



The Knowledge, Attitudes and Lifestyle Practices of Hypertensive Patients in the Cape Coast Metropolis-Ghana

Francesca Anowie¹ and Sarah Darkwa^{2*}

¹Department of Home Economics, Cape Coast Technical Institute, Cape Coast, Ghana.

²Department of Vocational and Technical Education, University of Cape Coast, Cape Coast, Ghana.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors designed the study, wrote the protocols, managed the literature searches and developed the questionnaire. Author FA administered and retrieved the questionnaires, and analyzed the results. Author SD wrote the first draft and subsequent versions of the manuscript. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JSRR/2015/19891

Editor(s):

(1) Karl Kingsley, University of Nevada, Las Vegas - School of Dental Medicine, USA.

Reviewers:

(1) Jaspinder Kaur, Punjab Institute of Medical Sciences, Jalandhar, Punjab, India.

(2) Rajendra Nath, King George's Medical University, Lucknow, India.

Complete Peer review History: <http://sciencedomain.org/review-history/11291>

Original Research Article

Received 2nd July 2015
Accepted 1st August 2015
Published 6th September 2015

ABSTRACT

Aims: To investigate the knowledge, attitudes and lifestyle practices of hypertensive patients to help educate them to properly manage the condition and help reduce incidence among the populace.

Study Design: A cross-sectional descriptive survey.

Place and Duration of Study: The Central Regional Hospital (Pedu), the Cape Coast Metropolitan Hospital (OLA) and the University of Cape Coast Hospital (UCC), between August 2014 and December 2014.

Methodology: We included 400 patients (158 males, 242 females; age range 20-89 years) with hypertension. Patients BMI's were determined as well as information on their knowledge of hypertension, attitudes towards exercise and dietary practices. Barriers to maintaining healthy lifestyles were also identified.

*Corresponding author: Email: snaadom@gmail.com;

Results: Out of the 400 patients, 282 (71%) were overweight and obese. The following barriers countered participants' efforts to maintain healthy life styles; "lack of education", "fear", "financial constraint," and "lack of commitment." Logistic regression showed that participants' occupation significantly influenced their knowledge levels positively with $P=0.012$ at α -level of 0.05.

Conclusion: More than 95% (n=383) of the study participants showed a poor level of knowledge in the causes, signs and symptoms, risk factors, prevention and treatment of hypertension. Participants' who had occupations and worked were more knowledgeable about the condition than those who had no occupation and no regular jobs. Hypertension's association with low levels of awareness, drug treatment, and blood pressure control identified in past studies still exist within current hypertension populations. Population-based prevention strategies, such as reduction in salt intake and integration of hypertension care into primary care need to be reviewed.

Keywords: Knowledge; attitudes; lifestyle practices; hypertension; Cape-Coast; Ghana.

1. INTRODUCTION

A non communicable disease is a medical condition or disease that is chronic, generally progresses slowly, non-infectious, non-transmissible and are the leading causes of death globally, killing more people than all other causes of death combined [1]. Examples of non communicable diseases are hypertension, diabetes, cardiovascular diseases etc. [2] report that out of the 1 million estimated hypertensives worldwide, about two thirds are from developing/underdeveloped countries. Also, [3] estimate that by 2030, mortality due to cardiovascular diseases in the adult population will reach 23 million with about 85% of such deaths occurring in low and middle-income countries. Worldwide, hypertension is the third leading risk factor contributing to death, surpassed only by malnutrition and smoking [4]. As a worldwide significant public health challenge, researchers' estimate that complications associated with hypertension currently kill 9 million people every year [5], with a 60% increase predicted from 972 million in 2000 to 1.56 billion in 2025. Although in the past hypertension was associated with affluence, this has changed since the last two decades with its incidence now higher in Africa than in Europe and USA, and has become the number one cause of death in Africa increasing in the next decade as a result of growing urbanization and related lifestyle changes [6].

Hypertension or Blood pressure is the force that blood exerts on the vessel wall which varies continuously in arteries due to the intermittent nature of the pump (heart) and elastic recoil of the arterial wall [7]. Being largely asymptomatic with patients experiencing very few signs and symptoms initially, hypertension is known as a "silent" killer and classified as primary (90–95%

of all cases) when there are no obvious underlying medical causes or secondary (5 -10% of all cases) when caused by other conditions that affect organs like the kidneys, heart or tissues and organ systems like the arteries and endocrine system [8,5]. A normal blood pressure is below 120/70 [9] with the upper number being the highest arterial pressure when the heart beats and fills the arteries (systolic) and the lower being the lowest arterial pressure in the arteries when the heart relaxes (diastolic), [10]. Hypertension when left uncontrolled often takes a toll on vital organs throughout the body leading to heart attacks or strokes [11].

