only from a monolithic tunnel view created by Western researchers that see only what is wrong (Airhihenbuwa, 2010).

Scarinci et al. (2007) used the PEN-3 model as a conceptual framework for a study on the contextual factors associated with commencement and cessation of smoking among women at various worksites in Brazil. Some of the focus group questions were based upon the PEN-3 model. As themes emerged from reading the transcripts, they were compared with the PEN-3 categories. Perceptions, enablers, and nurturers were identified thematically. The comments were then grouped in these categories as negative or positive. The educational diagnosis of behavior (perceptions, enablers, and nurturers) portion of the model was the central component of Scarinci et al.'s (2007) analysis and discussion. Rather than looking separately at factors that fit into the cultural appropriateness of behavior, researchers chose to categorize the perceptions as positive or negative. There was no attempt to classify any behaviors as existential or look for any connection with person, extended family, and neighborhood as components of the health education domain.

Other research done by Scarinci et al. (2011), albeit using different coresearchers, used a strategy similar to the smoking study in an investigation of cervical cancer among Latina immigrants. The educational diagnosis of health behavior was used and responses were grouped according to the positive or

negative direction of the data. Scarinci et al. (2011) asserted the identification of these factors was the most important part of the PEN-3 model as reason for the emphasis. They also felt that the model was not sufficient for purposes of analyzing primary and secondary prevention programs. Hence, a decision was made to incorporate the health belief model as a sort of two-pronged approach. It should be mentioned that in the previous article, Scarinci et al. (2007) referred to the PEN-3 model as a conceptual framework, whereas in the 2011 study PEN-3 was noted as a theoretical model. This contrast is mentioned because in this study, effort is made to make a clear distinction between theoretical and conceptual frameworks. Perhaps over the intervening years between the two studies, Scarinci et al. (2011) determined that PEN-3 was indeed a theory rather than a conceptual framework.

Kumanyika and Obarzanek (2003) referenced the PEN-3 model as a theoretical framework for designing culturally appropriate interventions, as a conduit for analyzing cultural roots of health behaviors that lead to obesity, and as a model through which to design culturally relevant obesity intervention programs. There is no mention of how the PEN-3 model was used to accomplish this.

Iwelunmor et al. (2010) researched the response of mothers to the febrile child, possibly with malaria. The objective was gaining understanding of cultural cues that women use to decide a course of treatment for the ill child. As Scarinci et al. (2007, 2011) the area of focus was the cultural appropriateness of behavior as positive, negative, or neither. The PEN-3 model was used to organize the

themes of positive responses to child malaria, existential responses to child

malaria, and negative responses to child malaria. Per the authors, this was the first

use of PEN-3 in malaria research in endemic studies and revealed the need to

work positively with mothers in treating children for malaria. Apart from the use

of the PEN-3 model in this research, there are few studies on malaria that use any

kind of theoretical framework.

Erwin et al. (2007) used only the educational diagnosis of health behavior

and cultural appropriateness of behavior domains in the study of social networks

important for a breast and cervical cancer campaign among African-American and

Latino women. It is odd that the researchers identified social networks in both

communities, yet failed to note the connection with the health education domain

where person, extended, family, and neighborhood form the basis of acculturation

in health education.

The PEN-3 Model and Health

All of the following studies demonstrate the wide usefulness of the PEN-3

model in identifying cultural constructs connected with health. However, as

previously indicated, none of the studies referenced so far used all three of the

PEN-3 domains. Three of the following studies use all three domains, two in

detail, and one in a cursory manner.

One of three studies that used all three PEN-3 domains was conducted by

Ka'opua (2008), to analyze a breast cancer screening promotion. Ka'opua (2008),

unlike other researchers who used the model, incorporated all three domains in

the research. Initially, the research team sifted through transcripts to identify

themes. The transcripts were analyzed the second time to determine connection

with PEN-3 domains and categories. The diagnosis of health behavior domain

was used to classify influences upon the women. Influences identified under the

diagnosis of health behavior domain (perceptions, enablers, and nurturers) were

classified using the cultural appropriateness of health behavior domain as

positive, negative, as both positive and negative, and existential. The health

education domain was used in determining the persons and institutions that should

be included in the intervention. It is important to note especially in the context of

how PEN-3 was used in this study that the use of the health education domain

enabled Ka'opua (2008) to identify knowledge, attitudes, and cultural values

expressed in the personal practices of Hawaiian women toward breast cancer

screening.

James (2004) conducted six focus groups across North Central Florida to

investigate factors influencing dietary choices among African Americans. She

looked for themes but used a deductive approach pushed the themes to fit within

the PEN-3 framework. In the health education domain after persons, extended

family, and neighborhood were identified each theme was classified as having a

negative or positive effect upon choices for food intake. Within the educational

diagnosis of behavior domain perceptions, enablers, and nurturers were classified

similarly. The cultural appropriateness of health behavior domain was used to

classify various aspects of eating habits as positive, existential, or negative. James

(2004) used charts to group and classifies themes in each domain in a manner that

emphasized the aspects of each portion of PEN-3. The use of PEN-3 in this study

most closely resembles the anticipated use of PEN-3 as the intended study of hypertension within the three domains of PEN-3 and the influence upon knowledge, attitudes, and cultural practices as demonstrated by Ka'opua (2008).

The final study of the three that incorporated all three domains of PEN-3 was done by Airhihenbuwa and a group of university researchers from the University of Western Cape, South Africa and University of Pennsylvania over a period of four years. This prolonged study provided time for Airhihenbuwa et al. (2009) to gather and analyze data then go back to the community and validate their findings in the health education domain. The health education domain is noted as the cultural identity domain and used in what Airhihenbuwa et al. (2009) identified as the intervention phase of the model. The authors noted that this phase is important to maintain the trust and cooperation of the study participants. Themes were gathered from transcript analysis and then classified using the cultural appropriateness of behavior and diagnosis of health behavior domains. Major themes were placed within a 3X3 matrix using cultural appropriateness and health behavior categories.

Rationale for Choice of PEN-3 Model

In practically every study from SSA nations and Nigeria, there is no application of theory to the problem of increasing prevalence of chronic disease, particularly hypertension. De-Graft-Aikens and Marks (2007) emphasized that scientific racism practiced under the guise of equality in academic publishing, is more often than not a point of further control since the methodologies employed are culturally biased and those entities that fund the research have much to gain

by the continued racism within the science sector. The current trend to "otherizing" in which researchers enter a community from the perspective of we know what your problem is and how you need to fix you with a continual emphasis on what is wrong with the community (Airhihenbuwa, 2009), is evidence of expanding scientific racism beyond its previous boundaries in psychology and sociology (de-Graft & Marks, 2007).

In this study, the goal was to hear the voices of the people rather than a presentation of statistics decrying the prevalence of hypertension. Various theories were examined for their compatibility in understanding the impact of a disease transcending national boundaries on the Nigerian populace. The popular theories that use the ecological or interacting levels of influence perspective to study the responses of people to hypertensive knowledge are mostly developed in the United States. While there is the nod to the impact of one's environment, family, and prevailing social conditions, these theories are based in personal empowerment, an outgrowth of the self and individualism of the United States mindset. In the search for theory that more closely touched on the influence of the family and community on health decision-making, the PEN-3 model was discovered. Additionally, this study investigated the knowledge individuals have about hypertension, and how that knowledge affected the attitudes and practices one developed. The PEN-3 model was designed for just such purposes. Another compelling reason for using the PEN-3 model was t it is the only theory extant that was developed by an indigenous African, more specifically, Nigerian, for the

purpose of providing a framework for health researchers to use a cultural basis for defining and framing health problems.

In the preceding studies, the responses given by participants were viewed through the lenses of the various domains of the PEN-3 model. As one views the application of the model, the emphasis on culture and its influence is quite apparent. The following section describes the relationship of the PEN-3 model to this study.

Relationship of the PEN-3 Model to Study Concept

Among the articles that used the PEN-3 model, the work of James (2004) and Ka'opua (2008) most closely reflect the use of the PEN-3 model within this study. James (2004) used all three domains to classify the themes of the study and noted their influence as positive or negative. Ka'opua (2008) used the three domains to classify themes, but went further and used the health education domain to identify culturally based knowledge, attitudes, and cultural values that drive observed practices.

This study was designed to acknowledge such attachment to cultural reality. It was also to determine what in terms of hypertension prevention, monitoring, and control, and use of information gained can inform current and future health education efforts within Nigeria. The blood pressure of the residents of Ogun State in this study was influenced by sociocultural factors that are seen within the three dimensions of PEN-3. They all were individuals who may or may not have an extended family, and they live within a neighborhood. Their health behavior is mediated by their beliefs, attitudes, and values. Enablers within the

community at large encourage adopted behaviors, and the nurturers play a role in developing and maintaining a chosen set of health behaviors. The chosen set of behaviors may be positive, known to be beneficial or existential and have no known negative or positive effect upon health, or those actions that are known to be detrimental to health and therefore are negative.

The research questions for this study are:

RQ1. To what extent and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?

RQ2. To what extent and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?

RQ3. How does knowledge gained about hypertension and its risk factors influence the dietary and physical exercise practices?

Understanding how personal knowledge of hypertension risk factors and outcomes are learned is developed from understandings of components of the health education domain. In this domain, the roles of person, extended family, and neighborhood are explored for their influence upon health knowledge. The formation of personal attitudes is developed out of the perceptions of relationships and expectations of health behavior and enabled or nurtured by various personal, extended family, and neighborhood elements. Practices formed to mitigate or prevent hypertension risks can be positive, existential, or negative in its influence upon a person's life. By pursuing a line of questioning within the focus group to direct conversation toward exploration of these themes, it can be demonstrated that the research questions relate to and build upon the PEN-3 model.

In answering the research questions, the PEN-3 model's focus on person, extended family, and neighborhood all were key to discovery of dietary habits, as people tend to eat as they were raised. Development of personal habits related to diet and exercise and those who encourage, nurture, or enable those habits as well as their net effect upon health being positive, negative, or neither finds answers in all three domains of the PEN-3 model.

Application of the Concept in Previous Research

A search within PubMed Central revealed that there were over 20 articles that discussed KAP in the context of malaria. The concept appears well established among research on malaria. There is at least one study in each of the following areas using the knowledge, attitude, and practices conceptual framework: lead exposure, exercise among pregnant women, avian flu (H5N1).breast feeding, pandemic influenza, dengue fever, experiences of private doctors and communicable disease in Taiwan, participants in a vaccine trial, and epilepsy. Because these articles dealt with a diverse array of topics (malaria, lead exposure, pregnant women and exercise, epilepsy, and others), they were not explored within this review. These studies are mentioned to demonstrate the wide application of the use of the concept framework, KAP in other areas of health research.

KAP does not appear in much literature on hypertension at the present. This is possibly due to an emphasis on prevalence, adherence to a treatment regimen, and clinical trials within the hypertension research community. It may also be true that in the absence of any ground breaking research in the area or

publishing of any seminal analysis of the construct and its value researchers have

not fully embraced the idea of how KAP can provide clues to the variances

observed in clinical trials and adherence research.

In this research, six articles have been identified that studied KAP in

relationship to hypertension. All six use KAP independent of hypothesis and

theory. The apparent goal was gaining an understanding of what was occurring in

the lives of people within these domains. Considering the focus of the studies on

hypertensive knowledge, it might be surmised that the unstated hypothesis for the

studies mentioned was "There is poor knowledge of hypertension among the

residents of the target community." The focus of this study is hypertension.

Therefore, studies with a similar focus are included in the review that follows. All

of the studies are reviewed in the following section from the standpoint of

knowledge, attitude, and practices. Afterward they will be reviewed in a

discussion of variables and research questions. Because the studies directly

address KAP as the central concept of their methodology processes, review, and

discussions, it would be redundant to place too much emphasis on those concepts

here. In this research, the PEN-3 Model and KAP were the theoretical and

conceptual frameworks, respectively. The relation between the two can be seen in

Figure 2.

All information gained in discussions with research participants was

gathered in one of three domains. When the Health education domain was

considered, data arrived from how health education was gained at the personal,

extended family, and neighborhood levels. This is the foundation of all knowledge in health education.

Within the Educational Diagnosis of Health Behavior, the perceptions formed based upon health knowledge guides the development of attitudes that are encouraged and maintained in contact and association with all persons or things that enable or nurture.

In the Cultural Appropriateness of Health Behavior domain, one's health is seen as the outgrowth of the sociocultural aspects of practices one holds; be they positive, existential, or negative. This relationship is clearly defined in Figure 2.

Figure 2. Diagram of how conceptual framework arises through the domains of PEN-3. PEN-3 Model from "Health and Culture: Beyond the Western Paradigm," by C. Airhihenbuwa, p. 30. Copyright 1995 by Sage Publications. Used by permission of the publisher.
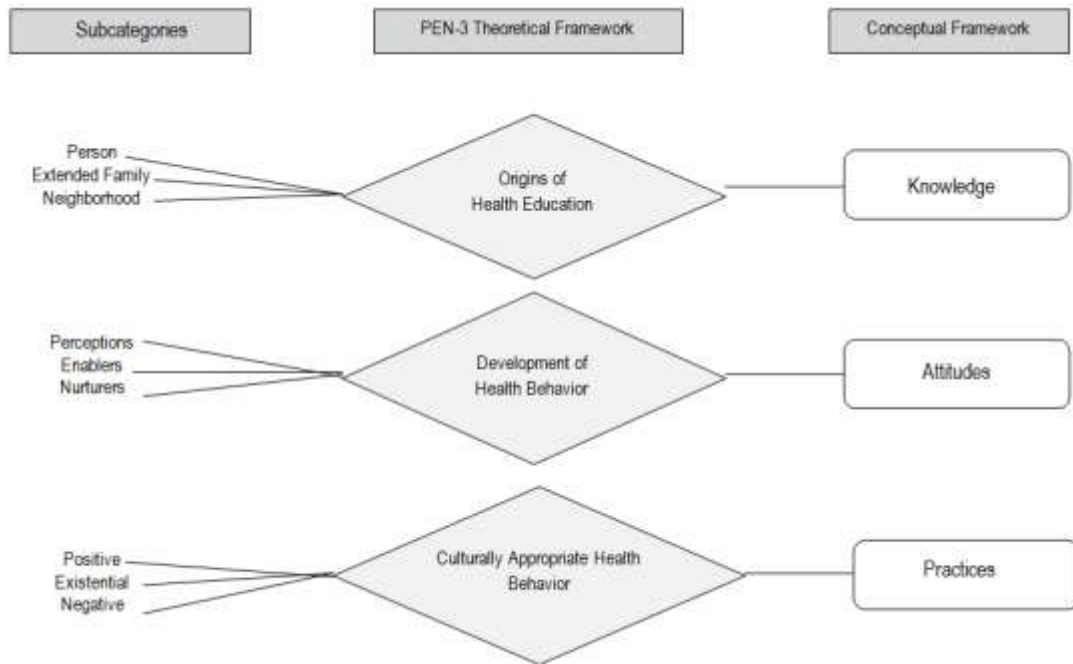
Literature Review Related to Key Variables and Concepts

This study aimed to review the KAP of residents of Ogun State, Nigeria concerning hypertension and its associated risk factors and outcomes. Six studies have been identified that use the same terminology. Another study uses knowledge, awareness, and attitudes as a construct. Two focus only on hypertensive knowledge, and one adds barriers to the KAP framework. Variables used within this study draw from all of these studies. KAP is the conceptual framework through which the cultural aspects of hypertension identified within PEN-3 are handled.

Kagashe and Fazal (2011) studied hypertensive knowledge among 200 hypertensive HIV+ and 200 hypertensive non-HIV+ patients in a cross-sectional descriptive study that used convenience sampling. The study excluded children, those not on hypertension medication, and pregnant women. Also investigated in this study was the knowledge of hypertension among 100 pharmacists. In this study, Kagashe and Fazal (2011) used a convenience sample of attendees at four government run hypertension, HIV clinics, and pharmacies in Dar Es Salaam, Tanzania. While this method provided a ready sample for the study, it did not provide data that could be generalized to other areas within the nation or populations in other countries where HIV is prevalent. As expected, individual patient knowledge of hypertension was low, below 60% among hypertensive and 48% among HIV+ patients. Pharmacists had unexpectedly low knowledge of hypertension (below 15%) and were not actively involved in counseling hypertensive patients. Inclusion of pharmacists was an excellent way to gain perspective on the levels of knowledge about hypertension held by those involved with the treatment of hypertension.

In another knowledge only cross-sectional study among hypertensive patients done at a clinic at a government hospital, similar results are found. Low knowledge of hypertension, risks, and complications is discovered among the 242 survey respondents. Osman, Suleiman, and Elzubar (2007) did not use theory to explain their findings. They provided information that may not be generalizable because a small convenience sample is employed. The authors listed variables similar to ones used in this study. This will be discussed in the quantitative

components section. The study aim was to describe patient knowledge. There was no apparent hypothesis.

Oliveria et al. (2005) used a random sample of 1,250 of whom 55% had an existing diagnosis of hypertension. Determination of the sample size was via use of 95% confidence interval estimates and available resources. Exclusion criteria were living outside the specified geographic region, no access to regular care, non-English speaking, too ill to participate, and not an insured member of the Henry Ford Health System. The study was descriptive, without a statistical hypothesis. Health system databases of patient encounters with physicians were utilized to identify 2,264 participants based upon International Classification of Diseases, Ninth Revision (ICD- 9) diagnosis code of hypertension (401.0–401.9). Use of a large randomized sample, strict identification using ICD-9 classifications, and access to a computer database of patient records and their encounters with health care providers gave this study a strong foundation. Respondents to the telephone interview were very knowledgeable about hypertension, with low performance on the attitude related questions. The methodology was strong in its presentation; however, despite clearly stating the purpose of the study, the authors did not have a hypothesis or theory to guide the research.

The remaining description of studies related to constructs of interest chosen for this study will cover only articles that contain knowledge, attitude, and practices as the variables of interest. There are six studies that meet this criteria: Three from the African continent; from Nigeria (Busari et al., 2010; Iyalomhe &

Iyalomhe, 2010), Tanzania (Mlunde, 2007), one from Seychelles (Aubert et al., 1998), one from Barbados in the Caribbean (Adams & Carter, 2011), and one from Iran (Sabouhi et al., 2011). All of the studies had as a purpose in some form understanding the role of KAP in the treatment of hypertension, patient adherence to a program, and KAP relation to demographics. None of the studies explicitly indicated the use of a hypothesis as a basis for statistical analysis. Aubert et al. (1998) alluded to a hypothesis by noting a process for ascertaining differences between groups. Aubert et al. (1998) and Iyalomhe and Iyalomhe (2010) made a possible connection to theory by mentioning health-seeking behavior impacts and the idea that models have been proposed for health behavior change. None of the models were described in the research. Iyalomhe and Iyalomhe (2010), Sabouhi et al. (2011), Mlunde (2007), and Busari et al. (2010) used structured questionnaires, Adams and Carter (2011) used focus groups, and Aubert et al. (1998) used face-to-face structured interviews.

Sabouhi et al. (2011) used a cross-sectional descriptive design. A clearly defined inclusion criteria, random sampling, the validation of blood pressure instruments, and questionnaires prior to use were all strong points of their research. The use of 234 persons recruited via random sampling added some strength to the research. The authors defined the variables used in the statistical analysis.

Adams and Carter (2011) randomly selected names from the voter registration rolls, and then randomly selected which ones to call until five focus groups of 10-12 members were formed. Prior to use, the focus group guide was

piloted on a group composed of a convenience sample. Groups were conducted by a facilitator and recorded by an assistant. The approach to conducting focus groups and analyzing data shows adherence to what is recognized as good focus group protocol. Adams and Clark (2011) also gathered data regarding barriers patients faced in obtaining care or maintaining good practices. The researchers made no mention of how or how many people were randomly chosen. This is an inherent weakness leaving readers to wonder about the inclusiveness of the sample. Authors point to the small sample size as a limitation.

Mlunde (2007) used a random sample to recruit 319 participants, but did not describe the technique used in randomization. The questionnaire used was not described in terms of its development and testing. Analysis was done in Epi Info Version 6. Mlunde's (2007) conclusions and recommendations were clearly stated. Data tables that support the findings were clearly identified and relatively easy to use.

Aubert et al. (1998) used an age and gender stratified random sample derived from a computed population data census table completed in 1987. The 1,226 persons were actively sought via mail and telephone calls to their homes and others who may know of their whereabouts. This method produced a response rate of 87% or 1,067 respondents. Blood pressures were taken at 2-minute intervals by trained health professionals. The face-to-face structured interviews were conducted in the local Creole by those who took the blood pressures. The authors noted a complete description of procedures is given in another publication. The questionnaire contained questions from the WHO STEPS, in

addition to ones generated by the researchers. Several data tables contained data on KAP related to health, KAP related to hypertension, and KAP related to other cardiovascular risk factors. A thorough statistical analysis is done that includes a logistic regression for any correlations. It should be noted that no conceptual framework, theory, or hypothesis was mentioned.

Busari et al. (2010) established a clearly defined set of inclusion criteria. The research was conducted at a rural health institution with 240, as they called them "consecutive adults". No definition of this phrasing was given. This process of choosing "consecutive adults" who registered at or came to the clinic is a major limitation of the study that possibly eclipses the effect of carefully calibrated blood pressure measuring tools, and use of the average of three readings at 5-minute intervals. The questionnaires with closed and open-ended questions were reported as a standardized and structured interview. It was developed and pretested especially for this study. Prior to use, the questionnaire was translated into Yoruba. There is no mention of verification of validity or piloting prior to and after translation. Authors admitted that the study may have contained some results that were subjective due to methods used in a resource poor setting. Of particular importance and a strength of this research for this study is its occurrence in southwest Nigeria.

Another study done in Edo State, Nigeria considered KAP in a suburban community with a diversity of religious practices and worker backgrounds. Iyalomhe and Iyalomhe (2010) alluded to theory in a brief discussion on the importance of understanding "health seeking behavior" within a person, family,

and community context that considers the influence of the personal, experiential, and sociocultural milieu upon the life. The methods were set forth and mention was made of random sampling and sample size based upon research done by others. The results and discussion included copious amounts of data. The presentation was summarized with a recommendation that the data be used in health planning for the study area.

KAP as Quantitative Method

Assessing knowledge, attitudes, and practice on a quantitative basis requires variables be established to organize and analyze data. Researchers have approached the topic in various ways. The outcome or dependent variable in most cases is hypertension, and the independent or causal variables are KAP. Some covariates used by researchers are demographic items including level of education, gender, body mass, ethnicity, and smoking. Studies that analyzed these variables are reviewed below.

Variables

Sabouhi et al. (2011) used a knowledge score that included data on definitions, etiology, and treatment methods. A similar scheme was followed for the attitude, and practice scores. Demographic covariates of marital status, age, gender, and educational level were included but were not directly linked to the main variables. The mean scores for attitude and practice are above 70% and the knowledge score was 50%. Significant associations ($p < 0.000$) were found between knowledge, attitude, and practice and hypertension. The authors did not

include all the data within the supplied tables, making it difficult to follow the discussion.

Aubert et al. (1998) and Oliveria et al. (2005) used extensive lists of independent variables grouped under demographics, hypertension knowledge, awareness, attitudes, perceptions, and practices. Aubert et al., (1998) also commented on practices related to health care visits and practitioner patient interactions regarding hypertension. Oliveria et al. (2005) analyzed the data for associations between the demographic variables and the independent variables and found no significant associations (The authors did not specify the type of analysis). However, Aubert et al. (1998) found significant associations ($p < 0.000$) between ethnicity, body mass, and age using regression analysis.

In the study done by Busari et al. (2010), the covariates are not as robust in their presentation, neither do they show any significant association with hypertension, or knowledge, attitude, and practices possibly due the lack of regression analysis on any of the variables. Busari et al.'s (2010) primary area of interest was medication compliance so they grouped compliance as "good" or "poor" and contrasted the compliance with "good" and "poor" knowledge. Authors noted significance was at $p < 0.05$, but did not make any mention of any variable meeting the criteria. Therefore, the presence of any significant associations is not known.