Hypertension can be treated with drugs (pharmacologically) such as diuretics, vasodilators, calcium channel blockers etc or without drugs (non-pharmacologically) but the former is more common in Ghana, while the latter strictly requires healthy life styles [12]. Often efforts to treat or reduce hypertension have been based mainly on pharmacological approaches with very little on the non-pharmacological approaches. [13] stress the need for combination of two or more life style modifications such as exercising, consumption of low sodium, high potassium foods and maintaining healthy weights etc to reduce blood pressure among people living with hypertension. These modifications they stated could help reduce the need for drug treatment of hypertension or complement the effect of antihypertensive drugs. [14] recommends the Dietary Approaches to Stop Hypertension (DASH) diet which consists of increased consumption of fruits, vegetables and low-fat dairy products, decreased dietary sodium, saturated fat and total fat, and moderation of alcohol consumption as a better lifestyle modification for people living with hypertension. [15] report that Ghana like other Sub Saharan

African countries is undergoing a rapid epidemiological transition which has led to the last decade seeing a shift in the major causes of death from solely infectious diseases to a combination of communicable and non-communicable diseases (NCDs). [1] estimates that NCDs kill 78,000 persons in Ghana annually, representing 354 deaths per 100,000 population.

In 2009, the total population of the Central Region was 1,921,640 [16]. According to [17], the estimated population for the metropolis in 2009 was 142,398. The 2010 Population and Housing Census quoted the total population of the Central Region and the Cape Coast Metropolis as 2,201,863 (1,050,112 males and 1,151,751 females) and 169,894 (82,810 males and 87,084 females) respectively [18]. From these figures, 2.1% and 2.4% of the total population in the Central Region was hypertensive in 2009 and 2010 respectively. This percentage increased to 3 and 4.1 in 2011 and 2012. In Cape Coast specifically, the percentage of the population who were hypertensive was 8.5 (2009), 10.5 (2010), 15.1 (2011) and 18.2 (2012) respectively [16]. A review of literature shows there have been several epidemiological investigations of population based prevalence of adult hypertension in Ghana spanning from the 1970's to 2009, from rural to urban areas and from various regions in the country. In more recent studies, researchers have also looked at knowledge, attitudes and beliefs of hypertensive adults and how these could help manage the condition. In terms of regions, there is very minimal documented information in this respect from the central region in general and Cape Coast in particular. In an effort to develop public health interventions that could educate hypertensive patients in Cape Coast more effectively about the risk factors and ways to prevent future morbidity and mortality, this study was carried out to investigate the knowledge, attitudes and lifestyle practices of hypertensive patients in the Cape Coast Metropolis in Ghana.

1.1 Literature Review

[19] assert that 21% (almost 10 million men and women) of the South African population suffer from hypertension. Similarly, a study by [20] in urban Lusaka reveals a prevalence rate of 34.8% (38% males and 33.3 females). In East Africa, specifically Tanzania, studies reveal high rates of hypertension in both urban and rural areas, specifically among the obese and elderly [21]. Also, [22] reports more prevalent hypertension

(31.8%) among urban residents in Kitwe, Zambia compared to similar reports by [23] from Tanzania (22%) and Uganda (23.7%). They attribute differences between their findings to the fact that [23] and colleagues conducted their studies in rural areas while they did so in urban areas. [24] report a prevalence rate of 47.5% coupled with low awareness, treatment and control of hypertension in Cameroun - Central Africa. In West Africa, a community-based study put the prevalence of hypertension in Nigeria at 32.8% [25].

[15] report the prevalence of hypertension in Ghana as a range from 19.3% in rural areas to 54.6% in urban areas with low levels of detection, treatment and control. Subsequently, they add that more than one in four adults is hypertensive in Ashanti Region. Over the period from 2008 to 2012, prevalence of hypertension has been on the increase in all the ten (10) regions of Ghana with the highest prevalence in Ashanti region (2.19% to 14.45%), followed by Eastern (3.36% to 5.22%), Volta (2.3% to 5.25%), Greater Accra (2.19% to 4.57%), Central (1.47% to 4.06%) and Brong-Ahafo (1.47% to 3.60%) regions. The three Northern Regions recorded the lowest prevalence over the period under review. Upper East (0.95% to 2.30%), Northern (0.93% to 1.88%) and Upper West (0.67% to 1.22%) [16].

[26] outline the basic steps in controlling hypertension as educating patients on hypertension and modification of lifestyle through health promoting behaviors. Providing new information (knowledge) is one method for changing a person's attitude and therefore his or her behavior or lifestyle [27]. The knowledge people gain refers to their understanding of any issue, hypertension in this case [28]. [28] refer to attitude as ones feelings or preconceived ideas towards a subject while practice is the way in which one demonstrates his or her knowledge and attitude through actions. [29] shares the view that patients who are informed about their condition appear to recover early than those without knowledge. [26] also are of the view that the level of knowledge people achieve can determine their attitude and practice towards hypertension. [30] demonstrate a poor understanding of Blood Pressure or hypertension in a United Kingdom general public population in London. They add that hypertensive participants in the survey had little knowledge of their own Blood Pressure and were unable to estimate it within acceptable levels.

[31] studied hypertensive patients' knowledge, attitude and practices and report patients had poor knowledge, attitude and practices but these improved significantly after health interventions were put in place. Prior to the intervention, only 16.58% of the study population had good knowledge, 30.89% good attitude and 26.76% good practice towards hypertension respectively which after intervention improved to 75%, 78.23%, and 66.18%, respectively. The low score for knowledge, attitude and practice was mainly due to illiteracy and low socioeconomic class of the patients. Also, it was found that the knowledge, attitude and practice score was less in females when compared to males. [32] suggest patients are generally knowledgeable about hypertension but that knowledge is usually not comprehensive especially in terms of specific factors that relate to their condition and good control of blood pressure. They found patients with high school education significantly more likely to understand normal blood pressure values.

[33] report similar findings when they studied some rural Nigerian women who mostly had some exposure to hypertension information but still lacked some knowledge in relation to specific factors associated with hypertension. Out of the 252 respondents studied, 80.6% had heard about hypertension, while 36.1% knew that hypertension was mostly asymptomatic. They also linked the knowledge that hypertension could lead to other complications significantly with level of education and occupation ($P < .001$) respectively. Also, they found attitudes to management and level of practice generally seemed to be lower than level of knowledge in the view of existing evidence that attitude improves as knowledge improves. Contrary to [33] findings, [34] in a similar study in North Carolina, found quite a high knowledge level in some aspects of hypertension among hypertensive adults and reported that the study population were generally aware that Blood Pressure over 140/90 mm Hg could be life threatening. Among the 22.3% of respondents categorized as having lower hypertension knowledge, older age (more than 65 years) and less high school education were to be associated when analyzed using bivariate analysis. Furthermore, 1 out of 5 hypertensive patients had misconceptions that taking medications could cure high BP and nothing could be done to prevent hypertension.

[35 p. 297] summarize the Health Belief Model as follows "in order for behavior to change, people must feel personally vulnerable to threats, view the possible consequences as severe, and see that taking action is likely to either prevent or reduce the risk at an acceptable cost with few barriers." Also, a person must feel competent (have self-efficacy) to effect and maintain the new behavior. Some triggers, either internal or external are required to ensure actual behavior. Nola Pender's Health Promotion Model was created to serve as a "multivariate paradigm for explaining and predicting health promoting component of lifestyle" [36]. The model assesses an individual's background and perceived perceptions of self among factors to predict health behaviors. The model explores three areas of a patient's participation in health promoting activities: individual characteristics and experiences (prior related behavior and personal factors- biological, psychological and socio-cultural), behavior specific cognitions and affect (perceived benefits of action, perceived barriers to action, perceived self-efficacy, activity-related affect, interpersonal influences and situational influences) and behavioral outcome [37]. All the constructs under the behavior specific cognitions and affect interact to enable the individual to be committed to a plan of action. Immediate competing demands and preferences together with commitment to a plan of action have effects on behavioral outcome. These constructs lead to a better understanding of the concepts needed to improve health and health behaviors. [38] believe that health behaviors must be in the control of the patient and mean something to the patient to be effective.

Pender's model integrates a number of constructs from expectancy value and social cognitive theory. The expectancy value theory states "People are more likely to work toward goals that are of value to them". The primary component of the social cognitive theory is self-efficacy which is the confidence a person has and enables him or her to be successful in a task or action [39 p 41-51]. Pender's model is a yard stick used to predict individual's readiness to change, barriers to action, interpersonal and situational influences and benefits to health promotion. All these components support the success of promoting health behavior change. Each concept in the model applies to a specific area of individual's behavior. One concept that was included in the Health Belief Model that has been purposely left out of the Health Promotion Model is a perceived threat of disease. By not

including this factor as a determinant towards health promoting behavior, the Health Promotion Model focuses more on health promotion and less on illness prevention as the Health Belief Model aims to do [38]. This is reflected in her definition of health. According to [39 p. 23], "Health is the actualization of inherent and acquired human potential through goal-directed behavior, competent self-care, and satisfying relationships with others while adjustments are made as needed to maintain structural integrity and harmony with relevant environments."

Previous studies have shown that knowledge has a positive and meaningful correlation with attitude [40]. The basis of hypertension treatment could be lifestyle modification (non-drug therapy). This has been identified as indispensable both for the prevention and management of all stages of high blood pressure [41]. [42] in a study discover that high intake of fruits is associated with a lower risk of hypertension than vegetable among subjects without baseline hypertension. [43] in a similar study find an inverse association with risk of hypertension being stronger with intake of fruits than with vegetables. Others like [44] have evidence that increased consumption of vegetables and fruits may avert body weight gain since these are naturally low in fat and energy.