The study that most nearly approaches the range of variables and context of the current research was completed by Iyalomhe and Iyalomhe (2010). The researchers included gender, educational attainment, marital status, age, and place

of employment. Regression analysis showed a reported significance of $p < 0.05$ for age and hypertension in males and females, albeit at different age ranges. No association data was provided for other covariates in the demographics category. Independent variables in KAP practically all showed some significance at a higher level ($p < 0.000$) with hypertension. Of the available studies, this study most resembled thisresearch in terms of scope at the quantitative level.

No qualitative component to any of the studies addressed the research questions of how do knowledge influence attitudes and practices in addressing risks for hypertension. In the work of Busari et al. (2010) and Aubert et al. (1998), there are references to medication side effects influencing compliance with the regimen. No connection was made between knowledge of hypertension outcomes and risks and medication compliance. Oliveria et al. (2005), Iyalomhe and Iyalomhe (2010), and Aubert et al. (1998) all made cursory references to the influence of knowledge upon the attitudes and practices directed at hypertension risk prevention. This research was designed to address this gap in the literature.

KAP_ as Qualitative Method

Research that only reviews quantitative data lacks the ability to gain contextual background from the study participants. The ability to understand participant ideas, perspectives, and expectations is fundamental to gaining a true understanding of observed phenomena (Adams & Carter, 2011). The intent of the qualitative portion of this study wass to gain such an understanding of the KAP (KAP) of hypertensives. What follows are brief reviews and comments on studies that covered KAP.

KAP as used in a Qualitative Study

There is only one qualitative study of KAP. This study, done by Adams and Carter (2011), investigated KAP of diabetic patients with hypertension. Though KAP was mentioned, little detail was provided on patient KAP toward hypertension. One statement from the focus groups was included that alluded to a basic understanding of what hypertension is. The majority of the results and discussion focused on barriers to treatment and manners in which medical staff could improve the delivery of service. From a patient perspective, what is known about hypertension and how it is known, a description of personal attitudes, and how those attitudes shape and determine lifestyle practices remains elusive data in this study.

Mlunde (2007) found a high level of knowledge about hypertension (66.8%) but low knowledge of hypertension risks (19.75%). The study title suggested that assessment of attitudes was included, but no data were shown. A total of 73.5% noted they exercised regularly to remain physically fit. Respondents were also asked about reasons for practices that increase risk such as smoking and consuming alcohol. The answers may also have been considered as a measure of attitude. However, as the author did not specifically outline what constituted attitude, there is no way to conclusively know what demonstrated attitude in the study.

Oliveria et al. (2005) surveyed 826 people in the United States and dealt with knowledge, awareness, and attitudes. An analysis of survey respondents' knowledge, attitudes, and awareness demonstrated a high level of knowledge in

regards to what hypertension is (> 81.8%), dangers of hypertension (> 70.2%), and the importance of controlling blood pressure (90.2%). Awareness of hypertension was 90.9%, in contrast with attitudes and related perceptions items that tended to be less than 40%. The importance of taking medication to control blood pressure was seen as important in 81.4% of the respondents and 89.8% felt changing lifestyle was important. This study provided some idea on how survey respondents gained knowledge and awareness of hypertension, its risks, and long-term effects through a few questions that covered the role of the physician in educating them about hypertension. Despite data on knowledge, awareness, and attitude within the study, there was no connection to practices undertaken by respondents to counteract hypertension.

Osman et al.'s (2007) study of hypertension knowledge of 242 respondents in Eastern Sudan possibly was a more accurate reflection of what may be found in the intended research due to its location on the African continent. This study was strictly an attempt to define the extent of knowledge. Knowledge of hypertension was assessed in four areas, namely symptoms (38.8%), complications (64.0%), etiology (61.6%), and treatment (56.2%). This study provides a measure that can be used for comparison between a West African and an East African nation within this study. The authors did not investigate how respondents came about their knowledge of hypertension.

Nigeria is a nation in epidemiological transition. This is the reason for including an older study by Aubert et al. (1998). KAP during epidemiological transition was the focus of the study of 1,067 respondents of primarily Black

Africans on the Seychelles Islands. The survey categorized study participants into four groups, namely aware of being hypertensive (AH), unaware of being hypertensive (UH), unaware and hypertensive (UHH), and unaware and non-hypertensive (UHN). All groups ranked high on the knowledge scores with (> 92%) respondents showing high knowledge of hypertension. In areas of exercise importance (76.4% AH, UH, and UHN), 80.25% was the average. Appropriate reported behaviors were 2.2 times higher among AH (62.8%) than UH and UHN (28.7%). Among the practices, it should be noted that the percentages of respondents answering questions about smoking, drinking, physical activity, and weight did not vary much between groups. The knowledge scores are more in line with those in Oliveria et al.'s (2005) study, most likely due to an extensive media and health education campaign reported by the authors. A caution may be found in the work of Aubert et al. (1998), who noted a major limitation of measuring KAP is its susceptibility to social desirability skewing, as respondents may not be honest in their answers to show conformity with socially accepted norms.

Sabouhi et al. (2011) described the survey respondents in terms of awareness, knowledge, attitude, and practice. Scores were analyzed and presented in terms of means of percentages with standard deviations. The mean score for patient awareness (of their own blood pressure condition) was 79.7 (SD 15.64), knowledge (of hypertension) was 50.50 (SD 17.66), attitude (toward steps to control or reduce blood pressure) 74.54 (SD 7.48), and practice score (taking medication, diet and exercise) 73.7 (SD 11.27). There was not an explanation of any possible connection between the categories of knowledge.

Busari et al. (2010) had as a stated goal the investigation of KAP regarding anti-hypertensive medication. Its value for this study is that it was conducted in Nigeria, and the authors compared knowledge to compliance with medication. This brief study attempted to show the connection between "poor knowledge" and "good knowledge" of hypertension and compliance practices with hypertension medication. No information was specifically detailed as attitude. The study did note reasons for poor compliance.

Women (59.3%) demonstrated a better knowledge of hypertension than men did (40.7%). Good knowledge was found among 28.8% of those in compliance with their medication regimen and among 18.3% of those not in compliance. In terms of percentage responding, 49.6% that had poor compliance also had poor knowledge.

Iyalomhe and Iyalomhe (2010) reported significant association ($p < 0.000$) of hypertension in practically all knowledge, attitude, and lifestyle practice variables. This study was done in a rural area of Nigeria and provides some background for comparison with the intended study. As in all the studies reviewed, although data were gathered on SES, there was no analysis of any possible significance of SES to the study outcomes.

None of these studies considered the prevailing family, and neighborhood conditions for providing knowledge of hypertension. Poor compliance practices were decried by Busari et al. (2010) without much investigation of the nurturers and enablers of the poor compliance practices. In societies where there is a sustained anti-hypertension health education program or frequent instances of

patient education by medical staff, as in studies by Oliveria et al. (2005) and Aubert et al. (1998), a high knowledge of hypertension is found. Even in the presence of what may be considered good attitudes (take medications, see physician, awareness of personal medical conditions), there is not a corresponding appropriate change in lifestyle practices as noted by Aubert et al. (1998), Sabouhi et al. (2010), and Iyalomhe and Iyalomhe (2010). How is knowledge of hypertension gained, and how does it shape attitudes, and how are practices developed based upon the knowledge and attitudes remained unanswered in the studies reviewed.

KAP and the Research Questions

None of the studies reviewed have a qualitative context from which to draw comparisons with the intended study. The research questions for the qualitative portion of this study provide some insight on the connection between KAP. The use of qualitative interviews gave respondents opportunity to explain the acquisition of knowledge of hypertension and how they use that knowledge to form attitudes and develop practices related to mitigating hypertension risks.

<div align="center">

Summary and Conclusions

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The literature demonstrated there are low levels of knowledge about hypertension and its risks among many in the Nigerian population. This is borne out by the quantitative research methodology used in studying hypertension among the people of Nigeria. Though research has quantified aspects of KAP to present the prevailing view, the actual feelings and attitudes of the population are not known. None of the available research used theory to guide research among

the Nigerian people to gain an understanding of KAP of those who have low

knowledge about a life threatening illness and are apparently not overly

concerned about the long-term outcomes. The purpose of this study was to

address the gap in knowledge from a sociocultural perspective that uses theory to

gain a better understanding of the KAP of Nigerians in regards to hypertension.

Airhihenbuwa's PEN-3 Model and its three domains (educational

diagnosis, health education, and cultural appropriateness of behavior) was the

theoretical basis for this study. This model was chosen because of its emphasis on

the cultural underpinnings of how one learns, adopts, and maintains health-related

behavior. The application of the PEN-3 Model to other research (cancer, diabetes,

smoking cessation) demonstrated its use as a tool for gaining understanding of

health issues facing underrepresented and or vulnerable populations. Research

support for combining the PEN-3 Model as the theoretical framework with KAP

as the conceptual framework was found in studies done by James (2004) and

Ka'opua (2008).

From the work of Iyalomhe and Iyalomhe (2010), Busari et al. (2010), and

others, it can be seen that knowledge about hypertension, its risks, and long-term

outcomes remains low among the general population in some Nigerian settings.

Attitudes and practices that would reduce the danger of hypertension are not

widely known by persons with hypertension. What was not known was the role of

the family, extended family, and neighborhood in enabling or nurturing the

prevailing practice, knowledge, and attitudinal positions toward hypertension.

Another unknown was the cultural appropriateness of what is currently known

about the hypertensive population. What is culturally acceptable and what is not in regarding knowledge and treatment of hypertension? Discovery of some answers to why people know relatively little about hypertension, and have not adopted attitudes and practices that counteract the effects of hypertension can provide insight for development of culturally appropriate interventions that can boost the knowledge held among the population to higher levels where appropriate attitudes and dietary and physical exercise practices can be widely encouraged at all levels within society. A preview of a plan for how the basic research was conducted will be discussed in the following section.

Preview of Chapter 3

Chapter 3 covers the elements: (a) the study setting, (b) a complete description of the location and its environment, (c) a discussion of the research design and a rationale for the use of a mixed-methods design, (d) and a description of the researchers' role. In the methodology section, logic for participant selection is described, followed by a discussion of instrumentation for qualitative and quantitative portions of the study. Discussion of the data analysis plan follows for quantitative and qualitative components. This section also describes how various threats to validity and issues of trustworthiness will be handled. Chapter 3 ends with a description of the ethical procedures that were followed, as well as a chapter summary.

Chapter 3: Research Method

Preview

The purpose of this explanatory mixed-methods study was to investigate how sociocultural contexts shape the knowledge, attitudes, and practices (KAP) of the study participants toward hypertension risks. It is expected that this inquiry will yield greater understanding of the role of sociocultural contexts in health behaviors.

Chapter 3 discusses the methods used in this study. A brief review of major sections of the chapter follows. The Setting provides demographic and geographic details on the area that forms the sampling frame in Illishan Remo, Ogun State, Nigeria. A discussion of the transformative mixed-methods study design and the rationale for using this approach are found the next section. Under the Role of The Researcher, attention is given to my role as a researcher and the potential impacts that role may have on the study given professional, ethical, and personal biases. Methodology, which is discussed after Research Design and Rationale, will detail the logic used in selecting participants, instrumentation, and threats to validity. It also includes a few paragraphs on procedures for the data analysis plan. Next a discussion of external and internal threats to validity, followed by a description of how threats to validity will be addressed. Ethical issues comprise the last section of the chapter, including IRB procedures, a description of ethical concerns for recruitment, data collection, and the anonymity of the data.

Introduction

In the literature, the use of quantitative methodology is apparently the preferred manner to study hypertension. No qualitative studies were found. However, neither approach alone can explain the sociocultural phenomena that are the focus of this study. Therefore the mixed-methods was used to understand how people deal with hypertension This mixed-methods study addressed the sociocultural aspects of the epidemiology of hypertension among residents of Ilishan-Remo, Ogun State, Nigeria. This study included quantitative and qualitative data gathered sequentially. The quantitative data were used to test the theory that knowledge of hypertension risk factors, attitudes toward hypertension, dietary and physical exercise practices toward hypertension, and SES would influence positively the blood pressure for the residents of Illishan Remo in Ogun State, Nigeria. Qualitative data are used to explain the role sociocultural factors play in the decisions people make regarding hypertension.

Blood pressure is measured with a digital or analog sphygmomanometer attached to a pneumatic cuff placed over the arm. In research, the blood pressure is read after the patient has sat quietly for a few minutes. Two or more measurements are then taken at 3-5 minute intervals and the mean of the three measurements is reported (Adedoyin et al., 2008; Andros et al., 2006; BeLue et al., 2009).

Setting

This research population consisted of residents of Ilishan-Remo, Ogun State, Nigeria. Located in the Southwestern part of Nigeria, Ogun State is considered the gateway state because of its access to the Atlantic Ocean, and its borders with Lagos, Oyo, Osun States, and the Republic of Benin (see Figure 4).

Figure 3. Map of Nigeria. The highlighted area is Ogun State.(Used under Creative Commons Attribution-Share Alike 3.0 Unsupported license.)

As of 2006, the listed population was 3,751,140, 49.9% male and 50.1% female. Projections placed the 2012 census count at 4,610,378. The population is comprised of six main ethnic groups: Egba, Ijebu, Remo, Egbado, Awori, and the Egun. Yoruba is the principal language. English is the official language for business and government affairs. National statistics show that 8.7% of Ogun State residents have tertiary education, 6.7% have a secondary education, 17.4% have never attended school, and the remaining 67.2% have attended or are attending primary and junior educational schools. The sampling frame consisted of urban and/or peri-urban, and rural residents from Ilishan Remo (Latitude: 6 54' 00"

Longitude: 3 43' 00") in Ogun State (National Bureau of Statistics, 2009; Ngex.com, 2006; Ogun State, n.d.). The inclusion criteria was residence in urban and rural areas of Ilishan Remo, ages 20-79, self-identification as a member of one of the listed ethnic groups, English speaker, and prior diagnosis of hypertension and or taking medication to control hypertension.

<div align="center">**Research Design and Rationale**</div>

A sequential transformative strategy was used in this mixed methods inquiry. Mixed methods research is defined as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts, or language into a single study (Johnson & Onwuegbuzie, 2004). In a sequential transformative strategy, the research is conducted in sequence (quantitative ->qualitative, or vice versa) using a theoretical or conceptual lens (Creswell, 2009). The quantitative portion of this study used the WHO STEPwise approach to chronic disease risk factor surveillance (STEPS) survey developed to measure participant KAP on chronic diseases. STEPS also includes a module that measures respondent SES. STEP 2 is the area for collection of anthropometric data, weight, and blood pressure readings. Investigation of SES status is important to this study because of its widely verified association with connection to access to health care and education. Three focus groups, each composed of six to nine randomly chosen respondents from a rural and an urban setting, comprised the qualitative interview portion of the study.

This sequential transformative mixed-method study used the PEN-3 model developed by Airhihenbuwa (1995) to explore personal, cultural, and educational domains of hypertension. The reasons for choosing this model were explored in detail in the introduction and Chapter 2. Factors influencing behaviors toward hypertension are referred to as KAPS. KAPS represents knowledge about hypertension, attitude expressed toward hypertension, diet, and physical exercise, practices are behaviors that reduce risks for hypertension, and socioeconomic scale represents impact of wealth on life. The PEN-3 model guided the development of survey and structured interview questions modifications where necessary.

Central Concept and Phenomenon of the Study

The central concept of this study was that the practices one develops or hold toward reduction of risk for and prevention of hypertension are directly influenced by the knowledge one gains or has of hypertension, and the attitudes one holds toward hypertension risk and prevention. The sociocultural milieu in which one lives dictates to a very large degree what is known, the attitudes one holds, and the practices (behaviors) one develops.

Research Questions

The research questions for this study were:

RQ1. To what extent and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?

RQ2. To what extent and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?

RQ3. How does knowledge gained about hypertension and its risk factors influence the dietary and physical exercise practices?

Role of the Researcher

Prior to the beginning of data collection I explained ethical procedures and established common understandings with participants. I applied ethical and interview training manual procedures for collecting data using the STEPS instrument. This training followed procedures outlined in the STEPS Training Manual provided by the publisher. I have over 20 years of teaching and training experience and is an Achieve Global® certified trainer.

I was the point of contact for focus group recruitment for the qualitative portion of the research. Focus group discussions with translator help where necessary were conducted using procedures outlined by Krueger and Casey (2009) and Fetterman (2010). Within the focus groups, the researcher's role was that of observer and interviewer. Focus group discussions journals, notes, and audio/video recordings were made and are maintained using procedures outlined by the above referenced authors. Maintaining and analyzing data was my responsibility.

For this study to be effective, I employed phenomenological reduction. Phenomenological reduction, or as it is more commonly called bracketing, describes the mental and psychological processes whereby I suspended personal

biases, experiential understandings, assumptions, and presuppositions for the express purpose of seeing and describing that which is observed. This view was important, as such I could never be truly neutral. With this understanding, I approached the study with the view that epistemology relates what we hold and believe to our acquisition of knowledge and that which is known or even knowable and its propinquity to the one who does the knowing (Carter & Little, 2007; Hansen-Ketchum & Myrick, 2008).

In real terms for this study, this meant laying aside whatever views, I, , held about hypertension and methods of risk reduction, and how one comes to know, comes to form attitudes (which in fact cannot be static), and comes to develop habits for the purpose of addressing hypertension. This was and cannot be a one-time process. It continued throughout data collection and analysis and through personal reflection on what was observed. This reflexive activity permitted the acknowledgement of personal assumptions and interests in the study and allowed me to become more intimately involved with the research topic, data, and analysis. I had to be careful to accurately interpret and validate the experiences of study participants and how they view hypertension and relate to its intrusions upon their lives. Because knowledge was jointly and continuously created by me and the participants alike throughout the process, a uniqueness to the data flows through my subjectivity and that of the participants. This uniqueness was not trammeled by a one-time act of bracketing, but via use of a continual mindfulness to the uniqueness of what was being created and how that

uniqueness challenged or was challenged by closely held assumptions (Carter & Little, 2007; Fischer, 2009; Milner, 2007).

Methodology

Methodology is a rationalization of the types of methods used (Carter & Little, 2007). To this end, in qualitative research there are many methods. This study used the case study approach from a social epidemiology perspective with a nod toward ethnography. The ultimate purpose of the methods explained by the methodology is the collection, management, analyzing, and reporting data (Carter & Little, 2007).

Sampling Strategy

Probability sampling would have provided greater external validity for the conclusions reached in this research. Of importance to this research was a comparison of blood pressure readings between urban and rural dwellers. The most appropriate selection of sampling technique would be a stratified random sample. In an effort to bolster comparison of blood pressures of residents from different areas and maintain a representative sample of the population, a quota sample could have been of value. However, because I used the blood pressure measurement from the quantitative portion of the research to determine hypertensive state for possible inclusion in the qualitative focus group, I chose a sample of 79 residents for the quantitative portion of the study. The choice of this sample size was subjective and based upon considerations of time and realities in the field, and cost constraints. To achieve a power of 0.90 with an effect size of 0.35 and a probability level of 0.05. Daniel Soper's Online Statistics Calculators

(www.danielsoper.com) recommended a sample size of 63. To maintain the 49.9% to 50.1% male to female ratio, individuals were recruited with numbers that are close the actual male to female percentages. Where possible, population educational percentages were maintained within the recruited sample.

The research was transformative or ethnographic in nature and sought to explain observed behavior among the participants. Purposeful sampling was used to select the six to nine members of the three focus groups. Purposeful sampling means that only individuals who were identified as hypertensive or was involved with someone who was hypertensive were recruited for participation within the focus group. Creswell and Plano-Clark (2011) recommended using a much smaller size for the focus groups if, as in this case, the goal was development of meaningful themes rather than merging or comparing data. There were a total of 24 members of focus groups. The answers provided by the focus group members allowed the qualitative research to reach a point of saturation. That is, a point where themes in the discussion started recurring.

As the research used a sequential mixed method design (the quantitative to inform the qualitative), the ideal would have been to use a probability-sampling construct to take advantage of the statistical analyses such a method offers. These analyses can provide inferences from which we can generalize to other residents of the community or state.

Logic of Participant Selection

The chosen population for this study was the residents visisants at the market from urban and rural areas within and surrounding Ilishan Remo in Ogun State, Nigeria, who were visitants at the market.

Recruitment. Recruitment of participants was by direct invitation to submit to a blood pressure check at a market site in the target area. A check was made of age with the acceptable age range being 20-79 years. Those who accepted the offer of a free blood pressure check were invited to complete the STEPS survey. Completion of the survey was not a prerequisite for a blood pressure check.

Those who elected to participate in the survey were invited to a specified area where an interview was completed. At the completion of the interview, participants received a brochure on hypertension, in which I wrote their calculated BMI and observed blood pressure reading. Some participants whose blood pressure reading was above 130mm/90mm Hg were invited to participate in the focus group discussion.

Collected data included demographic information, survey data, socioeconomic data, height, weight, and blood pressure measurements. Data gathered from focus group discussions consisted of researcher journals, answers to unstructured interviews on diet and exercise, participant records of diet, exercise, and adherence to any medical regimen.

The origin of the contact information was the demographic data on the STEPS. Primary identification came from the survey. Secondary identification

originated from the review of survey data. All prospective members of the cohort were contacted by the researcher. Recruitment continued until there were enough for three to four focus groups of six to nine members each.

Instrumentation

   Qualitative components. Focus groups are devised by the researchers for fulfilling specific purposes of the study, such as gaining insight into the way people interact with specific information. Focus groups are frequently used by researchers and consultants as tools for drawing conclusions based upon the data obtained from the discussion. Because purposeful or snowball sampling is often chosen and group members may not represent a complete cross-section of the study population conclusions drawn cannot be generalized (Hydén & Bülow, 2003). The reason for using a focus group as opposed to private interviews was qualitative in nature. It was hoped that the use of a focus group discussion would enable members to find support for their views and prompt some ideas for consideration. A focus group is a manner in which understandings of how at the health system factors level, community level, family, and individual level affect knowledge, attitude, and practices of hypertensives (Wexler et al., 2009). The main goal of the study was to gain an understanding of how and to what extent knowledge of risk factors for hypertension moderate attitudes surrounding hypertension and affects the development of habits that counter those risks or fails to motivate one in development of habits that counter risk. This was explored within a sociocultural context using PEN-3 domains. To facilitate analysis, domains were handled individually with a specific narrow focus. Despite the best

efforts of researchers, focus groups can be biased by too much heterogeneity among participants that inhibits participation and disclosure, or the moderator allows tangents to the discussion to develop. The use of homogeneous grouping as far as possible can forestall the former, and the moderator bringing the discussion back to where it should be would correct the latter (Wong, 2008).

Focus Group Protocol

Objective. The objective was exploration of the intersection of KAP regarding hypertension within the three domains of PEN-3; health education, educational diagnosis of health behavior, and cultural appropriateness of behavior.

Inclusion and exclusion criteria. The inclusion criteria for the focus group was identification as hypertensive, the spouse or adult child of someone who has hypertension, and was involved with reminding someone to adhere to a regimen or providing some type of care to the hypertensive. The age range for the study was 20-79 years.

Location/setting. The site was a lecture hall at Babcock University School of Public Health (see Figure 15, Appendix D).

The discussion group. There were three focus groups of six to nine members each, with a mix of rural and urban residents. Dyas et al. (2009) asserted that groups of this size promote facilitation for the moderator and participation by the group members. The focus group subjects were reminded of the consent they had signed prior to the survey. The purpose was explained to the group as a whole at the start of the focus group discussions. All demographic information for focus

groups was drawn from the STEPS. Identifying data were removed. Focus group participants were not to refer to each other by name throughout the interview to maintain anonymity. Sessions lasted no more than 90 minutes. Although it was scheduled, the 10-minute break after the first 45 minutes was not taken, as groups were willing to continue the discussion without interruption. Arrangements were made to have a trained counselor in the group in the case that some response triggered an overly emotional response. It was found after three groups met that elements of saturation began to emerge.

Wong (2008) advocated encouraging a free flowing discussion among group members where the emphasis is on personal interactions and sharing of ideas, opinions, and experiences. This is preferred to a discussion that is merely responses to the moderator's questions. Possibly due to my presence as a foreigner or due to social desirability bias, there was not as much group interaction as desired.