2. MATERIALS AND METHODS

A cross sectional descriptive survey was used. The study was carried out in three major health care facilities situated in the Cape Coast Metropolis. The Central Regional Teaching Hospital (CRTH) Pedu, the Cape Coast Metropolitan Hospital (CCMH) Bakaano and the University of Cape Coast Hospital (UCCH), UCC. The Cape Coast Metropolis is bounded to the south by the Gulf of Guinea, west by the Komenda-Edina-Eguafo-Abrem (KEEA) Municipality at Iture Bridge, East by the Abura-Asebu-Kwamankese (AAK) District and to the north by the Twifu-Heman-Lower-Denkyira District. The metropolis occupies an area of approximately 122 square kilometers, with the farthest point at Brabadze, about 17 kilometers from Cape Coast, the capital of the metropolis and the Central Region [17]. The target population for the study consisted of all hypertensive patients aged at ≥ 18 years who reported to the three selected health facilities in the Cape Coast Metropolis. According to the Ghana Statistical Service [18], out of the metropolis' total population of 159205, 23905

were hypertensive. However, patients who reported to the three health facilities between September 2012 and September, 2013 were as follows: Central Regional Hospital – 1296 (391 males and 905 females), Cape Coast Metropolitan Hospital – 2667 and University Hospital – 1884 (782 males and 1102 females). Therefore, the total number of hypertensive patients in the metropolis was 5847.

2.1 Sample and Sampling Techniques

The sample size for the study was 347. This was determined using the formula devised by [45]. Thus,

$$n = \frac{N}{1 + N(e)^2}$$

where n is the sample size, N is the population size and e is the level of precision (0.05). The assumption for the equation is a confidence level of 95%. Using a population size (N) of 5847 in the equation,

$$\frac{5847}{1 + 5847(0.05)^2} = 374$$

From the above equation, a sample size of at least 374 was determined as a fair representation of the population and a sample size of 400 used. The sample size for each hospital was arrived at based on the following

formula, $f = \frac{n}{N}$ developed by [46]. The considered sample size is n , the population size is N and f is the sample fraction of the sample size.

Applying this formula,

$$\frac{400}{5847} = 0.06841$$

The sample fraction of 0.06841 was multiplied by the size of each stratum to obtain the following sample sizes, 89, 182 and 129 for Regional, Metropolitan and the University hospitals, respectively as shown in Table 1.

Convenient sampling technique was used to select hypertensive patients to form the sample because there was no register for hypertensive patients. The nurses who had access to patients' folders were asked to refer hypertensive patients

to researchers after routinely taking their vital statistics. Four hundred (400) patients in total from the 3 hospitals were referred to researchers within the period data was collected. Participation was strictly voluntary and patients' concern were orally obtained and confidentially assured prior to partaking in the study. A self developed questionnaire with 7 sections covering the demographic characteristics of patients, patients' knowledge on hypertension, attitudes and perceptions, dietary practices, sleeping patterns, barriers to maintenance of healthy lifestyles and patients' attitudes towards exercise were distributed to participants.

Table 1. Sample size allocation to hospitals

Hospital	Population	Sample
Central regional hospital	1296	89
Cape Coast Metropolitan Hospital	2667	182
University hospital	1884	129
Total	5847	400

2.1.1 Pilot-testing of instrument

Questionnaires were administered to 40 hypertensive patients at the Saltpond Municipal Hospital, Saltpond to help establish the reliability of the items. This hospital was chosen because it had similar characteristics as those selected for the main study. The Cronbach's alpha reliability test was determined against the acceptable range of $\geq .600$ as stated by Cohen [47]. SPSS version 21 was used to compute the reliability coefficients for each scale in the questionnaire before the overall was computed. Table 2 presents the results as obtained from the Cronbach's Alpha reliability test, as well as the items under each of the scales.

2.2 Data Analysis

Retrieved questionnaires were serially numbered, coded and input into the Statistical Product and Service Solutions (SPSS version 21). Frequencies, percentages and cross tabulations were obtained from the factor analysis. Binary logistic regression modeling was employed for inferential data for e.g. Patients levels of knowledge; "knowledge level" as a dependent variable was categorized as "adequate and poor" and a logistic regression run to determine if any of the participants characteristics influenced the knowledge level. Patients dietary practices were categorized into

"good and bad", and for their attitudes, the participants were classified into "positive" and "negative attitudes". To be classified as having "adequate knowledge", "positive attitude" or "good dietary practice," the criterion for classification was set at least at 50% and scores below 50% were classified as having "poor knowledge," "negative attitude" or "poor practice."

Table 2. Cronbach's alpha reliability coefficients

Scale	Number of Items	Coefficient
Knowledge on hypertension	27	.914
General attitudes and perception	21	.848
Dietary practices	34	.857
Attitudes towards exercise	11	.991
Sleeping pattern	14	.861
Barriers towards healthy lifestyle	10	.953
Overall	117	.910

3. RESULTS AND DISCUSSION

Data on the number of reported cases of hypertension in both the Central region and the Cape Coast Metropolis were obtained from the Center for Health Information Management in Cape Coast and reported in Table 3. The incidence of hypertension has been increasing in both the Central region and Cape Coast Metropolis from 2009 to 2012 with the numbers for females increasing almost twice as that for males.

Earlier studies that covered both urban and rural areas in Ghana did report the prevalence of hypertension as being higher in the former than the latter and increased with increasing age ranging from 19.3% in rural to 54.6% in urban areas [48]. [49] in a systematic review of the epidemic of hypertension in Ghana reports an expected increased burden of hypertension as a result of increase in life expectancy and rapid urbanization.

He associates the high prevalence of hypertension in Ghana with relatively low levels of awareness, drug treatment and blood pressure control. Prevalence of hypertension has been increasing in Ghana from 1977 when the urban and rural prevalence were reported to be 11.3% and 4.5% respectively [50,51].

Table 3. Reported cases of hypertension in the central region and Cape Coast metropolis

Morbidity returns on hypertension in the central region				Morbidity returns on hypertension in the Cape Coast metropolis			
Year	Male	Female	Total	Year	Male	Female	Total
2009	14115	27058	41173	2009	4878	7257	12135
2010	18485	34224	52709	2010	7405	10392	17797
2011	23116	42055	65171	2011	9970	15759	25729
2012	32785	64321	97106	2012	11605	19293	30898

Source: (District Health Information Management System-DHIS, Centre for Health Information Management-CHIM, Central region)

An urban prevalence of the greater Accra in 2004 was found to be 32.2% and 24.1% rural prevalence [52]. By 2005, a study of the Ashanti region presented an urban prevalence of 33.4% and rural prevalence of 27.0%. According to [22], hypertension is more prevalent (31.8%) among urban residents in Kitwe, Zambia.

The group studied had more females (n=242; 60.5%) than males (n=158; 39.5%). [53] in a similar study found females to be more than 63% out of 323 hypertensive patients in Kumasi. Other studies elsewhere have reported similar trends. [54] in a study of Jamaicans confirm the dominance of female hypertensive patients. On the contrary, [55] find the condition more prevalent among males (55.6%) than females. Majority of the study participants were between 60-69 years old (n=132; 30%) followed by those between the ages of 50-59 years (n=89; 22.2%) and the least were below the age of 40 (n=25; 6.3%). This trend in age and prevalence is consistent with other studies. [56] report a strong positive association between prevalence of hypertension and age in both men and women. [57] finds 35% of the participants to be between the ages of 40 and 55 with 40% over 55 years in a Ghanaian study.

Results of the Body Mass Index of the study participants in Table 4 show more than 70% were either overweight or obese. Several studies attribute overweight and obesity to hypertension. In Tanzania, [21] reveal high rates of hypertension among the obese and elderly specifically in both urban and rural areas. Eleven studies published on hypertension with surveys conducted in Ghana between 1973 and 2009 identified increasing body mass as one of the factors associated with high blood pressure. The others were increased salt consumption, family history of hypertension and excessive alcohol intake [49].

Marriage was popular among participants with more than half being married (n=232; 58%) and the least popular being single (n=25; 6.2%). Christians formed the majority (n=347; 86.8%). Majority of the participants (71.8%) had obtained some level of education but this did not translate into knowledge in hypertension. Only about a third of the participants did not receive any formal education (n=113; 28.2%). More than a third of the participants were retirees (37.8%) who probably may be living more sedentary lives rather than active lives. This lifestyle may increase the risk of acquiring hypertension and difficult to control if already acquired. For those in active employment, being active may probably not be a problem but rather making time to eat well for healthy growth may be a more pressing issue (n=128; 32.0%). Also, depending on what an individual does for example, bankers may sit longer hours working at their desks without engaging much in any physical activity. With majority of the participants (57.0%) not having regular incomes suggest that quality of life in terms of healthy eating among others may be compromised in periods of less income compared to the others who had regular income (n=172; 43.0%). If more than half of the participants (n=255; 63.8%) lived on less than the national minimum wage of GH¢157.20, then probably the basic necessities of life may not be met in their families. About half of the participants financially depended on others especially spouses and children (n=209; 52.2%).

More than half of the participants (n=255; 63.8%) correctly explained that hypertension occurred when one's blood pressure moved higher than normal. Even with this knowledge, participants still believed that once it did not cause health problems in an individual, it was normal.

Yet, hypertension is said to be asymptomatic and so it could equally cause fatalities even without necessarily showing any symptoms.