Two sessions had audio and video recording for the entire length of the discussions and one group had only audio recording. It was planned to have six recording sessions by using Airhihenbuwa's suggestion to take initial data back to the people for additional input. Recording took place in three initial sessions and if time and funding had permitting, three post-preliminary analysis sessions would have been recorded. Time, financial resources, and logistics ruled out the reconvening the groups. The post sessions were to gain feedback from focus group participants on their reactions to preliminary conclusions.

Permission for audio and video recording was part of the consent process. I led all group discussions with a translator who was a local health educator on standby if necessary,. Confidentiality guidelines for members were part of discussion during the consent process. These guidelines included prohibition on divulging discussion contents with others who are not members of the group. Recording confidentiality entailed the removal of SD cards with recorded information from the recording devices and uploading contents to a cloud service, Google Drive. I journaled during the discussion using a Livescribe™ pen and paper. These notes were kept confidential by direct upload to Google Drive . All notes and electronic data will be retained by me for a period of five years from the date of collection. The room was set up as shown in Figure 5. All focus group members were reimbursed for travel. Refreshments were provided during and at the conclusion of the session.

When I return to Nigeria, I will seek to find as many of the focus group members as possible and invite them to hear the report of findings. Additional and corrective input will be solicited at that time. This meeting with the participants will serve as a final discussion and exit interview. Input gained will give me a clearer view of what I have learned from this research. The insights gain can further inform and articles for scholarly journals that will arise from this study.

Figure 4.

Focus group room setup during research.
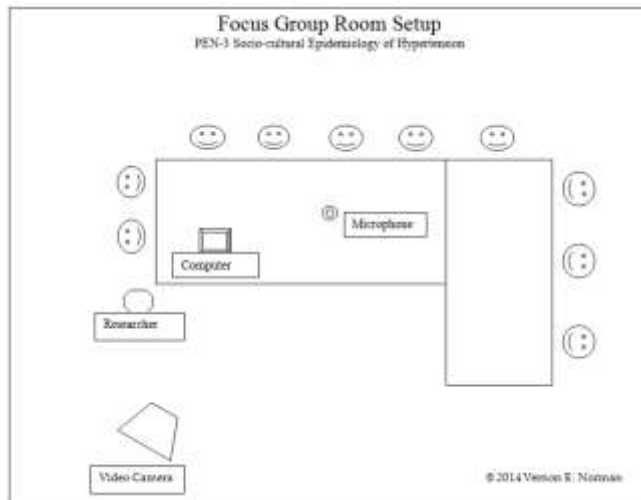
Interview Protocol

Lambert and Loiselle (2008) advocated using more in-depth individual interviews of some focus group members to enrich the data collection. The focus group discussion was driven by four contexts, namely status, conversations, associational, and relational. Therefore, individual interviews, structured or unstructured, can provide missing data, provided there were no interactions between interviewer and interviewee. At the point of planning, individual interviews were not planned.

Audio. Audio recording of focus groups was done with a Phillips portable digital audio recorder. Discussions were recorded in MP3 format and saved to a micro SD card. The micro SD card was backed up daily to the researcher's computer. This process provided the redundancy of data archives.. The benefir of redundancy proves invaluable in the case of equipment failure or loss.

Video. All focus group discussions were recorded on video. Video was recorded with a Zoom QX3 video recorder. Video files were recorded on a SD card and backed up to the researcher's computer and cloud service for redundancy of data. This redundancy was of benefit in the case of equipment failure or loss.

The Questions for the Focus Groups . Some questions for the focus group discussions arose from requested data in STEPS. Participants were asked to elaborate on usage of alcohol and tobacco products, and use of fruits and vegetables. Questions on hypertensive knowledge, diet, and physical activity were explored. The second phase of questions was based in the conceptual framework KAP within the theoretical concept of PEN-3. Participants were asked to describe how and to what extent knowledge of hypertension is gathered from personal resources, extended family, and the neighborhood. Some questions addressed how and to what extent attitudes were formed from personal resources, extended family concerns, and the neighborhood sociocultural environment. Other questions covered how and to what extent were practices for reduction of risk and prevention of hypertension developed from personal resources, extended family support, and neighborhood sociocultural environment. A similar strategy followed for the remaining two domains of PEN-3, educational diagnosis of health behavior, and cultural appropriateness of behavior (Airhihenbuwa, 1995). The listing of questions for the focus group can be seen in Appendix B. See Table 1 for a simple schematic of the focus group discussion guide.

Table 1

Simple Schematic of the structure of the Focus Group Discussion Guide

Topic	PEN-3 domains	Conceptual domain
Personal sources of knowledge *Extended family's* role in knowledge acquisition *Neighborhood's* role in knowledge acquisition	Health education	Knowledge
Personal *perceptions* of hypertension and outcomes *Enablers* of personal attitude toward hypertension *Nurturers* of health behavior attitude development	Educational diagnosis of health behavior	Attitude
Positive (beneficial) practices held *Existential* (neither beneficial or detrimental) practices held *Negative* (detrimental) practices held	Cultural appropriateness of health behavior	Practices

Note. Example from the Focus Group Guide (See Appendix B).

Procedures for Pilot Studies

It was previously noted that WHO STEPS was successfully used in Nigeria in 2003. A pilot study was not planned but if the need arose for purposes of the focus group sessions, the following procedure would have been followed. In the quantitative portion of the study, an established self-administered survey of cardiovascular disease knowledge was used. Even though a great many of the study population spoke English, it was not the primary language of many, and the English used is not the American variety. For those who wished to participate and preferred to receive and answer questions in another language, a translator would facilitate the questioning. During the focus groups, there was little need for a translator although one was available. Prior to field use, I made a presentation to a

group of graduate students to ensure integrity of the instrument, who provided me

with some feedback (Babbie, 2010).

Quantitative Components

      Instrument. WHO STEPwise approach to Surveillance (STEPS) is an

instrument designed by the World Health Organization to collect simple health

surveillance data useful for tracking chronic disease risk factors efficiently.

STEPS was first published and initiated in 2000 for use in chronic disease

surveillance activities in emerging economies. Validity and reliability testing of

the physical activity portion Global Physical Activity Questionnaire (GPAQ) has

been done in over ten countries, as documented by Armstrong and Bull (2006)

and Guthold et al. (2011). The testing was directed at ascertaining the concurrent

and criterion validity, and test-retest reliability of GPAQ. Concurrent validity was

done comparing GPAQ with the International Physical Activity Questionnaire

(IPAQ) to obtain acceptable-to-good validity and reliability aspects of the

instrument. Criterion validity was validated via use of pedometers. Results

demonstrated concurrent validity between GPAQ and IPAQ had a correlation

coefficient of $r = 0.54$, moderate-to-good. A concurrent validity of $r = 0.65$ for

sedentary questions, and $r = 0.31$ for criterion validity. Test-retest reliability

numbers were high (0.67-0.81), meaning that the GPAQ had a good-to-excellent

performance (Guthold et al., 2011). Reliability and validity data were unavailable

at the time of writing on WHO STEPS as a whole. Correspondence seeking

specific permission was sent to WHO director of publications for permissions,

validation, and reliability information on the entire instrument. However, no answers were received.

The appropriateness of STEPS to this study can be seen in its widespread use in 63 countries, representing all five of the WHO regions and Nigeria, which conducted a subnational survey in 2003 (WHO, 2012). It is called STEPS because it is composed of core modules that can be added onto or expanded as desired—or the budget allows. The three basic modules form a hierarchical system consisting of a risk factor questionnaire, physical measurements, and biochemical measurements. All module steps represent various levels of risk factor assessment. The premise is that small quantities of discrete quality data on chronic disease risk factors that can reasonably predict future chronic disease burden are more useful to emerging economies than quantities of low quality data. Each module uses standard WHO definitions (see Appendix F). STEPS is considered a standardized instrument that is readily adaptable to surveillance of chronic disease risks various countries. All questions and protocols are standardized, thus permitting analysis of trends countrywide or comparison with other countries. STEPS is designed for low and middle-income countries; therefore, all materials are freely downloadable from the WHO STEPS website (Ng et al., 2006; WHO, 2012).

In answering STEPS questions, participants revealed information regarding their knowledge of hypertension and its risk factors. They also indicated the type of dietary and physical activity habits they have adopted. The research questions were answered from data collected using STEPS.

Quantitative data collection was via sequentially numbered WHO STEPS. Numbering was done using Batesblaster numbering software (Batesblaster.com). This survey was designed to collect the following data:

STEP 1: Demographic Information, and Behavioral Measurements (risk factor measurements for alcohol, tobacco, dietary habits, physical activity and any knowledge and prior history of hypertension)

STEP2: Physical Measurements (height, weight, blood pressure, hip circumference, and heart rate)

STEP 3: Biochemical Measurements (blood glucose, lipids, and triglyceride data). This study did not collect hip measurements or use STEP 3. I performed the measurement of blood pressures, weight, and height. These physical measurements were recorded in STEP 2 of the STEPS instrument. Collection of this information was needed to test the hypotheses and for possible inclusion in the focus group.

Instruments used in physical measurements. Blood pressure data for this study was gathered using the Omron HEM-907XL digital oscillometric blood pressure device. It was chosen because it was one of the few for which a validation study could be found. Ostchega et al. (2010) conducted a national study of 509 individuals. The study compared readings of blood pressure from a standard mercury sphygmomanometer (HgS) to the Omron HEM 907 XL. Correlations between the two measurements were $r = 0.94$ for systolic blood pressure (BP) and $r = 0.83$ for diastolic BP. *P*-values for device agreement were $p < 0.0001$. In youth between the ages of 13 and 19, there was an average difference

of 1.77 mm Hg. It was concluded the Omron HEM 907 XL met Advancement of

Medical Instrumentation standards. The Omron HEM 907 XL is powered by 6

AA batteries or AC power. On battery power, the device is able to make 300

measurements on one charge. It was very portable and easy to use in mobile data

gathering situations.

Height information was recorded using the Detecto ProDoc™ Digital

Height Rod stadiometer. The battery powered Detecto was mounted on a stand,

had a remote display, was easily calibrated, and measured heights up to 6'7".

Weight measurement was taken using the Detecto ProDoc PD100 digital scale.

This scale can accurately record weights up to 480 pounds in 0.2-pound

increments and included a body mass index (BMI) calculator. The zeroing feature

and locking adjustable feet made for easy calibration and setup. It was battery

powered and highly portable.

Data Analysis Plan

The quantitative data analysis plan for this study consisted of a

quantitative phase and a qualitative phase followed by merging of the data for

triangulation. The term mixed methods has been used to describe this process of

data collection. STEPS is a closed ended survey that was used to collect

quantitative data on knowledge and practices regarding known risk factors for

chronic disease. The focus group followed the survey with semi-structured

questions designed to explore sociocultural contexts of KAP that persons have

regarding hypertension and its risk factors. An explanation of planned data

analysis procedures follows.

Quantitative analysis used some of the resources provided by WHO for analyzing data collected with STEPS. Initial analysis of data was for obvious and not so obvious human error. After initial scanning of data for recording error or missing entries data were entered into SPSS 18 for analysis. Prior to running any tests, data were displayed in frequency tables for univariate analysis, that is going down the data table one column at a time and verifying the integrity of each entry. This was followed by running some descriptive statistics. The use of SPSS 18 with appropriately coded check code routines inserted when defining the variables in SPSS was able prevent data from being entered into the wrong field or in the wrong format; for example, use of dd-mm-yyyy may have been entered mm-dd-yyyy. This can be flagged during data entry within the software (Hellerstein, 2008). Respondent answers to the STEPS instrument were reviewed before completeness and correctness before further analysis with SPSS 18.

The variables of BMI, age, mean systolic pressure, mean diastolic pressure educational attainment, and annual income were all treated as continuous variables within the descriptive statistics. For purposes of display in tables, they were recoded as categorical variables and statistics done again due to a small sample size. Variables for tobacco use, alcohol use, knowledge of hypertension, and walking or biking to work, or doing moderate to vigorous exercise were all yes or no answers. Variables such as educational attainment, annual income, ethnicity, and others were recoded to numeric answers or ranges to facilitate analysis.

One of the big problems with the small sample size was apparently lacking the ability to determine whether the data were normally distributed despite what the histogram with a normal curve appeared to reveal. Reports of skewness and kurtosis were also probably not enough. The Kolmogrov-Smirnov test was done to determine whether the data were normally distributed. In the case of a small sample size such as in this study, the results for the Shapiro-Wilks test were used to determine the assumption of normality of data distribution.

A regression model was used for determination of any significant correlations between hypertension and data collected on risk factors, tobacco, alcohol, and diet (practices) and SES data.

Future plans for data include use of ESRI ArcGIS® Desktop 9.3 (Redlands, CA) interfacing with a GIS maps of Nigeria from Geo Community (geocomm.com) to facilitate the development of spatial and GIS modeling to enable construction of alternate means of viewing relationships within the data and to disclose any associations between place of residence and observed hypertension related data.

Test of hypotheses. The hypotheses were as follows:

H_a1: There is a significant difference between urban dwellers and rural dwellers in terms of hypertension knowledge and hypertension risk reduction dietary and physical exercise practices as measured by the STEPS survey.

H_01: There is no significant difference between urban dwellers and rural dwellers in terms of hypertension knowledge and hypertension risk reduction dietary and physical exercise practices as measured by the survey.

H$_a$2: There is a significant difference between urban dwellers and rural dwellers in blood pressure and anthropometric indicators.

H$_0$2: There is no significant difference between urban dwellers and rural dwellers in blood pressure and anthropometric indicators.

A paired-samples *t* test was used after checks for normality to evaluate whether the mean of the differences on two variables (knowledge and practices) was significantly different from zero for all data. The Pearson product-moment correlation coefficient was used to test the degree of linear relationships among variables within the sample. Multiple linear regression was used to test variables for their ability to predict hypertension.

Qualitative analysis. Questions for the focus groups within the qualitative portion of the study were developed for clearness of concept to be addressed. Qualitative data gathered from the focus group interviews consisted of researcher journals, direct observations of use of various words, participant observations of KAP, and documents listing the participant data from focus group sessions. Subsequent to collection interview and other qualitative data was entered into NVivo 10$^®$.

Coding qualitative data requires one to be aware of and identify relevant phenomena in the development of contextual meanings. Yet, coding itself is not analysis and to be done effectively, must be started during data collection rather than waiting until the final analysis. Codes can be inductive as in grounded theory, or for this research, was dictated by the conceptual and theoretical frameworks, research questions, and specified variables. The whole goal was

documentation of everyday lives as they are lived within a hypertensive context (Basit, 2003).

The coding of data for analysis within NVivo10® was a component of cross-case synthesis for the purposes of building an explanation of observed phenomena. I was responsible for the analysis of data and conclusions drawn from the analysis. Additional insight gained from focus group transcripts as part of qualitative research round out claims formed from data analysis. Attention was given to giving complete rich thick descriptions of contexts and places where the research takes place, and what occurred to provide users of the report the ability to make determinations about reliability of material for their sites.

Threats to Validity

In the collection of the quantitative data, notes were made of any issues arising out of the use of the STEPS instrument. These notes include data on observed limitations and utility for research. The use of precision instruments to collect blood pressure and anthropometric measurements went far to eliminate the possibility of error in procedure or reading and recording data.

Within qualitative research reliability threats arise from instances of inconsistency between transcripts and notes or audio recordings of interviews and shifting of codes within the coding process (Creswell, 2009). The following strategies counteract reliability and validity issues. Redundancy of recording devices, audio, and video with audio gave the ability to cross check interviews if audio was not clear to aid the correct transcription of recordings. Transcript reading while listening to audio helped eliminate errors. Codes were cross-

checked for alignment with the PEN-3 domains before application to the study.

The validity, trustworthiness, authenticity, and credibility of the report come from

the use of multiple data sources and inclusion of cases that are counter to the

research. Rapport was built with focus groups and respondents by spending extra

time and engaging in conversation during blood pressure collection to know

respondents and to build trust. Member checking arising out of trust between

focus groups and researchers helped to verify understandings. Provision of rich,

detailed descriptions gives others sufficient detail for comparison research

(Creswell, 2009).

Issues of Trustworthiness

Efforts were made to choose a sampling frame that is representative of the

population in Ogun State. It is possible that recruiting from a regional market

helped achieve that goal. Recruitment for data collection at the market site

produced a varied context for data collection and focus group composition.

Illishan Remo is the home of Babcock University and possibly biased gathering

data from those with a higher SES. While this at once may be considered a threat

toward validity, it can also be useful in the context of discovering how the

interaction of post-secondary education influences the KAP toward hypertension.

The depth of interviews in the focus groups and participant willingness to

answer was (as in the case of a husband and wife participants where the wife

deferred to the husband) reduced the level of information necessary to form a

comprehensive description of the KAP. Where reluctance on the part of some

interviewee intruded on the integrity of answers, every attempt was made to allow their voice to be heard within the collected data.

SSA is home to hundreds of ethnicities and people groups. It would be foolhardy to suggest that data obtained are representative of any people group other than the one interviewed. What may be determined is that local culture may be the most dominant influence, regardless of ethnic background. Unsuspected intervening variables may have arisen that instruct the data collection and analysis in a manner other than planned. Regardless, the goal was to obtain KAPS data on the residents of Ogun State that a sociocultural epidemiological view of hypertension may be established to assist governmental agencies in designing and implementing programs to mitigate the threat chronic disease poses to the nation.

This research explored informant KAPS through the PEN-3 model; therefore, the data presented in a narrative manner from the focus group perspectives allowed for the development of personal thinking and decisions about cardiovascular disease and risks, as well as hypertension, in particular within the PEN-3 model construct (Baxter & Jack, 2008). Extensive use of respondent narratives enables readers to gain perspectives on how persons of other cultures view and work with hypertension. Reporting of study results to program participants, Babcock University School of Public Health (BUSPH), Ogun State Ministry of Health, (OSMH), and Nigerian Federal Ministry of Health, (NFMH), will be done in support of individual and state and federal goals for non-communicable disease prevention.

Ethical Procedures

Ethical approval was from the Walden University IRB (2013.05.10 08:28:01-05'00'), and from Babcock University IRB. A professor from Babcock University facilitated an exploratory visit to Nigeria and provided all types of local planning, coordination, and logistical support required for the research. The university was the base from which I operated while in Nigeria. All survey and ethical agreements were explained in regional dialect or English, as required by the participants. The language of agreement secured prior to conducting the survey was noted on the survey. Human participant protection was according to protocols established by OSMH and NFMH, in accordance with Nigerian human subjects' protection protocols and Walden University IRB standards, which are based upon the Belmont report.

Summary

This research took place in Ilishan-Remo located in Ogun State. Ogun State is in the Northeast corner of Nigeria on the African continent. The rationale for choice of a transformative mixed-method design was the vast majority of available research is quantitative. The use of mixed-methodology allowed confirmation of existing research and providing new insights from qualitative results. The PEN-3 model and its domains (a) origin of health behaviors, (b) development of health behaviors, and (c) cultural appropriateness of health behaviors was reviewed. Study of the sociocultural dimension of hypertension focused on the personal, cultural, and health education domains from the context of knowledge gained, attitudes formed, practices developed, and socio-economic

impacts on health. My functions included focus group recruitment, focus group moderator, operating video and audio recording equipment. Some of the means I employed, such as phenomenological reduction to put aside bias, were discussed. The methodology discussion noted the logic of participant selection: the manner of recruitment, the sampling strategy, and a justification for a sample size of 79.

A review of the instrumentation provided a view of how the qualitative and quantitative components were handled. The qualitative component is the focus group. Included in this section were the focus group protocol, the inclusion and exclusion criteria, the location and setting, and the manner of the discussion.

The quantitative components include the STEPS instrument, blood pressure cuffs, and scales. Validation was provided for portions of the instrumentation. It was also noted that STEPS has had prior use in Nigeria.

A review of the data analysis plan was divided into quantitative and qualitative analysis. Each type of analysis was discussed in terms of how it would be done and the instruments to conduct it. SPSS 18 was used to perform the quantitative analysis. NVivo 10 was used to look for themes within the focus group discussion data. Any research has various threats to validity. Methods to address some of these threats to the qualitative portion include redundancy of data recording, the use of code checking, transcript reading during audio playback, and the use of audio and video recording. The use of SPSS 18 to analyze STEPS allowed direct entry of data from recruitment data sheets to decrease chances of error. There are code check routines that I inserted when defining the variables in SPSS 18 to facilitate accurate input of data. Statistical analysis included

descriptive statistics, paired-samples *t* test, the Pearson product-moment

correlation coefficient for detection of significant correlations, and regression

analysis for testing the predictive nature of study variables. The chapter concludes

with a discussion of trustworthiness issues and ethical procedures.

Preview of Chapter 4

Chapter 4 discusses the work of the research. This discussion will include

a brief introduction reviewing the purpose of the research and the research

questions. The following sections will cover the setting, demographics, data

collection, and the process for data analysis. I used a sequential mixed methods

approach. Qualtitative data are presented first and then the quantitative data.

A brief review of major sections of the chapter follows. The setting

provides a description of organizational conditions that influenced participants

and or their experience at the time of this study. The next portion discusses

participant demographic details discussion of the data collection process. The

analysis section qualitative components by discussing the process used to move

deductively to categories and themes. Supporting data including quotes will

provide support. Discrepant cases will be included. The quantitative analysis

reports descriptive statistics characterizing the sample, and statistical analysis of

the data reporting exact statistics used with probability values, and confidence

intervals. The chapter concludes with evidence of trustworthiness. This discussion

addresses implementation of credibility strategies, issues of transferability,

confirmability, and intra coder reliability.

Chapter 4: Results

Introduction

This mixed-methods study was designed to understandthe sociocultural aspects of the epidemiology of hypertension among residents of Ilishan Remo in Ogun State, Nigeria. The quantitative data was used to test the theory that knowledge of hypertension risk factors, attitudes toward hypertension, dietary and physical exercise practices toward hypertension, and socioeconomic status would have a positive influence, that is a lowering effect, on the blood pressure readings. The qualitative data were used to explain the role sociocultural factors play in the decisions people make regarding hypertension.

The following data, separated according to urban or rural residence, were collected for the quantitative portion of the study: blood pressure, height, and weight. . Then, for the qualitative portion of the study, focus groups were convened. With PEN-3 as the theoretical framework, participants were asked KAPabout their knowledge of and attitude toward the risks of hypertension and about diet and exercise in light of these risks .

Setting

Ilishan Remo is about 45 km from both Ibadan and Lagos. It is a semirural town with a marketplace, town hall, a secondary school, and several other public buildings. Local travel is by auto, okada (motorcycle), bicycle, or foot.

Babcock University is the major institution and employer in the area. It has over 8,000 studentsand boasts schools for every major discipline, including

law. Most residents of Ilishan-Remo have never visited Babcock University, and because of tight security, one cannot just walk onto the walled campus.

This research was done during the rainy season, when multiple daily showers are the norm. All interviews and focus group discussions were held in rooms provided by the Babcock University School of Public Health.

Demographics

Participants for the study were overwhelmingly from Ilishan-Remo. Two were from Ibadan, one was from Alba State, and five were from Lagos. The ratio of women to men was 47 to 32, respectively. Ten of the women reported their status as pregnant. Almost half (45.6%) of the participants had completed secondary school Twenty-seven percent reported completing college or university and 5% reported earning a post-graduate degree. The remainder had a primary education (12.7%) or completed high school (6.3%). Participants' duration in school ranged between 3 and 23 years; the highest frequency and percentage of years in school was 12 years (41.8%). Ethnicities reported were Yoruba (58.6%), Igbo 17.7%), Remo (8.9%), Hausa (2.5%), Edo (2.5%), Egba (1.3%), and Isklo (2.5%). Participants for the study were overwhelmingly from Ilishan-Remo. See Table 2 for the complete demographics, categorized by urban and rural dwellers.

Table 2

Frequency Table for Sample Demographics of Urban and Rural Dwellers from WHO STEPS Survey

Variable	Rural *n*= 72(91.1%)	Urban *n*= 7(8.9%)
Age in years		
20-29	20(28.2)	0(0)
30-39	26(36.6)	2(28.6)
40-49	17(23.9)	2(28.6)
50-59	4(5.6)	3(42.9)
60-69	3(4.2)	0(0)
70-79	1(1.4)	0(0)
80-89	1(1.4)	0(0)
Marital Status		
Never married	12(16.7)	2(28.6)
Currently married	51(70.8)	5(71.4)
Separated	2(2.8)	0(0)
Divorced	3(4.2)	0(0)
Widowed	3(4.2)	0(0)
Cohabiting	1(1.4)	0(0)
Occupation		
Government employee	2(2.8)	1(14.3)
Non-government employee	22(30.6)	2(28.6)
Self-employed	38(52.8)	3(42.9)
Student	5(6.9)	1(14.3)
Homemaker	1(1.4)	0(0)
Unemployed	1(1.4)	0(0)
Refused	3(4.2)	0(0)
Level of Education		
Less than primary school	1(14.3)	1(14.3)
Primary school completed	10(13.9)	0(0)
Secondary/High School completed	35(55.5)	1(14.3)
College/University completed	17(23.6)	5(71.4)
Post graduate degree*	4(5.6)	0(0)

*Table continues on next page.

Table 2 *Continued*.

Variable	Rural *n*= 72(91.1%)	Urban *n*= 7(8.9%)
Annual Income		
Q1 0-20,000 ₦	21(29.2)	1(14.3)
Q2 21,000-50,000 ₦	10(13.9)	1(14.3)
Q3 51,000-100,000 ₦	15(20.8)	4(57.1)
Q4 101,000-300,000 ₦	12(16.7)	0(0)
Q5 301,000 ₦ and up	3(4.2)	0(0)
Don't know	6(8.3)	0(0)
Refused	5(6.9)	1(14.3)

₦ The official symbol for Nigeria monetary unit, the Naira. Conversion rate at the time of research was 16,000 ₦ to 100 USD.

Of the 79 participants, 56 were currently married, 14 never married, 2 separated, 3 divorced, 3 widowed, and 1 co-habiting. Forty-one are self-employed, 24 worked as non-government employee, 6 are students, and 3 are employed by the government, and the remainder 1 works at home and another 1 is unemployed. Fifty-two participants earn less than ₦ 100,000 annually. Sixteen participants earned above ₦ 100,000, with three earning above ₦ 300,000. Eleven refused to report this information or did not know.

Participant ages were grouped in ranges. From the 20-29 range, there were 20, in the 30-39 range there were 28, in the 40-49 range 19, in the 50-59 range 7, in the 60-69 range there were three, and 1 in the 70-79 range.

Data Collection

Survey interviews of the 79 participants took place in a lecture hall of one of the buildings of the School of Public Health. It was large and comfortable, with plenty of light from the large windows. Participants completed the surveys at the desk, and then came to the front of the room where I was seated at a table to take the blood pressure, height, and weight measurements. All participants were

interviewed using the WHO STEPS survey (Appendix D). All participants'
height, weight, and average blood pressure were taken. BMI was calculated from
height and weight data.

Blood pressures, height, and weight were all taken in the same room
where surveys were completed. Blood pressure data were taken over a 4-minute
interval. The participants' blood pressure was taken with an adult cuff. Three
participants required an adult extra-large cuff and two a pediatric cuff. Blood
pressure data were taken with the Omron HEM 970 XL blood pressure machine.
For this study, since the participants had already sat through the survey, the
Omron HEM 907 XL was set to take the first measurement immediately, then
take two more at one-minute intervals, and finally display the average. Data were
recorded in the designated area of the participant survey forms, with height and
weight. Height was taken with a ProDoc Digital Stadiometer Standalone Wall
Mount Height Rod, and weight with Pro Doc PD100 digital scale. Height data
were entered into the digital scale to obtain the BMI.

All digital data were uploaded to Google Drive™. These three measures
(blood pressure, height, and weight) were collected throughout the duration of the
time in the field. Taking height and weight measurements required less than two
minutes per participant. Surveys were done prior to the height and weight
measurements. Three focus groups were held. A case study interview was
conducted using the focus group questions on the morning of the 17th because the
man arrived early prior to the others and needed to return to work.

Consent forms were read and explained. Questions were answered before they were signed by the participants and collected prior to the survey started. Surveys were later scanned and saved to a micro SD card. All participants were given a copy of the consent form at the time of signing.

Focus group interviews were recorded with a Philips audio recorder. The last two focus groups were also video recorded with a Zoom QX3 HD recorder. Focus group notes were taken using a digital LiveScribe Smartpen®. All survey forms and recording equipment were kept in a locked cabinet while in the field. Audio and video files were also uploaded to Google Drive™. Upon return from the field, all survey data were locked in a fireproof file in the researcher's office.

Data Analysis

Treatment of data All computerized survey data are anonymous. Participant names have been deleted. Data are confidential, with I only having access to the computer files. All surveys, original consent forms, and backup copies of digital audio and video files are stored in a locked FireKing® file cabinet. Digital audio and video files are also stored in the researcher's account on Google Drive The audio files were shared with the transcriber, as noted in the IRB application. The password to the Google account is not shared. All data are scheduled to be destroyed the last week of July in the year 2018. The data were entered into SPSS 18 for subsequent analysis. Exploratory frequency statistics were run to detect missing and or incorrectly entered values. Focus group transcripts, audio, and video files were loaded into NVivo 10® for subsequent analysis.

Qualitative results. This study combined a quantitative survey with qualitative focus group discussions. The purpose of the focus groups was to determine whether participant comments could provide a more nuanced understanding of the quantitative data.

Setting. Three focus groups were assembled from survey participants. The participants were chosen from those who completed the survey and had some indication of high blood pressure, had a family member with high blood pressure, or were involved in making changes in their lives to prevent high blood pressure, and who agreed to return to participate in the focus group. The focus groups and interviews were held in the room allocated for our use by Babcock University. Although participants had already signed the consent form, participants were reminded of it before the discussion began.

An interview was conducted with a single individual who arrived early and was anxious to return to work. While not planned, this was consistent with Lambert and Loiselle (2008), who advocated conducting in-depth interviews with some individual members of the focus group. Group one was composed of two men (a man and his nephew) and a woman. Ten participants were invited, hoping to have a group of six to nine members. This number was chosen based upon recommendation from Dyas et al. (2009), who maintained that groups of this size improved facilitation by the moderator and participation by the group members. However, only three showed up about an hour after the man whom was interviewed as an individual. Group 2 (10 members) and Group 3 (11 members) were larger because all who were invited returned. Group three had several

members who appeared to know each other and who were involved in lively banter with each other as the group was assembling. This apparent conviviality contributed to a more relaxed atmosphere than was exhibited by the two other groups. Focus group seating was arranged according to that recommended by Wong (2008).

All surveys were completed and anthropometric data collected on the campus of Babcock University rather than in the market, as originally planned, due to security reasons.

Qualitative Data Analysis

Analysis of qualitative data usually takes one of two paths; the inductive approach usually is used in the development of theory or knowledge about the phenomenon being studied is sparse. The deductive approach is preferred when existing knowledge forms the foundation of the research and that research is grounded in a particular theory or to test a theory and development of ideas and themes moves from general to specific (Elo & Kyngäs, 2008, Hsieh & Shannon, 2005). The deductive approach was used in this analysis because the PEN-3 theory formed the theoretical foundation for the research. However, Hsieh and Shannon (2005) argued that the deductive approach introduces an inherent bias in the research. This bias comes about, because the researcher tends to see the data only from the theoretical construct, which can predispose one to blindness toward contextual phenomenon. Nevertheless, Hsieh and Shannon (2005) acknowledged that the deductive approach permits the extension and support of theory. I believe my work extends the PEN-3 model by the manner in which I constrained the

various domains of PEN-3 to be the conduits to direct knowledge toward the conceptual framework.

The focus group questions were based upon the PEN-3 domains of health education, educational diagnosis of health behavior, and cultural appropriateness of health behavior. Questions were asked that addressed the conceptual framework of knowledge, attitude, and practices within the three domains.

Although knowledge, attitude, and practices represent the conceptual framework, these three were also used as variables within the qualitative process for developing a category matrix for KAP. The independent variable, knowledge about hypertension risk factors, prevention, and control were defined as adequate, if one knew about hypertension risk factors, and basic methods for prevention and control (dietary, exercise, and other). The knowledge was defined as inadequate if one had heard of hypertension, but was not clear on exactly what hypertension is or methods for prevention and control of hypertension.

The independent variable practices were defined as adequate if regardless of the level of knowledge about hypertension, one eats five or more servings of fresh fruits and vegetables daily, and exercises intentionally at least three times a week. One's practices were defined as inadequate if regardless of level of knowledge of hypertension and methods of prevention and control, fewer than five servings of fruit and vegetables were eaten per day and intentional physical exercise was omitted four or more days per week.

The independent variable, attitudes toward hypertension, was defined as favorable if the knowledge regardless of how minimal leads to actions, behaviors,

or practices intended to prevent or control hypertension. Attitudes were defined as unfavorable if regardless of level of knowledge of hypertension risk factors, no efforts were made to determine personal status or initiate practices to prevent, monitor, or control blood pressure. Qualitative Data Analysis was conducted in NVivo 10® by QSR International, Burlington, MA.

Research Questions for qualitative analysis. Research questions for this study were centered in the PEN-3 theoretical model and the KAP conceptual model by framing the focus group discussion questions within these two contexts.

RQ1. To what extent and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?

RQ2. To what extent and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?

RQ3. How does knowledge gained about hypertension and its risk factors influence the dietary and physical exercise practices?

The results of coding knowledge and practices as adequate or inadequate and attitudes as favorable or unfavorable can be seen in Table 13. Questions were asked across all three of the PEN-3 domains that addressed KAP. This allowed opportunities to explore the domains from multiple angles and improve the chances of reaching saturation.

Qualitative Results

Those attending the focus groups represented a wide range of SES, education, ethnicities, blood pressures, and BMIs. The SES for the groups was determined by averaging the annual income data from the WHO STEPS survey. Coincidentally, those who returned for the focus groups were groups representing three of the income quintiles. In some aspects, the quality of answers to the questions appeared to mirror SES closely. Higher SES is most likely a result of educational level. Group 3 had the highest average SES (Q3 ₦ 51,000-100,000 or USD 340-660). The range was Q1-Q4. Seventy percent (70%) of its members had completed a bachelor's degree or higher. Group 2 had 57% of members with a college degree and an average SES of Q2 (₦ 21,000 -50,000 or USD 140-300). The range was Q1-Q4. Group 1 had no college graduates and the lowest SES, Q1 (₦20,000 and below or USD 130 and below). There was no range. Annual wage ranges are based upon a conversion of ₦15,000 to $100 used at the time research was completed in Nigeria. See Table 3 and 4 for focus group and interview demographics.

Table 3

Focus Group Demographics

Focus Group		Group 1	2	3	Interview
N		3	11	10	1
Sex	F	1	6	5	1
	M	2	5	5	
Avg Age		28	47	38	27
Avg BMI		25.1	26	23.6	28
BP > 130/90		2	2	1	0
Mean BP Systolic		130	124	111	120
Mean BP Diastolic		69	79	70	81
Avg. SES		Q1	Q2	Q3	Q3
Bachelor Degree or >		1	4	7	1
High School Completion		2	4	2	0
Primary School Completed		0	3	1	0
[a]Marital Status	M	1	8	6	1
	W	0	1	0	0
	N	2	2	4	0

[a]Marital Status: M = married, W = widowed, N = never married. Based upon survey data none were divorced or cohabiting.

Table 4

Focus Group, Selected Lifestyle Variables

Focus group		1	2	3	Interview
Tobacco Use	Ever	0	3	0	0
	No	3	8	10	1
Alcohol	Yes	3	6	3	0
	No	0	5	7	1
Fruit/Veg ≥ 3 days / week	Yes	3	6	9	1
	No	0	5	1	0
Recreational Physical Activity	Yes	3	4	6	1
	No	0	7	4	0
Ride Bike /Walk to Work	Yes	2	7	8	1
	No	1	4	2	0
Vigorous Work Activity	Yes	1	2	2	0
	No	1	2	2	0
Moderate Work Activity	Yes	2	5	6	0
	No	1	6	4	1

On the two major lifestyle indicators for this study, blood pressure and BMI, Focus Group 3 had the lowest overall average measurements for blood pressure and BMI (111/70 mm Hg and 23.6, respectively) and Group 1 the highest average blood pressure reading at 130/69 mm Hg and the highest average BMI of 26. Seventy one percent of all focus group participants reported being currently married. Of the remaining, there was one widow and eight who had never married.

On the major lifestyle variables, only 27% of Group 2 were currently smoking or had ever smoked. No members or Groups 1 and 3 had ever smoked. Alcohol use by groups was 100% for Group 1, among Group 2 (55%), and 30% of Group 3. The eating of fruits and vegetables for at least 3 days per week ranked highest among Groups 1 and 3 at 100% and 90%, respectively. Group 2 mirrored their alcohol usage with 55% eating fruits and vegetables at least 3 days per week. There was the least amount of recreational physical activity among members of Group 2 (36%) and the greatest among Group 1 (100%). Riding a bike or walking to work greater than 10 minutes was over 65% in all groups. Twenty-one percent of all focus group members did vigorous work, and 55% of all focus group members did work requiring moderate activity for at least 10 minutes at a time. Focus group demographics are compared in the tables 3 and 4.

Findings and Discussion

All focus group discussions focused on the origins of health behavior, the development of health behavior, and culturally appropriate health behavior. In the

analysis of the focus group transcripts, themes were developed using the PEN-3

framework to push the conclusions toward the conceptual framework of KAP.

Figure 5. Focus group (screenshot from video).

In the origins of health behavior domain, the manner in which participants

gained information about health behavior was explored. The questions for this

section focused on how knowledge was gained at the personal level. What role

did the family and extended family play in the process? How did community

structures and institutions contribute to the knowledge of health behavior is the

final area for this section. All participants were guaranteed that their identity

would not be revealed in the use of all data collected. This extended to the focus

group discussions. Therefore, the names of participants are not revealed. All

quotations are verbatim with no corrections.

Knowledge of health behavior. For the participants, the generally

accepted colloquial term for hypertension was "BP." A common theme that

emerged was "thinking" and or "stress" as the cause of high blood pressure. A

typical response to the question of "What causes hypertension?" was "If

somebody is thinking whether he on a diet or he loves thinking, through thinking

he can get hypertension."

Although the terms stress and thinking were used, it is felt that anxiety is

probably a more accurate term for "thinking" and "stress." Anxiety might not be

an altogether separate idea. Confirmation for this concept may be found in this

response: "When you think too much, worry too much, anxiety. Not exercising

enough. Your emotions" (FG1, P2).

One participant used the term stress instead of "thinking." "You know,

stress. Stress causes high blood pressure. Hypertension. If you overstress yourself

it can cause hypertension" (FG2, P2). Using checking questions it was determined

"thinking" was a colloquial term for stress. Others provided answers that pointed

to diet and lack of exercise as causes for the development of hypertension. "To

my own perspective, smoke, alcohol can also cause hypertension" (FG3_P8).

> A major cause of hypertension is too much cholesterol in the system. So,
>
> you get that from taking too much egg. And when there is too much
>
> cholesterol, it's kind of builds fat, reduce the blood vein, therefore the
>
> heart to pump. (FG3, P4).
>
> I know, as it has been mentioned that stress will be one of those things that
>
> would be a factor. I also know that lack of exercise will be a factor, and
>
> then not eating appropriate meals, a balanced diet, which somebody has
>
> mentioned. Eating too much fat and oily food, we should avoid things like
>
> fast food. That would help our blood vessels. We must exercise regularly

and have good hours of sleep and again avoid any stressful events.

(FG3_P5).

One participant introduced a new risk for hypertension; "Carrying things that are too heavy." (FG1_P1).

A few brief quotes on the long-term outcomes for hypertension. "I think maybe people like that die." (FG1_P1). Sudden death, it makes you very weak from the inside, headache it can cause your body to start shaking." (FG1_P3). "The result is death." (FG3_P5). "I think it causes stroke, from stroke somebody is getting it. It affects your brain." (FG3_P4). "The person can have a stroke." (FG1_P2). "When you have hypertension you will have loss of memory." (FG3_P7).

> We know that hypertension is a slow killer and that's the main reason why we should be very careful because it can lead to a stroke as has been mentioned. It can lead to cardiac problems and also the person, before they even get to death, may become paralyzed and the very massive stroke that can kill the person. So it does move from one stage to the other.
>
> (FG3_P5).

From those chosen to participate in the focus group, there was good basic knowledge of what caused hypertension. The long-term outcomes for untreated hypertension appeared not to be well understood by some. However, for whatever reason, there appeared to be an overriding view of thinking, stress, and anxiety as possibly the cause for hypertension.

Person. Participant answers ranged over a wide area in discussing how they learned about hypertension. Some suggested ways that were felt to be effective in learning about hypertension. Various suggestions were given, such as speaking with a consultant, reading medical books, finding resources on the internet, and listening to health talks. The following participant spoke of his personal efforts to learn and also the work a sales company he is affiliated wityh:

> From books I read, from articles, on the internet and presently I am selling
> Forever Living Products. So in a group of seminars we are giving lectures
> on what cause hypertension and some helps. I learned about them before,
> but when I start Forever Living, some seminars were organized for us to
> learn more about things that causes illness. (FG1_P2)

Reading books and magazines and internet searches were the primary ways in which participants gained information about hypertension at the personal level.

Extended family. The participants gained their information about hypertension from families. From the answers, none seemed to have gained information on their own. This section will use little snippets from the participant replies to provide a general overall view of the apparent role family played in health education. Personal tragedies provide the genesis of the education of some participants about health education particularly regarding hypertension. From the death of an aunt, a husband, and a mother from hypertension, relatives took inspiration and taught the children. Adult children having learned of the risks for hypertension, returned to instruct their parents. Through family suppor, a

mother's insistence on temperate living, and extended family looking out for each other the knowledge of hypertension risks and methods of prevention was spread. There was also those who found no support from family.

Neighborhood. Schools, churches, and governmental agencies were central to many participants' acquisition of knowledge about hypertension, risks, and outcomes. Of these three, schools and churches far outweighed the influence of governmental agencies. Then there is the young man in Focus Group 1 who, as a salesman of health related products, has obtained most of his health education training from the company.

Although the government is not mentioned often, its role in health education can be seen in various comments. While it is not an indication of helping to educate the populace, one participant noted, "I watch on television the government. At times we watch the governor go to the hospitals to see sick people" It was mentioned earlier in this study how the emphasis on infectious disease by many SSA governments has sapped funds needed for education and treatment of chronic diseases. Echoing the reference, a participant voiced this concern:

> I have observed that the government, certainly they have been helping a
> lot about the HIV AIDS, but it seemed that that is the main topic right
> now, and polio. I have not heard them talk about high blood pressure and
> diabetes, and these are very important issues that they need to discuss
> more so that the community can have full knowledge about what these

diseases are. So I wish they would do that. That might help the community more. (FG3_P5).

In the following comments, the efforts of various government agencies to educate its citizens via the media of health issues is described:

From the political aspects, they as our leaders, they have to authorize the media, the radio broadcast. We have the regulators and others in charge of the authority. They say this is what should be here. So, initially since much of this radio they do give us education and they give us health issues and such. (FG3_P4).

Our government helps about hypertension. They tell the old woman old papa to go to the hospital and get the medicine for hypertension. (FG3_P8).

The government tell us to keep healthy through jingles on the TV the radio. We have health programs, just like the States, and all that on TV; both national TV programs that are dedicated towards health-related issues. They make it better by making those programs in indigenous languages so that those who are not so formally literate can still understand and get along with it. They get health experts like doctors, professors to discuss this in the indigenous languages, so when they do that, the people the layman can follow along and get what they need. So the jingles on TV do that and here we have a radio station on campus they do that in 3 languages—the basic 3 languages here in Nigeria, they do that

too, so both on campus, national TV, national radio it's everywhere. (S. B.

Interview 2013).

While it is apparent that some feel the government is doing its part to educate the

citizenry on chronic disease, there remains the question of how the increasing

incidence of chronic disease will demand that resources allocated for infectious

disease be redirected to educate the population and provide some form of greater

access to treatment for those affected with chronic disease.

One participant saw things from this perspective, "Government can help.

Hospital can help. School cannot help. Church can pray for us" (FG2_P6). There

are apparently churches that do more than pray. It was mentioned "My church

[Redeemed Church] sometimes do a talk, talk about health" (FG1_P2). Others

described the role of their church in health education:

Sometimes they used to come and give lectures. From the community. The

environment, keep your surrounding clean, wash the things we eat. They

used to talk about this most times in the church they talk about it so much.

So those things help me and my family to be very, very careful. (FG3_P8).

My church too, they tell us about health, because in Sabbath School period

they do health talk and they normally tell us about our body, what you are

going to eat, you should wash your ourselves we should eat good food so

that we won't create any disease for our body. We should drink like 8 cups

of water a day… (FG3_P6).

From two unabashed members:

> We want to thank God for the SDA church. We have what you call the
> health and temperance leader of the church. The work of health and
> temperance leader is to bring awareness to the entire church. And I want to
> believe that most of the times you look at the various diseases we have
> like the hypertension we are talking about. They talk much about it give
> awareness to the congregation, and also try to bring resource people to
> give lectures, to give awareness to the entire membership, and that is
> seriously helping the church to know more about the disease. (FG3_P1).

In this participant's experience emphasis placed by the church on health figured
prominently in the development of member knowledge of health issues and
disease in general.

> For the church, like my brother has said, I thank God for the SDA church,
> in fact all the teachings from childhood would help one to live a healthy
> life because the church, according to what is in the Bible will tell you
> "don't smoke," don't drink alcohol, don't eat this and don't eat that. The
> reason is that God wants you to live long and to serve Him, because if you
> are not healthy, you cannot serve God the way you're supposed to be, you
> will not be useful to yourself and to people around you. So that being in
> mind, always makes me to be conscious of my health. (FG3_P7).

The ability to render acceptable service to God by maintaining good health
is a theme developed by this participant. He as the preceding participant notes the

role of the chuch in developing an appreciation for a healthy lifestyle among its members.

When school was mentioned in the context of focus groups 2 and 3, some participants meant Babcock University. Babcock University is the largest employer in the area and appears to have had a tremendous effect upon the community and its employees. On what are called Health Sabbaths, the program is provided by Babcock University:

The Health Department always organized from time to time health Sabbath's. That day would be dedicated for health issues. Doctors, medical doctors from Babcock and outside Babcock would be there to give lectures on many issues so that people will be aware and conscious. Especially diabetes, hypertension, all these killer diseases. Health talks are presented on them. So, I thank God for the SDA church and the Babcock University. (FG3_P7).

Babcock as a community provides sports facilities that you go to play volleyball basketball, football, whatever. So they provide that. That's the community. (S. B. Interview).

The acquisition of cardiovascular health related knowledge on the personal level involves searches of books, the internet, and attending training seminars. Family, in particular the mother, has been demonstrated to be the primary source of training for cardiovascular health. Some learned from personal tragedies in the illness and death of family members. Government agencies,

school, and churches use various resources to get the message out regarding cardiovascular health.

Attitudes toward health behavior. Attitudes toward health behavior are formed within the context of acquired knowledge. The importance placed upon the knowledge by the person transmitting said knowledge will determine the type of attitude formed about the topic under consideration. Out of this context, perceptions about health attitudes are formed. Those perceptions are enabled and nurtured by well-meaning individuals from one's social circle. Regan and Fazio (1977) postulated in their work on attitude formation and behavior that experiences produce attitudes that tend to be held in a more self-assured, and positive manner than attitudes that are formed through indirect or vicarious means. For these participants, attitudes that were formed out of their personal experiences as children or adults become their guide for choices of behavior toward health. The next section will first explore the perceptions relative to hypertension, its risks, and outcomes, and prevention held by group members. Afterward, the enabling factors that encourage holding onto certain attitudes and the events or persons that nurture those attitudes will be reviewed.

Perceptions. The perceptions participants hold of hypertension, its risks, outcomes, and preventive measures explain the practices they made with chronic disease prevention. "It [hypertension] is not a good thing in our body, because I think you should take care of your body" (FG3_P1). "I don't have time. It's because of my work" (FG3_P2).

The following is from a participant who has given thought to why people do not listen to or heed health related information that can preserve their health. He also provided insight on some of the struggle that goes with trying to live in a healthy manner.