Table 4. Demographic characteristics of respondents

Variables	Frequency	Percentage
Sex		
Males	158	39.5
Females	242	60.5
Age (in years)		
20 – 29	7	1.8
30 – 39	18	4.5
40 – 49	59	14.8
50 – 59	89	22.2
60 – 69	132	33.0
70 – 79	65	16.2
80 – 89	30	7.5
Body mass index		
Underweight	5	1.2
Normal weight	113	28.2
Overweight	155	38.8
Obese	127	31.8
Marital status		
Single	25	6.2
Married	232	58.0
Divorced	54	13.5
Widowed	78	19.5
Separated	10	2.5
Cohabitation	1	0.2
Religion		
Christianity	347	86.8
Islam	42	10.5
Traditional	4	1.0
Atheism	6	1.5
Buddhism	1	0.2
Highest educational level		
No formal education	113	28.2
Primary	44	11.0
JSS/JHS	87	21.8
SSS/SHS	65	16.2
Tertiary	91	22.8
Employment status		
Full-time/Part-time	128	32.0
Under-employed	59	14.8
Fisherman/ farmer	56	14.0
Others	107	26.8
Student/Home maker	62	15.4
Retired	151	37.8
Occupation		
Teacher/Educationist/Lecturer/Student	54	13.5
Accountant/ Nurses/ Bankers	44	11.0
Trader/Businessman	139	34.8
Household income		
Regular	172	43.0
Irregular	228	57.0
Monthly income (GH¢)		
Less than 157.20	255	63.8
157.20 – 1,499	106	26.5
1,500 – 7,200	31	7.8
Above 7,200	8	2.0
Financial situation		
Dependent	209	52.2
Independent	191	47.8

In addition to the above responses, 95.8% just added that hypertension was “Mogya mbordo” which means having too much blood.

Their knowledge on the causes of the condition was not left out. As to whether or not obesity was a cause of hypertension, a significant percentage (45.8%) got it wrong as they responded in the negative. However, the majority had it correct. Similarly, 295 (73.8%) knew that stress could lead to hypertension. About 73% of the participants did not know that lack of physical activity could increase one’s risk of acquiring hypertension as well as drinking too much alcohol (67.8%). In addition, only few of the participants (27.5%) knew that cardiovascular diseases could occur as a result of this condition or hypertension. For signs and symptoms of hypertension, it was observed that majority of the participants (n=348; 82.1%) mentioned that the condition had no signs and symptoms, while the remaining (n=71; 17.9%) correctly pointed out that hypertension had several signs and symptoms. Some of the signs and symptoms identified included headache and dizziness, fainting and stroke. The main signs and symptoms of the condition specifically mentioned

by the participants were headaches or dizziness and stroke while minimal knowledge on the consequences of untreated hypertension was shown.

Participants showed adequate knowledge about two of the four risk factors of hypertension presented to them, namely, high fat/sodium diet (72.8%) and sedentary lifestyle (53.8%). However, fewer of them (n=128; 32.0%) and (n=159; 30.2%) selected genetics and stress as potential risk factors of hypertension rather they easily identified older age and obesity as high risk factors for acquiring hypertension. [58] identifies genetic factor as risk factor for hypertension.

[59] maintains that despite the efforts by WHL and other hypertension agencies which promote awareness and education, with an institutionalization of a world hypertension day, several people across the world still lack knowledge about the condition. [30] report poor understanding of Blood Pressure among the general population in a study conducted in London.

Table 5. Knowledge about hypertension (definition and causes)

Knowledge about hypertension	Wrong Freq. (%)	Correct Freq. (%)
What is hypertension?		
When the blood pressure is higher than normal	145 (36.2)	255 (63.8)
When BP is high enough to cause health problems	258 (64.5)	142 (35.5)
“Mogya mbordo” Too much blood	383 (95.8)	17 (4.2)
Causes of hypertension (high blood pressure)		
Obesity	183 (45.8)	217 (54.2)
Stress	105 (26.2)	295 (73.8)
Physical inactivity	293 (73.2)	107 (26.8)
Cardiovascular diseases	290 (72.5)	110 (27.5)
Drinking too much alcohol	271 (67.8)	129 (32.2)

Table 6. Knowledge about hypertension (signs and consequences)

Knowledge about hypertension	Wrong Freq. (%)	Correct Freq. (%)
Signs and symptoms of hypertension		
No signs and symptoms	329 (82.1)	71 (17.9)
Headache and dizziness	112 (28.0)	288 (72.0)
Fainting	317 (79.2)	83 (20.8)
Stroke	109 (27.2)	291 (72.8)
Consequences of untreated hypertension		
Kidney or heart failure	222 (55.5)	178 (44.5)
Blindness	278 (69.5)	122 (30.5)
Death	291 (72.8)	109 (27.2)

[53] observe that patients show less than average knowledge about hypertension and the probable life style modifications that could help manage it. Findings from this study seem to be consistent with this trend of low knowledge of hypertension among populations mentioned in the above studies irrespective of efforts made to educate people on hypertension.