See, sometimes when you're talking about these chronic diseases, not everybody believes. If you are telling somebody to be careful, that person may see you as not someone very serious. For example, when you are talking what you eat, the fat food that you eat. Once you try by all means to avoid meat and other things, some people will laugh at you and say you are just joking. So his own perspective—he sees I know something very, very serious, and so sometimes some people don't take it as serious. They take it as a joke until they are contracted with that disease they will say "oh, I remember that sometimes somebody told me about this thing. So in my own perspective, I take this serious. But someone may not take it serious as the way I am looking at it. And that is why the diseases still on. (FG3_P1).

In rural communities, people are closer to traditional cultural beliefs about the origin of illness. These particular beliefs probably tend to promote an attitude of helplessness, as it is near impossible to fight the will of the spirits.

When you talk about high blood pressure they might not take it seriously until. Because they believe in my own place [village] they don't believe it is what you have eaten or your life style that will cause you to have the disease. They will believe that it is one spirit that is in them, they call it

INEBU. And they will always believe that way, that it's a spirit that is

against you. It's spirits, evil spirits. (FG3_P2).

"Evil spirits have touched the person or something like that." (FG3_P7*).*

One idea that surfaced frequently is that hypertension is caused by

"thinking" or worry or anxiety.

One participant shared that hypertension occurs, "When you think too

much, worry too much, anxiety... When someone thinks too much, carrying things

that are heavy" (FG1_P1 & P2)*.* "When a person is thinking a lot of something—

a lot of something on their mind, so they can get hypertension" (FG1_P3)*.* "When

someone is thinking on something that will make money and other things, that

will cause high BP or pressure" (FG1_P2). "When a person has hypertension, he

is thinking about money, or thinking about his children, thinking about husband or

wife, or he has something this thing happen and it does happen you know"

(FG2_P4)*.* "You have hypertension. You are thinking about your children. It

makes you to have hypertension" (FG2_P9)*.*

Enablers. Typically, enabler in common usage refers to someone or

something that assists a person in engaging in destructive behavior. However,

other definitions for enable include making capable of accomplishment, possible,

providing knowledge, or power to achieve an act. Within this research, the term is

used in the sense defined by Airhihenbuwa (1995).

Enablers are cultural, societal, systematic, or structural influences or

forces that may enhance or be barriers to change, such as the availability

of resources, accessibility, referrals, employers, government officials, skills, and types of services.

The quotes from the focus groups will represent both definitions; enhancing change or a barrier to change. The change is taking appropriate measures to improve or maintain a healthy state of being. One participant stated: "Talk to everybody. Do not have hypertension" (FG2_P4). Another shared the following:

> We thank God for all work Babcock has done for us about the hypertension. So last month, last week, so they came to the town and told us we should come for treatment for it. So they treat us, and they explain to the old men old women that they should not think. Thinking of too much can cause hypertension. So they should be coming now for checking up on this. They told us in the town that all those who are old, they should stop drinking smoking, so that is the advice they give us. And the elders and small, small boys. They should stop smoking and drinking alcohol. (FG2_ P6).

After this bit of information, I inquired, "Can women also get hypertension?" The participant continued and several other joined in "Not only men, everybody—even the women" (FG2_ P6).

> Babcock as a community provides sports facilities that you go to play volleyball basketball, football, whatever. There is lots of others even the notice boards of departments and all that we have most of these things

displayed, telling you to watch your weight, check your BP, do this do that. So, basically that's it. (S. B. Interview).

Other participants shared, "...then we are here in school, here at Babcock, we are given health principles" (FG3_P4). "We have many health agencies here. They do enlighten the public on how to live a healthy life. So, you go to them if you have any issues, maybe something bothering you. You go there and they will enlighten you. I think that's how they go about it" (FG3_P9). Another participant noted:

People see you around go like "Hey guy! You look good today!" And things like that—or they are getting to you like "Hey what you waiting on?" So society, at least in community here at Babcock, it's like a family, Babcock family. Everybody around here knows you. So if you're going wrong, they're like Hey, watch this, watch this and you come back on track. So the family and society both encourage. (S.B. Interview).

Other participants shared that, "I take my work to go on and go up. If I have money, I will go to hospital and take care of my health" (FG2_P4). "But when I have money I take it to help myself and my children" (FG2_P5). "I don't get money" (FG2_P2).

Enabling by giving helpful advice to others to improve their health and getting the same message from various agencies, churches, and Babcock University is a primary means to combat hypertension. Access to adequate resources cannot be overlooked as a determinant of who can be treated for hypertension and who cannot.

Nurturers. These according to Airhihenbuwa (1995), are the extended family, kin, friends, peers who influence "health beliefs, attitudes, and actions." Based upon the advice or recommendation of nurturers, people will pursue some type of targeted health behavior. Participants shared, "My son was making me learn about hypertension by coming and talking to me that I should do nothing. Tell me to be happy so I don't have bad thoughts" (FG2_P9). "I need help from my neighbor. I want them to sponsor me at the hospital" (FG2_P6). Other participants shared,

> My mom especially was always conversed against nocturnal feeding, always conversed against overweight all of that so, she says don't eat too much, don't do this. Dad says you got to exercise, such like that. So my family is very supportive basically. They helped a lot. Over the years they themselves don't drink or smoke or anything so they lead by example basically. So they tell me to do things and they do them themselves. (*Interview 2013*)

A husband strongly encouraged his wife who was proud of her ability to work hard and earn money to get rid of stress and take care of herself so she would not get hypertension:

> My husband always tell me that he will report me that I am too much stress myself because my own nature is that if I start work for money – until I see no more light I can't stop working. I can do two days' work in a day. My husband normally tells me that the work you are doing is too much. You should not fall sick or you can know hypertension can come at

any time. Many disease can enter because of that. I should not stress myself. I should be doing small, small work; I should not over stress myself. (FG3_P8).

The role of family as nurturers should never be underestimated. It is from the family that children and as they mature develop their association with the role of health and lifestyle. Often the role of the spouse is vitally important in bringing one back to or even teaching one of health principles.

As I said earlier, all the time our family plays a vital major part; because they are with you to do everything possible to make you healthy. So, they do that like they said their wives do remind them 'don't stress yourself, and make sure you watch what you eat. (FG3_P4).

Personal experience became the impetus for providing advice that will improve their health to others.

When some people went to the hospital about their blood pressures, in their surroundings, if they know that their neighbors have it, they go to them and give them advice that they should stop smoking and stop drinking. And when they ask the person what's happen in my body drinking and smoking –then explain to them that they went to the hospital when they started drinking or smoking it cause hypertension caused high blood pressures for them. From there we continue with the person. You let her know what is causing everything. You let her know what is causing the blood pressures. (FG2_P4).

The following extended comment probably best sums up the role of family in encouraging an appropriate lifestyle and the effect upon society at large.

> Family plays a huge role. Family, one gives you support, gives you comfort when you don't have anybody around so getting information, even if you have all that it takes and your family doesn't support you, somehow you are isolated or you tend to lose everything because they don't give you what you need to get. So your family gives you that edge that you can still forge ahead. Take for instance: You want to stop all the narcotics and one's father is a drug baron and maybe the mother does some things that are not right. Somehow you lose that drive to do what you want to do. It also passes through the community—can transfer to the community, seeing that if the community is evil or bad or stuff like that, you don't have that drive. That drive kind of dies down, somehow. So the community, the family has a huge role to play. It has to play on your psychic, your mentality; cause everything you do depends on the mental ability. If that is faulty, subconsciously the body follows. So if the family is good, it reflects on the large society. If the larger society is fairly good, you are not bad yourself. (S. B. Interview).

SES plays a huge role in health outcomes and has been widely researched. It was felt by a participant in the interview that his SES made a tremendous difference between him and those who were of a lower SES. The truth of his statement is seen in the difference SES and educational attainment make in hypertension.

My family is elite. So we are lucky. We are not the informally literate

type, so we know a lot about all this here. My mom's a nurse, so that helps

us a lot in all this health-related issues. Concerning those I speak with,

they also are elite. But when you get to the town, most of them are not

really elite because they have the formal education at limit of maybe the

elementary level, some struggle and get to the secondary level so that's it.

And you really don't get most of this at that level of education. So maybe

that's why you see there's a gap between them and us. (S. B. Interview).

Practices of Health Behavior

That lifestyle is a precursor or barrier to disease is well known. Despite

this, there remains a wide gap between personal practices related to preserving

and maintaining health and personal knowledge. Positive behaviors are those

rooted in personal beliefs and knowledge that are known to be beneficial to

health. Existential behaviors are those based within the culture and are not

necessarily negative or positive in its application. Negative behaviors are those

practices that portend debilitating outcomes and disease for its adherents

(Airhihenbuwa, 1995).

Positive behaviors. No disagreement showed on the benefits of engaging

in positive behavioral practices that promote cardiovascular health. Participants

were mostly aware that positive practices were based in eating and exercise. They

also emphasized the necessity of eliminating stress from their lives. Participants

shared the following: "Don't stress yourself, and make sure you watch what you

eat. But from my own side, we have a balanced menu a new menu so they have already arranged it" (FG3_P4).

> Cleanliness. The kind of fried foods we eat, gradually phased out. We really don't eat fried food for like 25 or 20 years. We don't eat red meat. If at all we take in animal it is mostly fish or poultry but not red meat. We don't use much of the air conditioner an all that so that you have fresh air all around. (S. B. Interview).

Still other participants shared, "They should stop smoking and drinking alcohol" (FG2_P6). "I should not stress myself. I should be doing small work. I should not overstress myself" (FG3_P8). "I stopped smoking, I stopped drinking. I sleep well. I don't have any problem with hypertension" (FG2_P4). "I have to exercise my body, eat well, and then take medications whenever my body complains of any illness" (FG3_P2). Another participant shared,

> I believe health is wealth and I must maintain that health by not defiling my body, by not taking those things that I know are harmful, like drugs or alcohol, make sure I eat regularly, balanced diet and make sure I have physical examination every year. And that will help to discover any abnormalities that may come up, and then from the medical doctor of whatever it is, maybe if it is something that requires treatment, then I will receive it. And keep on doing the positive things in life. I know, as it has been mentioned that stress will be one of those things that would be a factor. I also know that lack of exercise will be a factor, and then not eating appropriate meals, a balanced diet, which somebody has mentioned.

Eating too much fat and oily food, we should avoid things like fast food

that would help our blood vessels. We must exercise regularly and have

good hours of sleep and again avoid any stressful events. (FG3_P4).

To echo the preceding sentiments, other participants shared eating a diect

rich in fruits and vegetables, good food, bicycling, checking your weigh, and

jogging as positive habits to form. More participant perspectives included:

I think the positive things we should do about hypertension is the way we

respond to things when things happen to us, the kind of food we take in.

The kind of activities we engage in ourselves and the kind of thinking we

have about it--our mindset about it. (FG1_P2).

NEWSTART, I try to follow that as much as possible…nutrition aspect,

the exercise aspect, the sleep aspect, the temperance aspect, fresh air like I

mentioned, rest and trust in God basically, the NEWSTART helps. (S. B.

Interview).

One cannot do things to improve their own health and ignore those

around. The community must also be a part of personal reckoning, as efforts are

made to increase knowledge to improve personal life outcomes.

I think we can take a bold step by going out, although but not always but

on a trial basis we go out and tell people around us, ok. If we find out what

they are doing is because some guys do sniff and they take holts. So you

go out and tell them these things have a negative impact on you. So I think

that is a positive attitude. So if each one of us can just take about a day or

so and go out an enlighten people so I think that's a positive thing.

(FG3_P10).

Existential behaviors. The concept of existential behaviors within the

cultural context posed an interesting dilemma for the participants in all focus

groups. Responses tended to differentiate between negative and positive. Neither

group was prepared to grapple with this concept. It presented behaviors in a new

context probably never considered before. In focus group 3, a participant sat

quietly mulling the question along with the others. He responded with:

To me sir, there is nothing that you would do that doesn't have any effect.

Whatever you do, it may have a positive and a negative effect. It's either

for it to be on the positive side or it will be on the negative side. So I don't

see anything that you will do that does not have an effect. (FG3_P1).

This insightful statement illustrates an important principle of life; there are

no inconsequential actions. Over time, all actions we make will tell either on the

positive or negative side.

Negative behaviors. Possibly when one thinks of negative behaviors,

there is a tendency to shrink back from self-incrimination. Consequently, there

were few who ventured to provide information in this regard. Their responses are

ideas that were voiced at various times throughout the discussion. The actions

mentioned may be considered negative or detrimental behaviors. "I am a smoker.

I am drinking" (FG2_P4). Another participant remarked:

You know when somebody has hypertension, we tell them that they have

hypertension and then we give them some medicine to use and tell them

that not to eat food that you are eating. Yes! That starch is too much.

(FG2_ P9).

An echo of the starch concept can be seen in the following statements "Negative would be taking too much of carbohydrates" (FG1_P1). "I smoke cigar. I drink palm wine. Now I have hypertension" (FG2_P10).

There was only one mention of salt (sodium) and obesity as contributors to hypertension during the three focus group discussions.

In hypertension my auntie died with it. She used to tell me that you have to reduce your salt. That salt also causes hypertension. And once you have hypertension, the doctor will tell you that you stop eating salt for a while … And she also tell me that when you are adding weight, that's too much fat. It's not good on your body. You have to check your weight from time to time. Once you have too much weight, you also lead to hypertension. When you are doing exercise, you will be able to control your weight which will help you to reduce your weight. And also it will help you to do other things. It will help you to be balanced. (FG3_P8).

As group 3 was the last of the focus groups at the end of the discussion, I went back to FG3_P8's comment. I mentioned that her comment was the only one out of the three focus groups where anyone had mentioned salt. Why? Participant 1 gave the following answer, to which the group all nodded their heads in apparent agreement. They all gave tacit approval to his comment.

You see, Sir, actually sometimes when you go to the hospital and they examine your blood pressure, the doctor will be telling you please you can

try to avoid taking too much salt. Here in Nigeria if you don't put salt in

food, the food will be yucky. So you want, to put in enough so that you

enjoy it, but not that it has an effect. So when you go to clinics or you see

your physician, he would advise you to be careful to reduce excess taking

of salt. (FG3_P1).

In the cultural appropriateness of health behavior domain, positive

behaviors were easily delineated. Eating many fruit and vegetables, exercising,

and avoiding stress were all given as positive behaviors. None seemed to think of

any culturally based existential behaviors. Some acknowledged their smoking and

drinking as negative behaviors. Using too much salt was also mentioned as a

negative behavior.

Summary of Results for each Research Questions of Qualitative Analysis

Transcripts of responses from the focus groups were reviewed to code

comments of focus group participants by the conceptual domains of KAP. A

representative response was chosen to align with knowledge of hypertension and

its outcomes that was adequate. Responses that were considered adequate

demonstrated some type of commitment to maintaining a lifestyle designed to

mitigate risks for hypertension. The majority of responses for knowledge fell into

this category. Knowledge was considered inadequate if responses indicated no

apparent desire or need to assume responsibility for personal health and efforts to

eliminate risks for hypertension.

Practices were considered adequate if they were engaged to reduce risk for

and control hypertension such as dietary practices or exercise habits. Practices

were considered inadequate if no appreciable efforts were made for preventing, reducing, and or controlling hypertension. The majority of responses of practices were considered adequate.

Personal attitudes were considered favorable or unfavorable. The majority of responses were favorable, although some indicated that there were still struggles in adopting or maintaining an attitude that would lead to the development of practices that were designed to prevent, reduce risks for, or control hypertension. Tables 5 and 6 summarized participant responses in relation to the conceptual domain and favorability and adequacy.

Table 5

Knowledge and Practices Representative Comments

Question	Conceptual Domain	Adequate	Inadequate
RQ1 To what extent and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?	Knowledge	"By taking good care of yourself. You need to observe what will not harm your body. You need to be careful with what you eat, what you do and how you take care of your body." (FG3_P1)	"It is not my duty!" [a] (FG2_P6) "I don't have time."[b] (FG3_P2)
RQ3 How does knowledge gained about hypertension and its risk factors influence the dietary and physical exercise practices	Practices	"From my own perspective, I think for you to maintain good health you need to mind what you think, mind what you eat. Then, once you notice any change in your body, you go to clinic or you go for checkup. You don't do self-medication, you go to doctor for prescription. That is my own perspective." (FG3_P11).	"I smoke cigar. I drink palm wine. Now I have hypertension." (FG2_P10)

[a] When the question of gaining knowledge was discussed, two participants engaged in a short heated exchange when one suggested to the other, each person has a personal duty to learn about health. The other retorted as above "It is not my duty!" This comment is considered inadequate since it can be representative of those who take no interest in gaining health related knowledge.
[b] The response of this participant commenting on a member who spoke of the necessity to take time to exercise.

Table 6

Attitudes Representative Comments. In this table, an attitude of I am responsible for my health is contrasted with the helpless attitude presented by those who feel their health is at the whim of the spirits.

Question	Conceptual Domain	Favorable	Unfavorable
RQ2 To what extent and in what ways does personal knowledge form the basis of personal attitudes toward risk factors and methods for coping with hypertension?	Attitudes	"It's my responsibility. My health is mine, so if I am healthy, I help myself first and my community. So it's primarily mine then later the communities…so it's my personal concern." (S. B. Interview).	When you talk about high BP they might not take it seriously until because they believe in my own place [village] they don't believe it is what you have eaten or your life style that will cause you to have the disease. They will believe that it is one spirit that is in them, they call it INEBU. And they will always believe that way, that it's a spirit that is against you. It's spirits, evil spirits."(FG2_P2*).* "Evil spirits have touched the person or something like that." (FG2_P7*).*

Figure 7.
Figure 7 is a schematic summary of participant comments from the focus group discussions. The PEN-3 categories are to the extreme left, participant comments in the middle arranged according to PEN-3 , the conceptual frame.

PEN-3 Sociocultural Pathways of Hypertension (BP)

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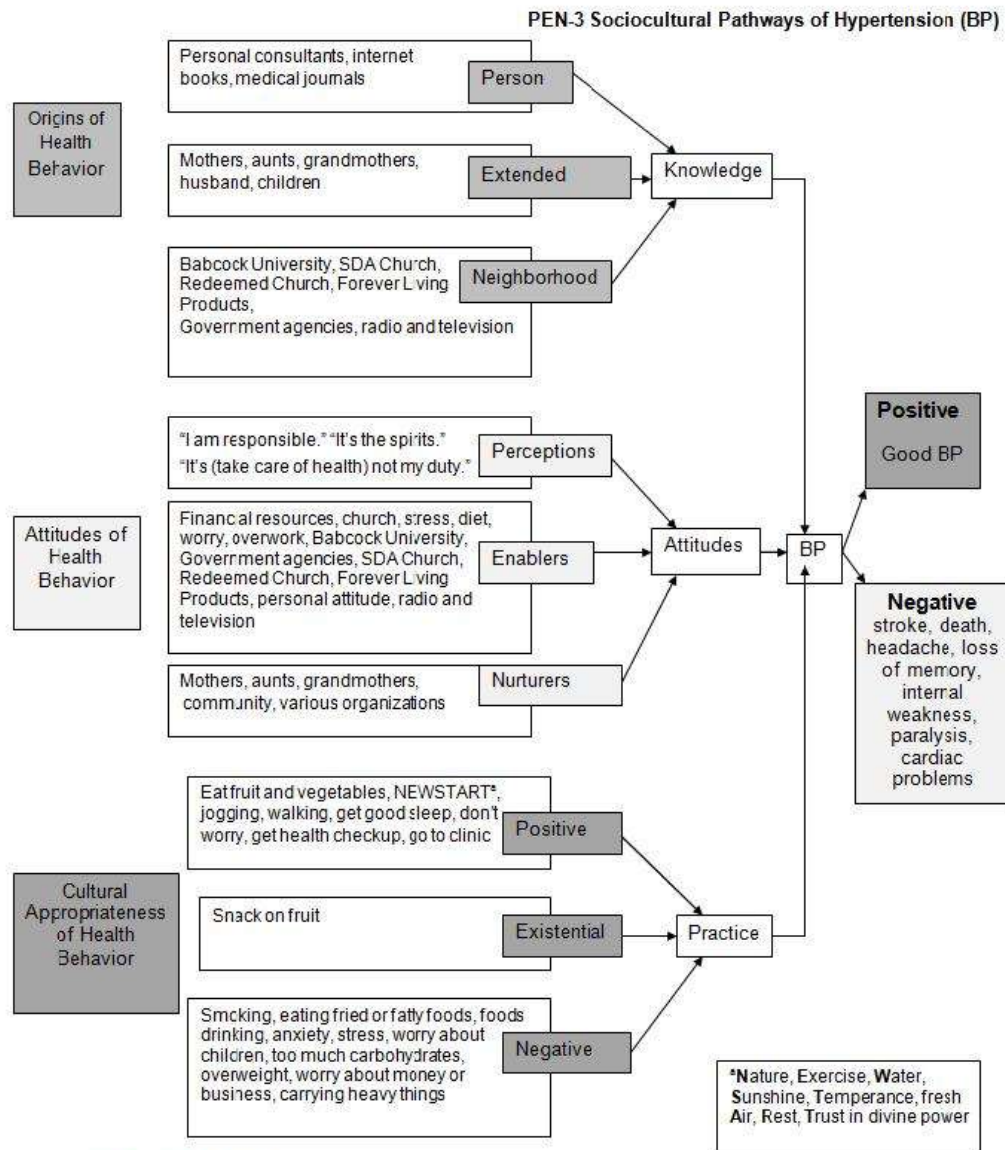
Quantitative Components

$H_a1:$ There is a significant difference between urban dwellers and rural dwellers in terms of hypertension knowledge and hypertension risk reduction dietary and physical exercise practices as measured by the STEPS survey.

$H_01:$ There is no significant difference between urban dwellers and rural dwellers in terms of hypertension knowledge and hypertension risk reduction dietary and physical exercise practices as measured by the survey.

$H_a2:$ There is a significant difference between urban dwellers and rural dwellers in blood pressure and anthropometric indicators.

$H_02:$ There is no significant difference between urban dwellers and rural dwellers in blood pressure and anthropometric indicators.

In the following paragraphs, the data from of the main variables of interest for the study will be discussed. The test of knowledge of hypertension was measured by the survey questions "Have you ever had your blood pressure measured by a physician of other health worker (BP measure)", and "have you ever been told by a doctor or other health worker that you have raised blood pressure (BP elevated)?" The majority of participants for both groups of participants of rural (70.8%) and urban dwellers (85.7%) had their blood pressure measured at some point. Only 25% for rural dwellers and 14.3% or urban dwellers had elevated blood pressure. However, just 20.8% for rural dwellers and 14.3% or urban dwellers were informed of their hypertensive status within the preceding twelve months.

Table 7

Descriptive Test Results for Knowledge of Hypertension

| | Rural | | Urban | | Pearson Chi-Square, 2-sided |
| | Yes | No | Yes | No | |
	n (%)	*n* (%)	*n* (%)	*n* (%)	
BP measured	51 (70.8)	21 (29.2)	6 (85.7)	1 (14.3)	0.40
BP elevated	18 (25.0)	54 (75.0)	1 (14.3)	6 (85.7)	0.53
Told in last 12 months	15 (20.8)	57 (79.2)	1 (14.3)	6 (85.7)	0.68

BMI. A view of BMI as continuous data provides the statistics seen in

Table 8. The mean BMI of the participants was 25.35, with a range of 14.1 and

42.2 among the participants. The test of normality was also conducted. First, the

skewness, and kurtosis statistics was investigated and was summarized in Table 8.

To determine whether the data follows normal distribution, skewness statistics

greater than three indicate strong non-normality while kurtosis statistic between

10 and 20 also indicate non-normality (Kline, 2005). Looking at Table 8, the

skewness statistic was 0.50, while the kurtosis value was 0.00, which fell within

the criteria enumerated by Kline (2005) indicating that the dataset for BMI was

normally distributed. Second, the histogram was presented in Figure 7. This

showed that spread of the study variable of BMI exhibited the bell-shaped curve

pattern of a normal distribution, which indicated that the dataset did not violate

the required assumption of normality. It was also observed that the values for data

for BMI were high relative to the minimum value.

Table 8

Statistical Chart of BMI as Continuous Variable

BMI	Statistic
Mean	25.35
Median	25.60
Modes	19.8, 25.6, 33.4
Range	28.1
Minimum	14.1
Maximum	42.2
Skewness (Std. Error)	.50 (.271)
Kurtosis (Std. Error)	-0.00 (.535)

Note. For all BMI data Pearson' R = 0.79 and p =0.49. p < 0 .05 is significant.
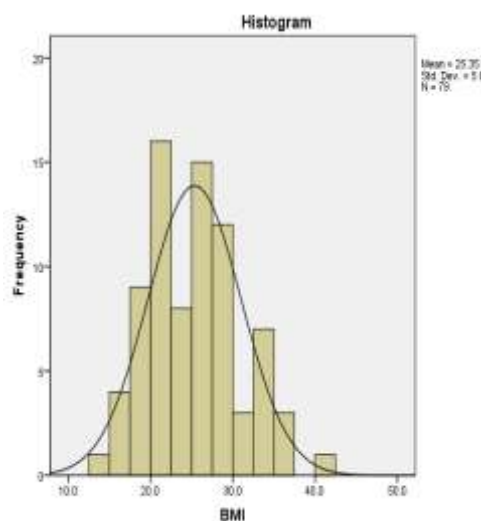
Figure 6. Histogram of BMI as continuous variable.

There was no statistical significance found in the differences between urban and rural dwellers (Residents of Ilishan-Remo coded as rural and Lagos and Ibadan residents coded for urban) in BMI based on a chi-square test of difference. The BMI ranges and designations of underweight, normal, overweight, and obese

are taken from the CDC website (2011). Using the CDC categories, the data in

Table 9 were obtained.

Table 9

Cross Tabulation Test with Correlations for Body Mass Index for H_a2

	Underweight < 18.5	Normal 18.6 -24.9	Overweight 25.0 -29.9	Obese I 30.0 – 34.9	Obese II > 35.0	n
Urban	0(0%)	4(57.1%)	1(14.3%)	1(14.3%)	1(14.3%)	7(100%)
Rural	9(12.5%)	25(34.7%)	26(36.1%)	9(12.5%)	3(4.2%)	72(100%)
Total	9	29	27	10	4	79

Note. $p = 0.67$ when groups are combined; $p < 0.05$ is considered significant.

When the data are compared, it can be seen the urban and rural residents

alike have demonstrated evidence of being overweight. Over 34.7% of rural

residents are overweight, with 12.5% falling into the obese category. Over 14.3%

of urban residents are overweight, 14.3% for obese I, and another 14.3% for obese

II. A Pearson X^2 using the main outcome variable of systolic pressure correlated

with BMI yields an Asymptotic (2-tailed) significance of 0.64, a Pearson's R of

0.001, and a Spearman Correlation coefficient of 0.00 for the rural residents. For

the urban residents, the results for Pearson X^2 Asymptotic Significance (2-tailed)

are 0.23, for Pearson's R of 0.38. In the General Linear Model Type III ANOVA

using Mean systolic pressure as the dependent variable and BMI and annual pay

as proxy for SES as covariates, and place of residence as random effect the

significance between BMI and Mean, systolic pressure is 0.001. The significance

between annual pay and mean systolic pressure is 0.69 for rural residents. For the

urban residents the numbers are 0.81 and 0.58, respectively.

Blood pressure. The p-value (0.05) of the chi-square test of difference

showed some significance in where one lived as compared to the obtained average

systolic blood pressures. Some (14) from the rural area had lower blood pressure than expected (see Table 10). No significance emerged when comparing diastolic pressure. Half of the urbanites had lower blood pressure than expected, and the other half were above the Stage 1 (systolic pressure above 130 mm/Hg) level of hypertension. Mean systolic pressure is the calculated mean from 3 measurements taken 1 minute apart. Mean diastolic pressure is the calculated mean from 3 measurements taken 1 minute apart. It should be noted that many of the participants had lower overall blood pressure readings than is normally expected.

Table 10

Cross Tabulation Test with Correlations for Mean Systolic Pressure

	≤ 100	101-120	121-130	131-140	141-150	≥ 151	Total
Rural	14	39	9	3	2	5	72
Urban	1	3	0	1	2	0	7
Total	15	42	9	4	4	5	79

Note. All systolic pressures are given within ranges. $p = 0.05$: $p < 0.05$ is considered significant.

Table 11

Cross Tabulation Test with Correlations for Mean Diastolic Pressure

	≤ 79	80-89	90-99	≥ 100	Total
Rural	57	8	2	5	72
Urban	4	2	1	0	7
Total	61	10	3	5	79

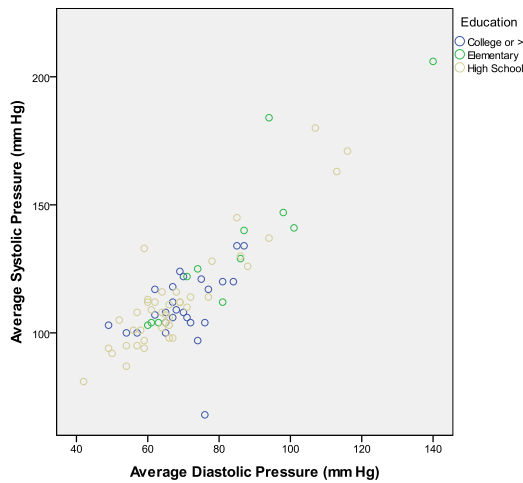*Note.* $p = 0.20$: $p < 0.05$ is considered significant.

Figure 7. The effect of educational attainment upon blood pressure

Dietary practices. A comparison of dietary practices that reduce the risk for hypertension showed that the majority of respondents (49) ate fruit on 3 or fewer days of the week. It should be noted 15 of the rural respondents reported eating fruit daily. While anecdotal, during the survey a participant noted that fruits were valuable because they commanded a high price in the market so people will sell fruits instead of eating them.

Table 12

Cross Tabulation Test with Correlations for Number of Days for Fruit Consumption

#Days	0	1	2	3	4	5	6	7	Don't know	Total
Rural	1	15	11	12	7	1	1	15	9	72
Urban	1	1	2	1	0	0	1	0	1	7
Total	2	16	13	13	7	1	2	15	10	79

Note. $p = 0.19$: $p < 0.05$ is considered significant.

Vegetables are a small portion of the meal in comparison to the carbohydrate content. Cassava, potatoes, and rice are typically eaten in large portions at each meal. In the rural community, 24 of participants eat vegetables

daily and 26 ate vegetables on at least three days per week. Two urban

participants ate vegetables two days per week. From this, it can be seen that,

either wittingly or otherwise, rural residents are more likely to eat a diet that is

rich in fruits and vegetables than urbanites.

Table 13

Cross Tabulation Test with Correlations for Number of Days for Vegetable Consumption

#Days	0	1	2	3	4	5	6	7	Don't know	Total
Rural	2	3	5	16	1	4	1	24	6	72
Urban	0	1	2	1	0	1	1	0	1	7
Total	2	4	7	17	1	5	2	24	7	79

Note. p =0.71: p <0.05 is considered significant.

A visual comparison of the number of days per week fruit is eaten can be

seen in Appendix C. There are a greater number of residents eating fruit three to

four days per week than those eating vegetables. To check for any correlations

between the lifestyle variables on work related activity, purposely planned

physical activity, tobacco use, alcohol use, and the mean systolic pressure and

BMI, Pearson's chi-square tests were conducted and the results were presented in

Tables 14 and 15.

Table 14

Comparison of Urban Residents to Selected Lifestyle Variables

Lifestyle variables			n	Pearson's Chi-Square Asymptotic 2-	Pearson's R
Urban Residents	Yes	No	7		
Alcohol Use	5	2	7	0.32	0.13
Tobacco Use	0	7	7	0.00[a]	0.00[a]
Tobacco Daily Use	0	7	7	0.00[a]	0.00[a]
Ride Bike / Walk*	4	3	7	0.03	0.00
Do Vigorous Work*	3	4	7	0.24	0.48
Do Vigorous Recreation*	0	7	7	0.00[a]	0.00[a]
Do Moderate Work*	4	3	7	0.26	0.82
Do Moderate Recreation*	0	7	7	0.00[a]	0.00[a]

Note. 0[a] Statistics could not be computed because all responses were the same for the variable. Correlation is significant at the 0.01 level (2-tailed). * > 10 min / day

Table 15

One-way Test for Pearson's Correlations & Chi Square

Lifestyle (practice) variables			n	Pearson's Chi-Square Asymptotic 2-tailed
Rural residents	Yes	No	72	
Alcohol use	24	48	72	0.53
Tobacco use	4	68	72	0.55
Tobacco daily use	4	59	63	0.53
Ride / walk*	54	17	71	0.50
Vigorous work*	20	51	71	0.51
Vigorous recreation*	31	40	71	0.44
Moderate work*	42	29	71	0.16
Moderate recreation*	40	31	71	0.21

Note. Correlation is significant at the 0.01 level (2-tailed). Mean systolic pressure was the dependent variable. The predictors were work with greater than 10 minutes of either vigorous or moderate activity, eating fruit or vegetables, tobacco and alcohol use, riding a bike or walking to work more than ten minutes per day, and purposeful vigorous or moderate recreational activity more than 10 minutes per day. * > 10 min / day.

T-test of difference results. After checking for normality, a *t*-test of

difference was conducted to determine the differences of hypertension

knowledge, hypertension risk reduction dietary, physical exercise practices, blood

pressure, and anthropometric indicators between urban dwellers and rural

dwellers. Test of difference was also conducted on the data of wealth, level of

education, age, daily fruit intake, and daily vegetable intake. Test results of the *t*-

test are shown in Table 16.

Table 16

One Sample t-test on Life Style Practices Variables, Age, Educational Attainment, and SES.

Variables	df	Sig. (2-tailed)	95% Confidence Interval Difference	
			Lower	Upper
Mean systolic pressure	78	0.00*	110.41	120.47
Place of residence	78	0.01*	0.02	0.15
Alcohol use	78	0.00*	1.52	1.74
Tobacco use	78	0.00*	1.90	2.00
Ride bike / walk *	78	0.00*	2.04	2.44
Vigorous work *	78	0.00*	1.15	1.44
Vigorous activity*	78	0.00*	1.06	1.25
Moderate work *	78	0.00*	1.66	2.08
Moderate activity *	78	0.00*	1.31	1.65
Daily fruit intake	78	0.00*	1.51	1.88
Daily vegetable intake	78	0.00*	1.95	2.30
Age	78	0.00*	35.72	41.16
Wealth quintile	78	0.00*	1.80	2.45
Educational attainment	78	0.00*	3.32	3.87

Note. **> 10 min / day. $p < 0.05$ is considered significant

From here, it can be seen *all* variables are statistically significant ($p < .001$),

as the *p*-values were all less than the level of significance of 0.05. Place of

residence ($p = 0.01$) retains statistical significance. These results would indicate a

rejection of null hypotheses $H_0 1$ and $H_0 2$. The results showed that there is a

significant difference in the hypertension knowledge, hypertension risk reduction

dietary, physical exercise practices, blood pressure, and anthropometric indicators

between urban dwellers and rural dwellers. There were also significant

differences in the wealth, level of education, age, daily fruit intake, and daily
vegetable intake between urban dwellers and rural dwellers.

 Correlations. To determine to what degree the research hypotheses were
addressed, a parametric test of Pearson's correlation test was conducted on
lifestyle variables for rural and urban participants combined. These tests were
conducted to determine the strength of the perceived relationship between the
named variables and mean systolic pressure. Table 17 contains the results. All
variables were ranked and individually paired with mean systolic pressure.

Table 17

Pearson's Correlation Test Results of Coefficient on Variables

Variable	Pearson's	
	r	Sig.
BMI	0.33*	0.00
Place of Residence	0.07	0.57
Tobacco use	-0.19	0.10
Alcohol use	0.30*	0.01
Walk / bike > 10 min /day	-0.11	0.34
Vigorous work > 10 min /day	-0.04	0.72
Vigorous activity > 10 min /day	-0.04	0.73
Moderate work > 10 min /day	0.07	0.52
Moderate activity> 10 min /day	-0.13	0.27
Fruit Daily	-0.12	0.29
Vegetables Daily	0.22	0.05
Education level	-0.27*	0.02
SES Quintile	-0.09	0.44
Age	0.26*	0.02

Note. * Correlation is significant at the 0.05 level (2-tailed).

The correlation results showed that only the BMI, alcohol use, age, and education level had *p*-values less than the level of significance of 0.05, indicating that they are significantly correlated with mean systolic pressure. BMI is significantly positively correlated with mean systolic pressure ($p < 0.001$, $r = 0.33$) and shows a strength of moderate correlation. Alcohol use is also significantly positively correlated with mean systolic pressure ($p = 0.01$, $r = 0.30$) and showed a strength of moderate correlation. Education level is significantly negatively correlated with mean systolic pressure ($p = 0.02$, $r = -0.27$) and showed a strength of weak correlation. Lastly, age of the participant use is also significantly positively correlated with mean systolic pressure ($p = 0.02$, $r = 0.26$) and showed a strength of weak correlation. As a summary, only BMI, alcohol use, education level, and age were significantly correlated with mean systolic pressure.

Linear regression. A multiple linear regression analysis was conducted to find a significant predictor variable for mean systolic pressure from the variables listed in Table 18. In this case, the regression model was used to test the ability of these variables to predict the influence of the independent variables of BMI, place of residence, walking or biking, vigorous physical activity, moderate physical activity, vigorous work activity, moderate work activity, number of days fruit is eaten, number of days vegetables are eaten, alcohol use, income, years of education, and age on the dependent variable of mean systolic pressure. That is, rather than looking at strength of the relationship, the quality of these relationships was tested. The multiple linear regression model results showed that only age ($p = 0.03$), BMI ($p = 0.02$), and level of education ($p = 0.02$)

significantly predicted the dependent variable of mean systolic pressure, as these were the only *p*-values that were less than the level of significance value of 0.05.

The Beta coefficients were investigated to determine the relative contribution of age, BMI, and education level to the dependent variable of mean systolic pressure. The Beta coefficient for BMI ($\beta = 0.25$) and age ($\beta = 0.20$) were positive, indicating that they have a positive influence to the mean systolic pressure, while educational level ($\beta = -0.28$) had a negative influence to the mean systolic pressure. In addition, upon comparison, education level had the strongest predictive influence to the mean systolic pressure, as it had the highest value among the Beta coefficients, while age has the least influence.

Table 18

Linear Regression Table of Coefficients

Variable	β	Sig.	Unstandardized B	95% CI for B	
				Lower	Upper
BMI	0.25	0.02*	1.00	0.14	1.86
Place of residence	-0.03	0.82	-2.12	-20.17	15.92
Walk / Bike [@]	-0.22	0.09	-5.43	-11.75	0.89
Vigorous work [@]	0.06	0.63	1.91	-5.95	9.77
Vigorous activity [@]	0.01	0.93	0.54	-12.24	13.33
Moderate work [@]	0.04	0.72	0.99	-4.55	6.54
Moderate activity [@]	-0.09	0.48	-2.59	-9.95	4.76
Fruit daily	-0.14	0.22	-3.81	-9.87	2.26
Vegetables daily	0.21	0.11	5.83	-1.25	12.92
Alcohol use	-0.07	0.55	-3.18	-13.79	7.44
Education level	-0.28	0.02*	-5.12	-9.43	-0.81
SES Quintile	0.02	0.85	0.34	-3.29	3.97
Age	0.20	0.03*	0.37	-0.05	0.79

Note. * Correlation is significant at the 0.05 level (1-tailed). [@]Greater than 10 minutes per day.

Prediction of mean systolic pressure. The results of the linear regression can be used to make a model for prediction purposes of the mean systolic pressure. This was done by taking the independent variables that are statistically significant and placing these variables in the general linear model where the relationship between them can be investigated. Mean systolic pressure was investigated against BMI, age, and level of education. These independent variables were shown to be statistically significant in the linear regression results in the previous section.

Table 19 shows the outcomes of the tests using Type III sums of squares establishing relationships between variables. From the test results, level of education ($f = 6.81$, $p < 0.001$) and age ($f = 3.51$, $p = 0.03$) are statistically significant, whereas while BMI was not statistically significant ($f = 2.53$, $p = 0.06$). Therefore, the best predictors of mean systolic pressure is education ($p < .000$) followed by age ($p < .025$). This can be seen visually using the graphs 1-9 in Appendix C.

Table 19

Test Results for General Linear Model

Variable	df	Type III SS	f-value	p-value
Age	3	2571.73	3.51	0.03*
BMI	4	2471.81	2.53	0.06
Educational level	5	8330.96	6.81	0.00**

Note. * $p < .05$. ** $p < .01$.

Evidence of Trustworthiness

Credibility. During the survey interview and particularly the focus group interviews, checking was used to verify accuracy of responses. Due to differing

accents, restating the question to see if a similar response was obtained or restating the answer and verifying its accuracy with the participant was done to ensure that correctness of the answer to the question could be assured. Focus group members had prior contact in the survey interviews; therefore, there was a slight bond between some participants and me. The questions in the focus group discussions covered the three domains of PEN-3, health education, educational diagnosis of health behavior, and cultural appropriateness of health behavior (Airhihenbuwa, 1995). Through inquiring about participant KAP across each domain, saturation was achieved during the discussion as similar answers were given for different questions across the domains.

Training in the use of NVivo 10$^{®}$ was initially done in December 2012 at a QSR workshop in Ontario, California. Additional support was obtained from a QSR representative at the APHA convention in Boston, MA on 2-6 November 2013 and from the text *NVivo 10 Essentials* by Edhlund and McDougall (2012).

Transferability

By providing unambiguous details of the focus group selection process, the participants, data collection, and analysis processes, the transferability of the research is improved. This study used a small sample ($n = 79$). This in itself would mean the conclusions are not readily transferable if the quantitative data alone were used. Central to this idea would be consideration of the basic assumptions of this research. That is, a population with low knowledge of hypertension and its long-term outcomes would be the participants in this study. It was felt that because the research was done in the Babcock University

community, there might be some impact upon the local community. However, it was not previously known that Babcock University regularly conducts health information sessions within the local community. This, in turn, provided the local population with a relatively high level of knowledge regarding hypertension. A review of the qualitative data presented provided a general background from which other researchers can make some conclusions that may not be altogether unfounded regarding the direction of future research.

Dependability

This research took place in a room designated for research purposes by Babcock University. The necessity of coming to the university campus may have been a deterrent for some who wished to participate. There was not an ever-changing research environment with which to contend. There were no surprises during research sessions within the setting of the designated room. There were no extraneous external circumstance due to a quarter break and the student body was absent. To that end, this research was conducted in an environment free from disruption from passersby, co-workers, business demands, family, and friends. Participants turned off or silenced their cell phones during the research, so there was no distraction from calls to or made by the participants. During one focus group a torrential downpour made hearing difficult, as the building had a metal roof. Speaking louder made this brief downpour a minor distraction and the discussion was able to proceed at pace. My American English accent did not always come across clearly. Although I had little problem understanding the

participants for the most part, there were some who experienced difficulty adjusting to my accent.

Confirmability

To the degree that the results of this study could be confirmed by other researchers, one could decide on the confirmability of this research. The procedure for member checking to verify understanding has already been noted. The audio files were transcribed by someone other than the researcher. Afterward, the audio files were reviewed as the transcripts were read to verify transcript accuracy. Initially, themes were investigated with NVivo 10$^®$. The transcripts were reviewed and color-coded to identify the KAP themes. This was compared with initial coding done in NVivo 10$^®$. Further review of the conceptual and theoretical frameworks revealed a pattern that was not seen prior to analysis. Using the revealed connections between the frameworks and the data flows within them, it was decided to constrain the themes along the lines of the theoretical framework and then the conceptual framework. Use of this method made the lines of connection between the theoretical and conceptual frameworks more direct and clearer. This method was chosen because the research was grounded in theory and allowed for the extension of the theory into new areas of understanding (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005).

Constraining the data to fit pre-existing theory may be considered a form of bias. The purpose of theory is to provide a framework for explaining or understanding observed or recorded phenomena. In the case of this research, theory was used within this context so any bias can be directly attributable to the

theory or its application to the data. Coding the data along the major domains of the theory and then by sub-domain assisted in determining relationships of the sub domains through the major domains to the conceptual domain.

Test-Retest Reliability

Although the WHO STEPS survey has been used worldwide, a statistical analysis was done using survey data gathered from study participants. A test for Cronhach's coefficient alpha was run to determine the internal consistency of the survey lifestyle items. This test for internal consistency is used to gauge the reliability of survey instruments. The scores range from 0 to 1. Scores that are closer to 1 are deemed to provide greater evidence of reliability. This test had an overall reliability Cronbach's alpha coefficient of 0.65, which is an acceptable lower limit for this test.

Summary

From the data, the point prevalence of rural hypertension (>130/90 mm Hg) was 13.8%. Among urban residents, the figure was 42.8%. For both groups combined, the point prevalence was 16.4% ($p < 0.05$). The results from statistical tests conducted for this research demonstrate that the null hypothesis is rejected by the value of $p < .001$ in the parametric t-test for age, BMI, daily fruit intake, daily vegetable intake, educational attainment, moderate work, moderate recreational physical activity, vigorous work, vigorous recreational physical activity, walking or biking to work, and wealth quintile. The knowledge of hypertension measured by "have you had your blood pressure taken" variable also indicated rejection of the null hypothesis ($p < 0.000$).

The Pearson's correlation test results showed that only BMI, alcohol use, education level, and age have a significant linear relationship or correlation with mean systolic pressure. The multiple linear regression model results showed that only age, BMI, and level of education were significant predictors of mean systolic pressure. The General Linear Model, Type III Sum of Squares demonstrated though all the lifestyle, practices, and knowledge variables had acceptable *p*-values, the level of educational attainment was the only true predictor of mean systolic pressure rather than place of residence for the participants in this research.

In Chapter 5, research findings, statistical analyses, and qualitative results will be summarized. Recommendations will be made for educating the population about hypertension and healthier lifestyles. The chapter will close with a review of implications for social change and the imperative for beginning regional initiatives for addressing hypertension within communities.

Chapter 5: Discussion, Recommendations, Conclusions

Introduction

In this chapter, the purpose and nature of the research will be discussed including whether the research questions were answered and whether the research objectives were addressed. The findings will be discussed with respect to the ideas covered in the literature review. The comparison of research findings will also consider how well the research relates to the stated conceptual and theoretical frameworks.

Purpose and Nature of the Study

The purpose of this study was to investigate knowledge of hypertension, including risks and outcomes, among a rural and urban population in Ilishan Remo, Ogun State, Nigeria, using quantitative and qualitative methods. The PEN-3 model (Airhihenbuwa, 1995) constituted the theoretical framework; the conceptual framework was made up of KAP . The conceptual/theoretical framework was used to test the theory that knowledge of hypertension and its risk factors, attitudes toward hypertension, and dietary and physical exercise practices would be used by residents to prevent or mitigate hypertension and its outcomes. It was also felt that SES would prove to be a positive influence on participant systolic blood pressure.

Summary of Research Findings and Statistical Analyses

Based on the results of cross tabs, rural residents in many of the measurements were found to differ somewhat from their urban counterparts. This was consistent with data in the research done by Ulasi et al. (2011) in the Enugu

study. But this research showed a difference from the Enugu and other studies. The difference was that the participants in this study were fairly cognizant of hypertension, and its risks and long-term outcomes if untreated. Aubert et al. (1998) and Oliveria et al. (2005) noted the effect of health education on hypertension. Participants in this study were also taking many of the steps required to prevent or reduce the risks for hypertension. The majority of the survey population (51.9%) had a high school education; most were between the age of 30 and 49 years (59.5%). There are opportunities for expanding outreach activities that focus on emphasizing the practices that reduce risks for hypertension. Most (72.2%) of the participants knew what hypertension was, as measured by their having submitted to a blood pressure examination prior to this study. With awareness at a high level, it was likely that additional education efforts would improve practices to prevent or reduce hypertension risks. The results of the linear regression demonstrated level of education, eating fruits and vegetables more often than 3 days per week, doing some type of moderate or vigorous physical exercise, and walking or biking for more than 10 minutes per day produced measurable benefits on cardiovascular health. Quantifiable lifelong effects of SES upon individual health have been well researched. In this as in numerous other studies, the level of educational attainment and annual income (as proxies for SES) were demonstrated to be the best predictors and had the greatest influence on systolic blood pressure.