On the contrary, [60] reports a very high hypertension knowledge level among a group of people in Kumasi-Ashanti region of Ghana but stresses that although they were knowledgeable about the conditions' basic information, that knowledge did not cover the etiology of hypertension. Probably, the poor knowledge in hypertension among people could be attributed to the seemingly silent and often times symptomless nature of the condition. Others like [61] and [62] report a significant association between education, knowledge and attitude and found negative attitude towards hypertension among most populations with low education. They added that the more highly educated individuals were the better attitude they had towards hypertension. [61] and [62] findings on education, knowledge and attitude has been supported by other studies. [63] found that

specific knowledge about a disease is often required to help people deal with it and stressed that education in general may not be enough to achieve that.

The analysis was carried out at α -level of 0.05 and only participants' occupation significantly influenced their knowledge levels with $P=0.012$. This implies that participants who had occupations and worked were found to have adequate knowledge about hypertension than those without occupations. The remaining characteristics did not impact participants' knowledge of hypertension.

[64] identify cost, financial situation, convenience and availability as barriers to the consumption of fruits and vegetables among hypertensive patients'. [65] find lack of knowledge about hypertension, inability to engage in healthy lifestyles, health beliefs and side effects of certain medications to be major barriers that impede management of the condition among hypertensive patients. Others have found results similar to these in other studies. [66] identify price of healthy foods as a major barrier to eating healthy among hypertensive patients.

Table 7. Knowledge about hypertension (risk factors)

Knowledge about hypertension	Wrong Freq. (%)	Correct Freq. (%)
Risk factors of hypertension		
Genetics	272 (68.0)	128 (32.0)
High fat and sodium diet	109 (27.2)	291 (72.8)
Sedentary lifestyle	185 (46.2)	215 (53.8)
Stress	241 (60.2)	159 (39.8)
Who is at risk of having hypertension?		
Aged	154 (38.5)	246 (61.5)
Obese people	174 (43.5)	226 (56.5)
People with cardiac problems	308 (77.0)	92 (23.0)
Genetically compromised persons	279 (69.8)	121 (30.2)

Table 8. Knowledge about hypertension (treatment and prevention)

Knowledge about hypertension	Wrong Freq. (%)	Correct Freq. (%)
Treatment options for hypertension		
Drugs	52 (13.0)	348 (87.0)
Diet	143 (35.8)	257 (64.2)
Exercise	184 (46.0)	216 (54.0)
How can hypertension be prevented?		
By engaging in regular physical exercise	169 (42.3)	231 (57.7)
By eating low salt diet	199 (49.7)	201 (50.3)
By reducing or stopping alcohol drinking	134 (33.5)	266 (66.5)
Cannot be prevented no matter what	206 (51.5)	194 (48.5)
What blood pressure is considered optimal?	298 (74.5)	102 (25.5)

Table 9. Participants characteristics that may influence their knowledge level in hypertension in the Cape Coast metropolis

Adequate knowledge on the condition (Ref. group is Poor knowledge)	B	p-value	OR	95.0% C.I. for OR	
				Lower	Upper
Age of patients	0.072	.762	1.074	0.677	1.705
Sex	0.202	.726	1.224	0.394	3.802
Body Mass Index (BMI)	0.360	.274	1.434	0.752	2.734
Marital status	0.238	.472	1.269	0.663	2.427
Educational level	-0.284	.225	0.753	0.476	1.191
Employment status	0.028	.896	1.029	0.671	1.576
Household income	-0.987	.142	0.373	0.100	1.390
Total monthly income	-0.664	.065	0.515	0.254	1.042
Financial situation	0.121	.832	1.129	0.368	3.461
Occupation	0.548	.012	1.730	1.129	2.651
Religion	-0.122	.777	0.885	0.380	2.061
Constant	2.721	.342	15.201		

[67] identifies the lack of will power as a major barrier to hypertensive patients effectively managing their condition. Cape Coast being the capital city of the central region and highly urban in nature, the high incidence of hypertension here compared to the whole of the central region could be related to the fact that urban areas probably have higher incidence of hypertension than rural areas. [68] highlights a positive association between sedentary lifestyle and chronic diseases in Ghana, and adds that sedentary lifestyles are more prevalent in urban than rural settings. People tend to walk more in rural settings than urban settings because the distances between places are shorter and there is less public transport unlike in urban areas where people travel long distances and cannot do without transport. A report by [69] indicates that over 80% of men and women report low consumption of fruits and vegetables while others consume lots of fatty foods which increase the risk of acquiring hypertension. [69] subsequently reports that palm oil which is high in saturated fats is used in cooking by the highest proportion of households (80%) in the Central Region. Considering the major role lifestyle modification plays in the prevention and management of hypertension, it is imperative that people gain in-depth knowledge in lifestyle modifications such as low consumption of salt and alcohol, high consumption of vegetables and fruits, optimal exercise, stress reduction and obesity prevention, and the development of a positive attitude towards life.