Some participants alluded to the effect of having money sufficient to cover medical expenses upon their lives. They can attend the clinic and pay for

medications. For some, this was not a viable option. In the absence of a national health insurance program, many are not able to obtain the care required for management of CVD. Hendriks et al. (2011) indicated the financial burdens present for obtaining adequate medical care. It is known that in Lagos and Kwara State, residents have access to the Hygeia Community Health Plan (HCHP) for hypertension and diabetes care (Hendriks et al., 2011). However, in the absence of widespread access to HCHP resources of the three predictors, age, BMI, and education level, BMI can be the easiest to manage as an individual. This can indicate that the previously named lifestyle variables can be added to the lifestyle in phases and produce some benefit for prevention and control of hypertension.

An overwhelming majority (94.3%) indicated that they did not nor had they ever smoked. Smoking is a known contributor to CVD. The absence of smoking can be attributed to participant reported interventions by churches, government agencies, and Babcock University. Alcohol consumption was reported by 36.7% of participants. There was recognition of the negative benefits to health. One participant directly connected his hypertension to alcohol and tobacco use.

Data from the focus groups revealed that participants were mostly familiar with hypertension, its etiology, and practices that would prevent or reduce the impact of hypertension. Although there were many who learned knowledge of health behavior from personal searches, the two main sources of health-related knowledge were parents (particularly the mother, aunt, or grandmother), and organizations (Forever Living Products, The Redeemed Church, The Seventh-day

Adventist Church, and Babcock University). As with the quantitative results, eating plenty of fresh fruits and vegetables, frequent purposeful exercise, and getting plenty of rest were all rated highly within the focus group discussions. The quantitative results noted the absence of smoking by the majority, but the qualitative data demonstrated the use of tobacco and alcohol were all considered risk factors for hypertension so for most participants its use was never begun or discontinued.

Interpretation of the Findings

Participants' knowledge of hypertension enabled attitudes that promote self-ownership of health outcomes. This ownership is seen in data that revealed low alcohol consumption among participants and even lower tobacco use. Correlations for all lifestyle variables (practices) were significant. During the focus group sessions, participants mentioned on several occasions the impact of knowledge of hypertension, its risk factors, and outcomes as the basis for their attitudes as stewards of their health. The survey inquired about the intake of fruits and vegetables. During the focus group discussions, some mentioned that they left off eating food rich in fat, fried foods, and "too many carbohydrates" from a health education experience or on the advice of a physician. Focus group participants also indicated that they chose purposeful moderate exercise in various forms (jogging and bike riding) to maintain physical fitness.

Taking BMI as a proxy for diet and exercise, since it can be considered an expression of dietary and exercise practices, gives insight to what extent knowledge was translated into adequate action. Among participants' BMIs, 36.7%

were in the normal range and 34.1% were overweight. Obesity was a problem for 17.7% of the participants, and the remaining 11.5% were underweight. Despite some participants indicating they were cognizant of the benefits of exercising and actually did some form of exercise at least 3 days per week, over 50% were struggling with their BMI. Even though the knowledge is adequate and the attitudes favorable, at some point the practices are not adequate to keep BMI within a normal weight range. BMI is directly correlated ($r = 0.30$ and $p = 0.01$) with mean systolic pressure as a measure for hypertensive status.

In the discussion of the causes of hypertension, participants repeatedly referred to "thinking," "stress," "worries," and less frequently "anxiety" as its origin. Iyalomhe and Iyalomhe (2010) reported when asked "*What is* hypertension" ($p<0.001$), the participants in that provided answers similar to the ones I received when I asked; "*What causes* hypertension?" Maybe the participants connected the word *cause* to the concept of *is*. Further agreement with Iyalomhe and Iyalomhe (2010) was on the response regarding spirits as the cause of hypertension. There were two participants who claimed they personally did not believe it, but knew of others who did believe evil spirits caused hypertension. A comparison with the study done by Ulasi et al. (2011) with a sample of 688 versus this study sample of 79 reveals a few similarities. Mean BMI and mean age for their study was 26.05 and 38.02, respectively. Iyalomhe and Iyalomhe (2010) found that in a sample of 108 participants, the mean age was 59.05 ± 9.06. They did not report on mean blood pressures. The significance compared to this study is the lifestyle variable descriptive statistics; 88 (81.5%)

used excess table salt, 68 (63%) used excessive condiments, 82 (75.9% $p< 0.001$)

did not regularly eat vegetables, 84 (77%, $p< 0.001$) did not regularly eat fruits,

44 (40.7%) were heavy alcohol drinkers, and only 30 (27.8%) were tobacco users.

However, over 60% of the survey respondents reported being depressed suffered

from anxiety, and fear of sudden death. Twenty-four (22%) also had adverse

events, seizures, dizziness, polyuria, sexual dysfunction, tiredness, and headaches.

All were diagnosed hypertensives.

In this study, participants had mean BMI of 25.35 and a mean age of

38.44. There was not much variance between the Ulasi et al. (2011) study and

mine on these variables. On mean systolic and diastolic blood pressure, there was

a wider variance between the studies; Ulasi et al. (2011) 129.21 ±20.77 and 84.51

±14.50 mm Hg, respectively. At Ilishan-Remo, the means and deviations for

systolic and diastolic blood pressure were 115.44 ± 22.46 and 71.22 ± 16.42,

respectively. The standard deviations are roughly a point different for mean

systolic pressure and 2 points different on mean diastolic pressure. Concerning

BMI and age, there is some confirmation of the findings of Ulasi et al. (2011), on

whose work this study is based. The mean blood pressures meanwhile do not

confirm or disconfirm any findings. The apparent discrepancy is possibly due to

sample size. It is known that as sample size increases, there is tendency for data to

assume a more normal curve.

What I have found compared to Ulasi et al. (2011) and others, in that the

knowledge level is high but there is some confusion on the cause of high blood

pressure and what it is. Residents of Ilishan-Remo appear to be clear on what they

must do to prevent hypertension and reduce its risks. Comparing my study results to Iyalomhe and Iyalomhe (2010), the sample is reasonably small to facilitate a favorable comparison to this study. Iyalomhe and Iyalomhe (2010) did not provide mean blood pressures and BMI so these cannot be compared. Over 75% of the Iyalomhe and Iyalomhe's (2010) respondents did not regularly eat fruits or vegetables. There was a high rate of "heavy alcohol" use, 44%, and 30% using tobacco. By comparison, Ilishan-Remo participants had an average age of 17 years younger than those in Auchi (Edo State) and only 4(4.8%) used tobacco. They also used alcohol 29 (34.5%), with 24 (28.6%) reporting regular use over the last 12 months. Because educational attainment was shown to be a pivotal factor in blood pressure outcomes in this research, it should be noted that the participants 32 (30%) of Auchi had a secondary certificate or higher, whereas in Ilishan-Remo the figure was more than double at 67 (84.8%).

Limitations of the Study

The intended age range for study participants was 20 to 79 years. Ages were accepted as reported by participants. All participants did not have government-issued IDs that could be used to verify their ages. There was no access to medical records; therefore, it was impossible to determine if reported condition of blood pressure was accurate. Another item for consideration was the inability to verify the accuracy of information supplied by participants on the questionnaires.

Some surveys were not completed in entirety or there were questions where the participant chose the *refuse* or *don't know* response. Since all the

surveys contained answers to the demographic and measured anthropometric data, the focus of the research, no surveys were discarded. This may introduce a selection bias. Participants were recruited and invited to come to the survey site. In some instances, individuals invited their friends to come along with them. This produced a small measure of snowball recruiting. These experiences have the possibility of decreasing the strength of external validity for the study.

This research used a small sample of 79 persons. A sample of this size is too small to use the data for any type of generalization. Furthermore, the results may be skewed by the effect of the previously unknown efforts of Babcock University to educate the local population on health matters, particularly concerning chronic disease. Consequently, the sample represented a health wise demographic that is not typical of other communities. In addition, only 7 urbanites were self-identified among the selected participants. This small population cannot be compared adequately on the key variables compared to the 72 participants who lived in Ilishan-Remo.

There was a change in data collection procedures due to a relocation of the survey, blood pressure, height, and weight data collection venue from the market to the university about 1.5 km away. This was an outgrowth of the university officials' concern for my safety due to the rash of kidnappings of the wealthy, and some foreigners by Boko Haram and unemployed college and university graduates. Boko Haram has waged a campaign of bombings, indiscriminate murders, and kidnappings of nationals and foreigners since late 2010. The kidnappings have extended as far south as Lagos. Ilishan-Remo is a little over an

hour by car from Lagos. Consequently, Babcock University Vice-Chancellor, the Dean of School of Public, the School of Public Health Director of Research, and Professor Aja expressed concern for my safety in conducting the interviews in the market. They did not want to risk having me kidnapped while I was their guest. Participants could have been a little unsettled or nervous, as for many this was their first visit to the university. This was for some unfamiliar surroundings.

Coming to unfamiliar surroundings might have caused an increase in the blood pressures of some participants due to stress from a new situation. All recruited persons took a taxi or okada to the university. All participants were reimbursed for their travel expense. Light refreshments were provided while participants waited.

Despite me telling each participant "I am not a medical doctor. I am doing health research. If you need any additional information you may visit the University Hospital or see your own physician," some participants expected me to write prescriptions.

Bias

To avoid selection bias, I used a probability sampling design in the form of the random selection of individuals to participate in the study. A quota sample was desired that an equal amount of urban and rural residents might be included. This would have been easier on "market day" when there are many more people in attendance from various areas. There was some snowball selection, as a few participants brought their friends. These friends were included, since we had limited time and resources in the field. Addressing this area of bias was a little

difficult because of security concerns and time constraints. Participants knew me as a foreigner. There is the possibility that there could have been some response bias in the direction of social desirability, as participants responded to questions particularly about smoking and drinking to present a good image to me on the survey and to those in the focus group.

Prior to the survey, participants were asked to be as honest as possible. They were also informed that all data was confidential and would not be shared with any Nigerian or American entity. These assurances were repeated at the start of the focus groups. All participants were given a copy of the consent form, which contained confidentiality assurances. There was reluctance on the part of some to report tobacco and alcohol use. A little encouragement allowed the room to say yes or no to the question. This would also tie into the possibility of demand characteristics, as all participants knew they were involved in research and could have provided the answer they felt I desired. During the focus groups, I used checking questions to determine whether the original question was understood. When the same or similar answers were provided, it was taken as indication that the answer given was correct.

Implications for Public Health

Extension of PEN-3 model

In this research, I was able to extend Airhihenbuwa's (1995) PEN-3 model by focusing the domains on the specific areas of the knowledge, attitude, and practice conceptual framework. Prior to this research, researchers would use one or all of the PEN-3 domains, mainly to determine what was negative or positive in

the observed data. James (2004) and Ka'opua (2008) used this approach when they investigated the cultural aspects of the three PEN-3 domains , then used the third domain to classify the data gathered as positive or negative for their own research purposes. It is possibly telling that the decision was only to classify negative and positive with the omission of classifying knowledge, attitudes, or observed practices as existential. This tendency was particularly highlighted by Airhihenbuwa (1995) to steer away from the idea that all culturally based health behavior is good or bad. There are those things that just are and count neither in the negative or positive column. This is possibly due in part to Airhihenbuwa's (1995) suggestion of using the first domain as the point where research is taken back to the community for input before making conclusions. Time, logistics, and resources prevented following this protocol in my research. This is not to say Airhenbuwa's (1995) suggestion for use of this domain should be ignored.

The PEN-3 model as a theoretical construct seeks to explore the individual's perspectives within the context of the group. While not stated this sets the model as an ethnographic tool that seeks understanding of beliefs, and cultural underpinnings of observed or reported rituals, lifestyle, and accumulated knowledge. Within this study the PEN-3 model was set as the theoretical framework. A strategic research approach was also implemented that used a conceptual framework (KAP) to focus the model on the three aspects (knowledge, attitudes, and practices) that create or mitigate the problem of hypertension. Answers provided under questions from the first domain of the PEN-3 model were observed to all relate to the development of health related knowledge.

Therefore, when used in the context of origins of knowledge of health and health behaviors, this domain can be used to explore how societies and individuals gather knowledge about health behavior. In this study care was taken to understand how individuals personally acquired information on hypertension.

When exploring extended family input on hypertension knowledge, many mentioned mothers, aunts, and or grandmothers as the person who provided the knowledge of hypertension. An occasional mention was made of fathers and children as provider of health information. The use of neighborhood to represent structural, governmental, institutional, and political boundaries supplying and or denying health information was initially an awkward concept for groups to grasp. This was primarily due to the use of the word neighborhood to include far more than many ever imagined it to be. Information gained flowed into the knowledge aspect of the conceptual framework with no problem.

Within the second domain of the PEN-3 Model (perceptions, enablers, and nurturers) expression of how various individuals, economic and political systems, cultural constructs, and institutions shape and support health habits is explored. On the surface this may not appear to fit well with the attitudes aspect of the conceptual framework. However, the manner in which one perceives their environment and those who nurture or enable various behaviors that are considered acceptable lends foundational support for the attitudes one holds.

The practices aspect of the conceptual framework connects with the third domain of the PEN-3 Model. The former names the practices and the latter classifies those practices as positive, existential, or negative behaviors; the

practices individuals hold either promote or destroy their health. In this study we refrained from classifying knowledge and attitudes as either negative or positive. This domain is one that is frequently used by researchers using PEN-3 to categorize behavior as positive or negative, as did Scarinci et al. (2007, 2011). In the literature review researchers tend to extend the concepts of the third to also classify the first and second domains of the PEN-3 Model also as negative or positive.

A careful look at the three domains of PEN-3 reveals each domain is deceptively simple in its declaration but broad in its application. This study used the KAP conceptual framework to bring a much narrower focus to each of the domains. The data flows through the personal exploration, the extended family, and the neighborhood to one concept, knowledge. In a similar manner data associated with perceptions, enablers, and nurturers focuses on how these three gave rise to individual and collective attitudes. Finally the participants classified practices as positive, existential, or negative. Regardless of the description of the actions together they all constitute the practices one follows in the daily life. Future use of the model should avoid broad generalizations and delve deeper into how personal KAP is integral to understanding the cultural context of health behaviors. This will move research away from the wholesale categorization of identified KAP as negative or positive. Use of this approach should improve health educator ability to develop programs and interventions that more directly target for specific audiences without bringing cultural offense to the participants by researcher classifications that fail to recognize the validity of knowledge

created by the participants, and researcher lack of understanding of the context of observed cultural practices..

In the arguments for choosing the PEN-3 Model as the theoretical framework reference was made to the Health Belief Model in the context of self-efficacy. However, when PEN-3 is considered alongside Bandura's (1997) Social Cognitive Theory (SCT), the SCT aspects of people and environment are seen to be similar to the origins of health behavior where exploration of person, extended family, and neighborhood (environment) is identified a closer connection is seen with SCT than the health belief model (Pajares, 2002). Within attitudes of health behavior and practices of health behavior are found echoes of the behavior portion of the SCT. As PEN-3 considers how health behaviors are formed, health attitudes are formed, and descriptions of health behavior only, it can be strengthened by considering, as does SCT, the methods by which (health) behaviors are maintained. Consideration of the proximity support systems, the effectiveness of support systems, and the natural and /or negotiated support systems adds the fourth domain and concepts of maintaining health behavior to PEN-3.

It is only proper to define the fourth domain that here be no confusion of what is intended. Proximity of systems of support is defined as physical, emotional closeness and propinquity of support systems needed to meet or maintain a desired level of health. Effectiveness of support systems is defined as a measure of the sufficiency and validity of support systems needed to meet or maintain a desired level of health. Natural support systems arise from extended family or self and enable one to meet or maintain a desired level of health.

Negotiated systems of support are obtained from the neighborhood through various mediums of exchange to obtain the backing outside of the extended family required to meet or maintain a desired level of health.

It may be thought, enablers from the second domain of PEN-3 provides researchers with the structure needed to explore systems of support. Enablers, in the second domain does not address the depth, context, range, quality, and types of support intended to be explored with this additional domain. The addition of proximity, effectiveness, and natural/negotiated systems of support opens a window where more focus can be placed on the support roles women and other caregivers occupy in the family, extended family, and neighborhood in developing health knowledge, and practices.

As conceptualized, the PEN-3 Model of itself or by design provides a broad canvas for visualizing the interplay of the three tenets of each of its three domains; (Airhihenbuwa (1995) original domain names are in parentheses). These domains are; origins of health behavior (health education), attitudes of health behavior (educational diagnosis of health behavior), and practices of health behavior (cultural appropriateness of health behavior). While the addition of a fourth domain, support for health behavior, and a fifth domain power to change health behavior do not narrow the focus of the other three domains of PEN-3 they do allow honing the results to a more nuanced exploration of the role gender issues can play in the prevention or mitigation of disease. Support for the addition of the fourth PEN is found in Connell's Theory of Gender and Power (TGP). Within TGP gender issues are grouped in three domains; the sexual division of

power, the sexual division of labor, and the structure of cathexis (the investment

of mental and or physical energy on a singular person, thing, or idea) are defined

as the arenas where gender roles are played out usually to the detriment of

women. Within healthcare the disparities and inequities experienced by women

lead to greater risks for and higher incidence of disease dues to societal structures

that promote gender discrimination (Wingood and DiClementi, 2000). Health

research typically when investigating disease risks will also seek to classify the

context and amount of exposure to a specified risk. Within the context of gender

many of the exposures are environmental and arise from economic, physical,

political, and social events. Individually and collectively health impacts from

exposures to these events influence women's social status and access to health

care (Wingood and DiClementi, 2000).

Consideration of some concepts express in SCT (how behaviors are

formed and maintained) and TGP (sexual structure or labor), and adding the

fourth domain to PEN-3 establishes a more robust measure for studying the

development of health based KAP in populations who are routinely discriminated

against within the current system of scientific research and endeavor.

When thought is given to gender issues within health care the idea of

rights surface. The declaration, assumption, and exercising of rights hold within

each concept an idea of power. It might be a breach of scholarly etiquette to state,

within health systems women on in many societies cannot declare, assume, or

exercise power over their bodies because society does not afford them power;

however the status of women's health behavior in middle and low income

countries attest to this statement. Lutrell, Quiroz, Scrutton, and Bird (2007) elucidate four types of power: (a) power over (ideas of coercion or persuasion), (b) power to (coalesce as a unit to effect change), (c) power with (the idea of shared action and accomplishment), and (d) power within (gaining strength from within). From these ideas the fifth domain of Power to Change Health Behavior is developed. The areas this domain covers are Power to make health behavior choices, Effecting power over health behavior choices, and Normalizing power to control health behavior choices and systems. Power to make health choices is defined as having the inner ability to make decisions regarding health. Effecting power over health behavior choices is defined as having the social and cultural power to accomplish the desired health choices. And normalizing power to control health behavior is defined as the process of making control over health choices for self part of the cultural norm. (See Appendix D). This domain goes to the crux of much of the sociocultural norms regarding health in low and middle income countries. Investigating how power dynamics temper all health decision making should lead to better organized and more effective health interventions and programs.

The study of gender based support structures and power structures that surround health behavior provides health workers with additional insight for the development of tools that more effectively address the health needs of women and the vulnerable in Nigeria, SSA, and most or even all other nations. Inclusion of concepts of support systems and power structures affecting health behavior within

health interventions pushes Nigeria and SSA nations along the path of attaining

Millenium Development Goal 3: Promote gender equality and empower women.

Recommendations for Primary Prevention of Hypertension

In an epidemiological transition, such as Nigeria is going through, chronic

disease becomes the major source of illness among the population. Hypertension

is a chronic disease that, if left untreated, can lead to heart disease, stroke, kidney

disease, and premature death. Primary prevention of hypertension of necessity

must include educational programs that encourage habits and or lifestyle changes

that promote healthy living. It also prevents and/or decreases the risk for

hypertension. These habits include but are not limited to eating plenty of fruits

and vegetables, regular physical exercise, reducing the intake of processed,

sodium rich food, eliminating smoking and alcohol use, and maintaining a healthy

BMI.

It is known that people tend to rely on medication for the full range of

prevention and its healing effects rather than taking those steps required of

themselves to engage in the preventive practices that ward off the onset of

disease. Those who can afford visits to and treatment by a physician should

continue with those visits and their prescribed medications, along with regular

visits to the local clinic or hospital for checkups.

There should be educational programs that educate the population on

healthful living practices to reduce the morbidity from chronic disease.

Particularly due to the effect on members recorded by this research, the Seventh-

day Adventist Church in Nigeria and the Redeemed Church should continue their

days of special emphasis on health and expand, where possible, the health

education trainings for members. The overall effect of such educational programs

can never be fully measured, as members of both groups can improve their own

health and in turn share their knowledge of healthful living with others.

Babcock University students and professors regularly go into the Ilishan

Remo community to conduct health seminars and health fairs for the local

population. Focus group members have acknowledged the benefit of this work.

An exploration of how this work of health education can be taken to surrounding

communities is in order. Currently, as discussed in Chapter 2, the majority of

funding from NFMH for prevention programs target infectious disease,

HIV/AIDS, malaria, and tuberculosis. Consequently, the funding is scarce for

chronic disease prevention. Babcock University should explore how training

teams can be deployed to various areas to specifically train women as lay health

educators. This will enable sustainability of the health education outreach after the

university health workers have left. These lay health educators may also be

helpful in extending the outreach to nearby regions. This will increase the

knowledge of chronic disease, its prevention, and basic ideas for minimizing

impacts upon the health among Nigerians.

Since Babcock University is well established in educating the community

with health related meetings, it can also be a model for community outreach to

other Nigerian universities that have schools of public health, schools of nursing,

and schools of medicine. The organization of schools of public health from

throughout the nation that met at Babcock University in May 2013, could bolster a network of university partnerships to promote healthy living.

While it is important that the NFMH continue whatever efforts it has for infectious disease, it is important that the NFMH expand its education services to address chronic disease. There may be some possibility for OSMH and NFMH partnering with the universities in outreach and health education efforts and engaging state ministries of health and local communities in the same work. Critical to the whole concept of education is the inclusion of a major component to address traditional views of the origin of health and disease, and taking personal ownership of health.

One of the goals of this study was to identify patterns of thought, influences of prevailing attitudes, and practices on population involvement with prevention methods for hypertension in Ilishan-Remo, Ogun State, Nigeria. The research has shown that in Ilishan-Remo of Ogun State, the active role taken by Babcock University in educating the citizenry has yielded several dividends of knowledge of how to care for personal health, attitudes of personal responsibility, and engaging in practices that promote healthy living. Beyond the recording of the blood pressure numbers lay stories of thankfulness, hope, frustration, and determination regarding personal health status. The work of churches and Babcock University in teaching about health has produced thankfulness for the knowledge gained that transformed lives. Hope is there because some are now attempting to gain control of their health. Frustration has set in for some, as in the absence of medical insurance and adequate personal wealth, they cannot afford

the medical services they feel are needed or to have sufficient resources they must work far more than is desired. These extended work hours produce added stress and anxiety that contribute to hypertension. Each is a facet of the cultural contexts in which the residents of Ilishan-Remo live. There must be more stories from individuals who took to heart the lessons taught by Babcock University lecturers and now say, "I used to smoke and drink, but now I don't. My pressure is down and I can sleep at night."

Some cannot afford adequate health care, which is an issue that must be explored. Perhaps OSMH, in concert with NFMH, and possibly some international organizations can investigate how best to expand HCHP to other areas of the nation to meet the medical and health needs of those with chronic disease. If the current burden of chronic disease is not met, these individuals will become a larger drain on governmental and private resources as chronic disease progresses.

Within two of the focus groups, participants represented wealth quintiles from 1-4. It was clear from the discussion of the impact upon health that personal wealth and educational attainment played a role in personal well-being. Those who were least wealthy despite the knowledge of hypertension and its outcomes made choices for dietary habits, physical exercise and practices in the necessity of working to support the family. The choices made by some in the focus group that were least wealthy were detrimental to health, but the alternative was not desired.

A study (Quick II) of the cardio-vascular health outcomes for patients enrolled in the HCHP in the rural areas demonstrated that those enrolled in the

program continued to have unacceptably poor outcomes due to poor knowledge of

hypertension and adverse practices by patients (Odusola et al., 2011). The study

authors proposed a diligent implementation of a cardiovascular health program to

improve outcomes of those enrolled in the health plan. From this research where

participants repeatedly praised Babcock University for the influence of its health

outreach programs, the major implications are for NFMH to use the model

developed by Babcock University to help address the unmet health educational

needs of the population. If the aid of local universities could be enlisted to use

their schools of health, nursing, and medicine to assist in bringing health

education to the people, perhaps the benefits to the local populations would be

similar as in Ilishan-Remo. This work may have some impact upon poverty

because poor health and disease exacerbates poverty in low resource countries. It

will also have an impact on health inequities arising out of lack of access.

Individuals, families, and communities could gain some of the same benefits from

improved knowledge about health that those of greater wealth have.

After his blood pressure was measured, a participant mentioned that this

was his first time knowing what his actual blood pressure was. Upon inquiry, I

discovered that in Nigeria among some physicians, the patient is only told the

status of the pressure (low, high, or normal), never the numbers. To follow up, I

checked in with a few individuals who were not participants. They all agreed this

was a problem. Babcock University School of Public Health is encouraging

physicians, nurses, and other health workers to let people know what the numbers

are. To this end, I agree with Babcock University's School of Public Health. Let

the people know the numbers and get them involved in tracking their own

pressures as much as possible.

Implications for Positive Social Changes

One important idea regarding the origin of health information that

emerged in the focus groups was the women (mothers, aunts, and grandmothers)

were the ones mentioned almost without fail as the source of their health

knowledge. The discrepant proportion of women to men who were

knowledgeable about hypertension was also noted by Busari et al. (2010). My

extension of the PEN-3 Model to include a fourth domain focusing on support

systems required to improve one's health outlook changes the paradigm for its

use. The inclusion of systems of support for health behavior and power to change

health behavior establishes PEN-3 + 2 as a tool that adequately explores the

systems and their viability for sustaining health outreach among populations; and

the power structures that must be developed, dealt with, or put in place to ensure

the sustainability of health interventions and programs.

Those who are involved in planning and providing public health

interventions and programs can take this revised model and the information it

provides to discover better ways to meet the needs of women and children, and

other vulnerable populatioins.

Depending on how programs are organized and funded, the use of schools

of health, nursing, and medicine to assist in bringing health education to the

people should not increase the financial burden on the local health sector. It may

be a benefit to the local economy, as improved health of the local population would mean scarce resources would not be turned away from other areas of need, and those in better health could generate more personal wealth. Participants in this study mentioned the steps they took and practices they maintained to improve or maintain their health. Particularly the knowledge of health gained, the attitudes of self-management of health, and the practices engaged in have improved the health-seeking behavior of the population of Ilishan-Remo.

This research is a step in the path of social change because the content is confirmation of the effect of outreach programs conducted by Babcock University. Indeed, public health officials and workers can use this endorsement of the health interventions conducted by churches and universities when soliciting financial and other support as outreach and health educational programs are prepared. The use of a similar approach for understanding a studied population can provide a deeper understanding of the decisions individuals make regarding their health.

Extending the PEN-3 model with the support and power domains contributes to social change by providing a new tool for investigating the viability of support mechanisms that are able to support interventions and programs and power structures that will hinder or help the program to be successful. Understandings gained enables the development of interventions and educational programs targeted at the specific level of knowledge, attitudes, or practices with carefully chosen and developed support modules. From this aspect, the effect of

this study could promote social change at the individual, family, and societal levels.

Recommendations for Further Study

It is clear that there are some differences in the experiences and lifestyles of market workers in Enugu, hypertensive patients in Auchi, and the residents of Ilishan-Remo. From this study, the difference appears to be the work done by Babcock University and maybe to a lesser extent the Seventh-day Adventist church, and possibly the Redeemed Church, and Forever Living Products. The question arises of whether or not this is true for other areas where there are universities and or concentrations of Seventh-day Adventist churches. A larger qualitative study should be done in the Ilishan-Remo area to determine whether the reported impact of Babcock University upon the health of the local community holds true. Further research should also be done to determine whether the reported impact extends to areas where there is no university but a concentration of Seventh-day Adventist churches. If true, this will support the recommendation for local university partnerships with federal and state ministries of health to provide the same health educational support to local communities. The final recommendation is more underrepresented public health researchers should engage in international research, particularly in mid- and low-resource countries. These countries need the exposure to underrepresented researchers and the researchers can gain new ways of looking at the world that can only be gained in foreign research.

Recommendations forAction

Babcock University School of Public Health could explore the feasibility of designing a health education curriculum targeted for women and other caregivers. The main goal is to equip women and caregivers with simple tools that will enable them to better function within the role so many have chosen or been thrust into. Within the program emphasis can be placed on training participants in dietary and daily exercise guidelines for preventing and or controlling hypertension. The BUSPH might well consider how to partner with the School of Nursing in the development and design of the curriculum as the majority of students in the nursing school are women. Part of the training would include networking skills and other skills essential to establishing and maintaining systems of support. This curriculum might also be a means of a formal acknowledgement of the pivotal role played by women in prevention at the population level and also start a conversation about some of the deeper issues concerning women within the local culture.

Conclusion

The incidence and prevalence of CVD among Nigerians will increase. As the move to urban centers and the adoption of high fat, high salt, and sugar content of processed Western diets continues, this trend will only accelerate. Untreated, unchecked CVD devastates the persons affected, their community, and the nation. The premature deaths, and diminished quality of lives have untold social and economic costs that resound at the state and national level. Research has already shown the economic impact upon national healthcare budgets that

cannot afford to pivot too far away from meeting millennium health goals for

infectious disease. Nigeria, like many SSA nations, faces an acute dilemma of

countering the infectious and chronic disease burden upon the population. From

this study, the benefits of appropriate knowledge of hypertension (hypertension

awareness) leads to adoption of appropriate attitudes of personal responsibility,

and adoption of practices that prevent or mitigate risks for hypertension and its

outcomes. The data also demonstrated that adoption of dietary habits of eating

plenty of fresh fruit and vegetables on three or more days per week coupled with

purposeful physical exercise three or more days per week would enable better

control of blood pressure and reduction of hypertensive risks. This research, as do

others, demonstrates SES is a factor in health outcomes. both income levels and

educational attainment showed an effect upon the blood pressure data. The

qualitative data supported the quantitative findings. The question of whether

knowledge of hypertension, attitudes of personal responsibility for health, and

dietary and physical exercise practices have an effect upon was answered

affirmatively. The focus group interviews revealed the impact of local

organizations taking a lead in providing health education to the community. A

comparison of three communities revealed some similarities and a major

difference. The major difference between Enugu, Auchi, and Ilishan-Remo was

the work of Babcock University in supplying health education to the Ilishan-

Remo community. From this study, a key message is the importance of the local

university in providing health education to the local community. If this model was

adopted across Nigeria, the task of meeting the health education needs and the

reduction in the incidence and prevalence of hypertension and related co-morbidities among the population could be more attainable.

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Appendix A: Permission

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Appendix B: Focus Group Guide

PEN-3 and KAP Focus Group Discussion Guide

Knowledge of Health Behavior

Knowledge.

Person. Health education should be a personal responsibility. What aspects of your life enable you to take responsibility for your health? Do you know what hypertension is? What are some risks for hypertension? What are long-term outcomes for hypertension? How do you gain knowledge about health matters? How have you gained knowledge about hypertension risks, prevention, and long-term outcomes?

Extended Family. What roles have members of your extended family played in your health education about hypertension risks, prevention, and long term outcomes?

Neighborhood. What role does the community (political, religious, educational, and governmental) play in health education? To what extent has the community provided information on hypertension risks, prevention, and long-term outcomes?

Attitudes.

Person. Health education should be a personal responsibility. What aspects of your life enable you to adopt an attitude of responsibility for your health? How do you feel about having hypertension?

Extended Family. What roles have members of your extended family played in your adoption of your current attitude about your health, particularly in regards to hypertension risks, prevention, and long term outcomes?

Neighborhood. What role has the community (political, religious, educational, and governmental) played in shaping your attitudes about hypertension risks, prevention, and long-term outcomes?

Practices.

Person. Do you believe practices that prevent disease or improve health should be a personal responsibility?

Extended Family. What roles have members of your extended family played in encouraging practices that prevent disease or improve your health particularly in regards to hypertension risks, prevention, and long term outcomes?

Neighborhood. What role has the community (political, religious, educational, and governmental) played in encouraging practices that prevent disease or improve your health particularly in regards to hypertension risks, prevention, and long term outcomes?

<div align="center">

Attitudes of Health Behavior

</div>

Knowledge.

Perceptions. What perceptions (knowledge, beliefs, and values) do you (including extended family or community) have about hypertension risks, and long term outcomes? (Probe)

Enablers. What are cultural, societal, systemic, or structural systems that may enhance gaining knowledge about hypertension risks, and long-term outcomes? What are cultural, societal, systemic, or structural barriers to gaining knowledge about hypertension risks, and long-term outcomes?

Nurturers. What is the role of extended family, kin, peers, and community in helping you gain a correct knowledge about hypertension risks, and long-term outcomes?

Attitudes.

Perceptions. What is your attitude about hypertension risks, and long-term outcomes? Why? (Probe – is it a concern? Why or Why not? Should you be concerned?)

Enablers. Who or what enables your current attitude (negative or positive) about hypertension risks and long-term outcomes? How? To what extent? Why?

Nurturers. Who or what encourages you to care about hypertension risks, and long-term outcomes? How? Why?

Practices.

Perceptions. What beliefs do you have about dietary, physical exercise, or other practices designed to prevent hypertension? What beliefs do you have about dietary, physical exercise, or other practices designed to reduce risks for hypertension and its long-term outcomes?

Enablers. What in your life serves to encourage you to engage in dietary, physical exercise, or other practices designed to reduce risks for hypertension and its long-term outcomes? What in your life serves to discourage you from engaging in dietary, physical exercise, or other practices designed to reduce risks for hypertension and its long-term outcomes?

Nurturers. To what extent do extended family, relatives, and community influence you to engage in dietary, physical exercise, or other practices designed to reduce risks for hypertension and its long-term outcomes? To what extent do extended family, relatives, and community influence you to engage in dietary,

physical exercise, or other practices designed to reduce risks for hypertension and its long-term outcomes?

Practices of Health Behavior

Knowledge.

Positive. What knowledge do you have about hypertension risks, prevention, and long-term outcomes you believe to be positive? (Positive behaviors are those health ideas, values, and actions that are accepted as helpful and should be continued.)

Existential. What knowledge do you have about hypertension risks, prevention, and long-term outcomes you believe to be existential? (Existential behaviors are those health ideas, values, and actions that are not harmful but do not necessarily help. These behaviors would cause no problem if continued or stopped.)

Negative. What knowledge do you have about hypertension risks, prevention, and long-term outcomes you believe to be negative? (Negative behaviors are those health ideas, values, and actions that are harmful and should be eliminated.)

Attitudes.

Positive. What attitudes do you have about hypertension risks, prevention, and long-term outcomes you believe to be positive? (Positive attitudes tend to encourage appropriate health related behavior.)

Existential. What attitudes do you have about hypertension risks, prevention, and long-term outcomes you believe to be existential? (Existential

attitudes are neither harmful nor helpful and will not influence the health outcome).

Negative. What attitudes do you have about hypertension risks, prevention, and long-term outcomes you believe to be negative? (Negative attitudes tend to discourage you from taking corrective action).

Practices.

Positive. What positive practices do you engage in to reduce hypertension risks, prevention, and long-term outcomes? (Positive practices are dietary and physical exercise practices that are accepted as helpful and should be continued.)

Existential. What existential practices do you engage in to reduce hypertension risks, prevention, and long-term outcomes? (Existential practices are dietary and physical exercise practices that are harmful but do not necessarily help. These practices would cause no problem if continued or stopped.)

Negative. What practices do you engage in that do not reduce hypertension risks and long term outcomes, and are not preventive? (These practices can be considered negative practices. They are dietary and physical exercise practices that are harmful and should be eliminated.)

Appendix C: Display of Graphs

For the following figures where average systolic pressure is named it is the same as mean systolic blood pressure.

Figure C1.
Histogram from One-way Frequency test number of days per week fruit is consumed by rural residents.

Q46 In a typical week, on how many days do you eat fruit?

Mean = 2.96
Std. Dev. = 2.458
N = 72
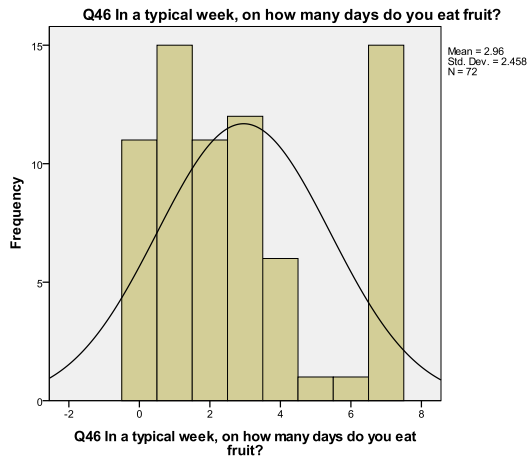
Visual inspection shows the majority of rural residents consume fruit on the average of 3 days per week.

Figure C2.*Histogram from One-way Frequency test for the number of days per week vegetables are eaten by rural residents.*

Q48 In a typical week how many days do you eat vegetables?

Mean = 4.08
Std. Dev. = 2.46
N = 72
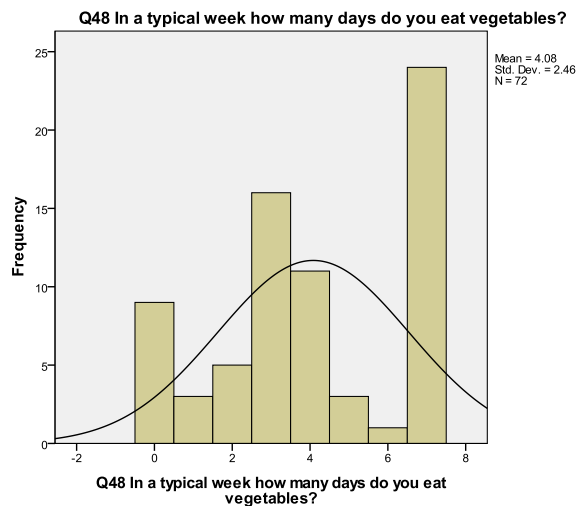
Figure C3.

Histogram of comparison of age groups to average systolic pressure stratified by educational attainment.
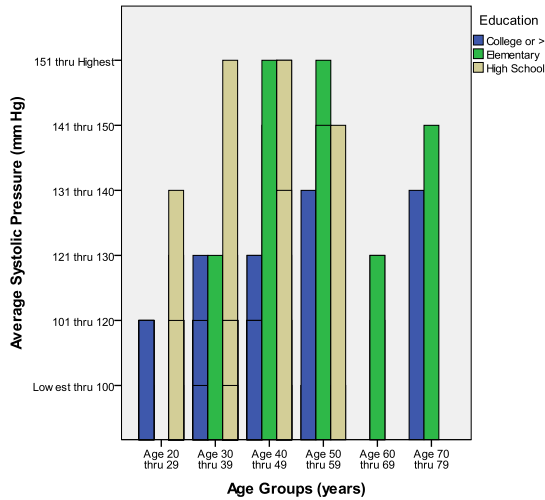
Figure C4.

Histogram of comparison of age groups to average diastolic pressure stratified by educational attainment.
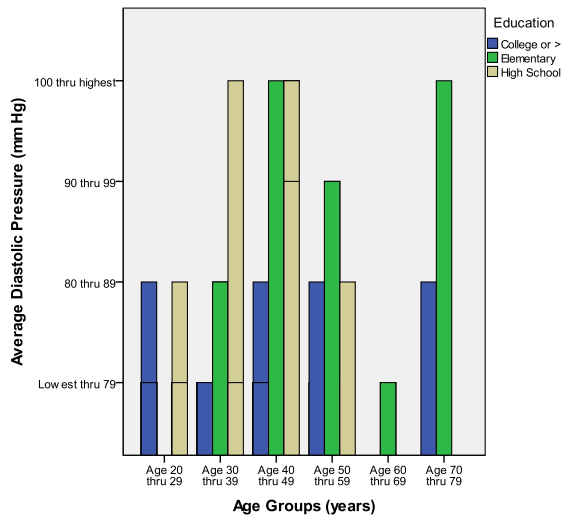
Figure C5
Histogram of comparison of age groups to average BMI stratified by educational attainment.
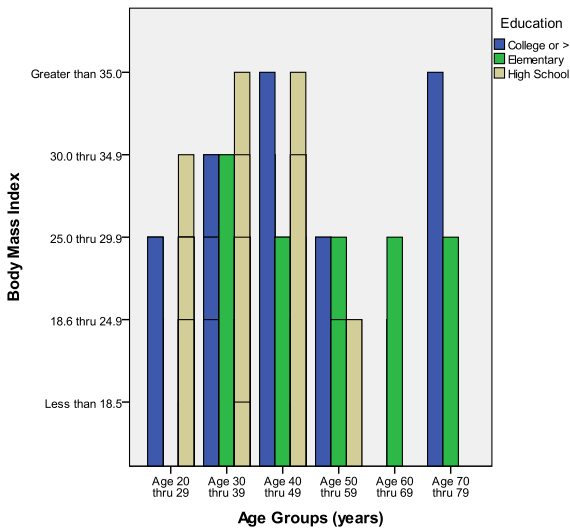
Figure C6.
Histogram of comparison of wealth quintile to average systolic pressure stratified by educational attainment.
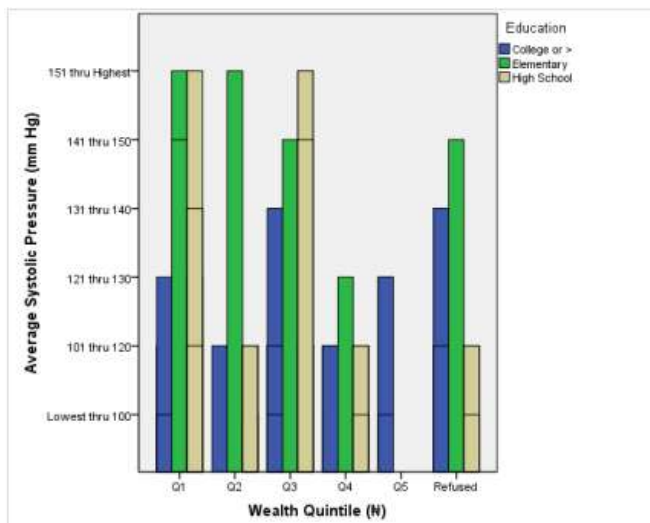
Figure C7

Histogram of comparison of level of educational attainment to average systolic pressure.
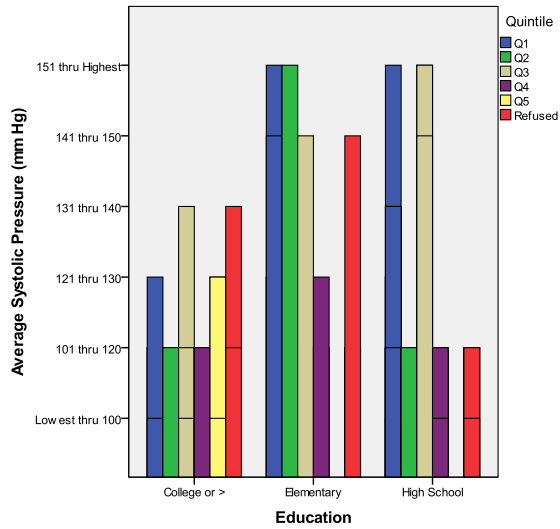
Figure C8.

Scatter of comparison of weight to height stratified by educational attainment.
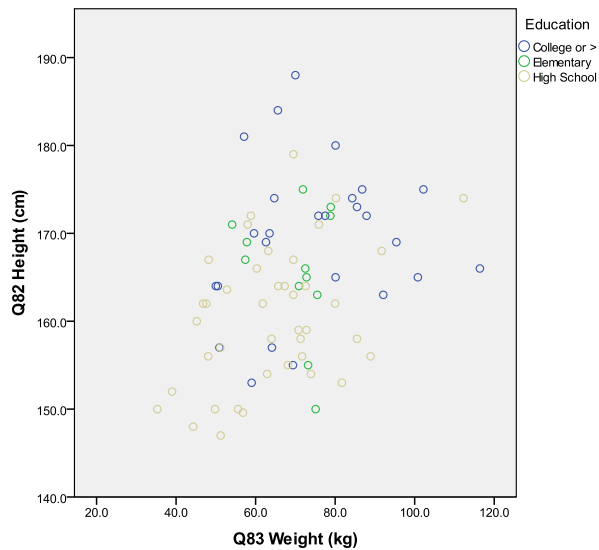
Appendix D: WHO STEPS Instrument at a Glance

Figure D1. Brief description of STEPS surveillance instrument. Step 3
Biochemical measurements, was not used in this research. No tissue samples, or
body fluids were collected.

STEPS
Department of Chronic Diseases and Health Promotion
World Health Organization
Email: steps@who.int
http://www.who.int/chp/steps

STEPS Instrument

Overview

Introduction	This is the generic STEPS Instrument which sites/countries will use to develop their tailored instrument. It contains the: • CORE items (unshaded boxes) • EXPANDED items (shaded boxes).
Core Items	The Core items for each section ask questions required to calculate basic variables. For example: • current daily smokers • mean BMI. **Note:** All the core questions should be asked, removing core questions will impact the analysis.
Expanded items	The Expanded items for each section ask more detailed information. Examples include: • use of smokeless tobacco • sedentary behaviour.
Guide to the columns	The table below is a brief guide to each of the columns in the Instrument.

STEPS Instrument overview continued.

Column	Description	Site Tailoring
Number	This question reference number is designed to help interviewers find their place if interrupted.	Renumber the instrument sequentially once the content has been finalized.
Question	Each question is to be read to the participants	• Select sections to use. • Add expanded and optional questions as desired.
Response	This column lists the available response options which the interviewer will be circling or filling in the text boxes. The skip instructions are shown on the right hand side of the responses and should be carefully followed during interviews.	• Add site specific responses for demographic responses (e.g. C6). • Change skip question identifiers from code to question number.
Code	The column is designed to match data from the instrument into the data entry tool, data analysis syntax, data book, and fact sheet.	This should never be changed or removed. The code is used as a general identifier for the data entry and analysis.

The instrument can be downloaded in PDF or Word format from http://www.who.int/chp/steps/instrument/en/. Retrieved on 5 October 2014.

Appendix E: Comparison of PEN-3 Models

Table E1.

PEN-3 Model by Airhihenbuwa** (1989)	*	PEN-3 Model proposed by Norman (2014)
Health education • Personal • Extended family • Neighborhood	K	Knowledge of health behavior • Personal • Extended Family • Neighborhood
Educational diagnosis of health behavior • Perceptions • Enablers • Nurturers	A	Attitudes of health behavior • Perceptions • Enablers • Nurturers
Cultural appropriateness of health behavior • Positive • Existential • Negative	P	Practices of health behavior • Positive • Existential • Negative
	S	Support for health behavior • Proximity of support systems • Effectiveness of support systems • Natural and negotiated systems of support
		Power to change health behavior • Power to make health behavior choices • Effecting power over health behavior choices • Normalizing power to control health behavior choices

*KAPS refers to the conceptual framework: knowledge, attitude, practices, and socioeconomic status. ** It is now called the PEN-3 Cultural Model

Appendix F: Photos from the Field

Figure E1.
The editors of the campus news magazine wrote about my research at Babcock University and the donation of the research equipment to the Babcock University School of Public Health. Professor Aja at the extreme right coordinated all local arrangements and security for the trip. All photographs in Appendix E were either taken by me or with my camera.

Figure E2.

Dr. Collins O. Airhihenbuwa (right, the author of the PEN-3 Model and Health Culture and Society, 1995) and the research author at the APHA convention 02-06 November 2013 Boston, MA.

Figure E3.

Dr. Meremekwu (left, Professor of Paediatrics at College of Medical Sciences, University of Calabar), the sponsor of the my (right) attendance at the Nigerian Branch of the Cochrane Collaboration, on my original trip to Nigeria.

Figure E4.
The research author at the entrance to Babcock University.

Figure E5.
The room where research was completed. Participants sat at the desks while completing surveys. The table on the stage was placed on the floor and all measurements were taken there. Focus groups sat around a table placed on the stage.