4. CONCLUSION

From the study, we conclude that the knowledge of hypertension among participants was generally poor. More than 95% (n=383; 95.8%)

of the study participants showed a poor level of knowledge in the causes, signs and symptoms, risk factors, prevention and treatment of hypertension. Attitudes and perceptions towards the condition were highly negative (98%) among participants and more than half of them (62.2%) were found to have negative attitudes towards exercise although some were engaged in walking, jogging, running and climbing of stairs. The following were identified as barriers that countered participants' efforts to maintain healthy life styles; "lack of education", "fear", "financial constraint," and "lack of commitment." Participants' occupation significantly predicted their level of knowledge about hypertension with those who had occupations and worked being more knowledgeable about the condition than those who had no occupation and no regular jobs. Looking at the past hypertension studies conducted in different areas in Ghana prior to this study and the subsequent conclusions provided such as its association with low levels of awareness, drug treatment, and blood pressure control, it can clearly be seen that the population-based prevention strategies, such as reduction in salt intake and integration of hypertension care into primary care, which have often been recommended, may probably have not been utilized or may need to be promoted more.

5. LIMITATION(S)

Considering the fact that factors relating to hypertension looked at in this study may vary demographically in other regions of Ghana, making strong generalization of the findings may be limited without a meta analysis of similar data obtained from two or more regions.

CONSENT

All authors declare that 'oral informed consent was obtained from each patient prior to participating in the study after the objectives of the study were explained, confidentiality of responses assured, identity of the participants assured to be kept anonymous and participation was voluntary and they could drop out anytime they felt uncomfortable to continue.

ETHICAL APPROVAL

All authors confirm that all necessary ethical approval (UCC IRB: 2/10/2014) has been obtained from the University of Cape Coast Institutional Review Board and the study has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. World Health Organization-Global Status report on non-communicable diseases 2010. Geneva: WHO; 2011.
2. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data; 2005. Available:http://www.ncbi.nlm.nih.gov/pubmed/156_526_04 (Accessed 2 February 2013)
3. Mathers CD, Loncar D. Updated projections of global mortality and burden of disease, 2002- 2030: Data sources, methods and results. WHO, 2006. Available:www.who.int/.../bod_projections2030_paper.... (Accessed 12 September 2014)
4. Addo J, Smeeth L, Leon DA. Hypertension in Sub-Saharan Africa. A Systematic Review; 2007. DOI:10.1161/HYPERTENSIONAHA.107.093336
5. WHO- A Global brief on hypertension; 2013. Available:www.who.int/.../WHO_DCO_WH_D_2013.2_... (Accessed 12 February 2014)
6. Vijver S, Akinyi H, Oti S, Olajide A, Agyemang C, Aboderin I, Kyobutungi C. Status report on hypertension in Africa-consultative review for the 6th Session of the African Union Conference of Ministers of Health on NCD's. Pan African Medical Journal. 2013;16(38). DOI: 10.11604/pamj.2013.16.38.3100
7. Cheriyan J, McEniery CM, Wilkinson IB. Hypertension Oxford University Press Inc. New York; 2010.
8. Carretero OA, Oparil S. Essential hypertension. Part I: definition and etiology. *Circulation*. 2000;101(3):329–35.
9. Modak RK. Anesthesiology Key words Review (2nd ed.) Philadelphia PA: Lippincott Williams and Wilkins; 2013.
10. Kaplan NM, Victor RG. Kaplan's clinical hypertension (10th ed.) Lippincott Williams and Wilkins; 2010.
11. Moser M. The clinical management of hypertension (8th ed.). Professional Communications, Inc, USA; 2008.
12. Brown JE, Isaacs JS, Krinke UB, Lechtenberg E, Murtaugh MA, Sharbaugh C, Wooldridge NH. Nutrition through the Life Cycle (4th ed.), Wadsworth, Cengage Learning; 2011.
13. O'Brien E, Beevers DG, Lip GYH. ABC of hypertension. London: BMJ Books; 2007.
14. Darling MS. Non-pharmaceutical management of hypertension among middle-aged and older Adults: A literature review. Unpublished thesis submitted to the faculty of the college of nursing, University of Arizona; 2009.
15. Ogedegbe G, Plange-Rhule J, Gyamfi J, Chaplain W, Ntim M, Apusiga K, Khurshid K, Cooper R. A cluster-randomized trial of task shifting and blood pressure control in Ghana: Study protocol. *Implementation Science*. 2014;9(73).
16. Central Regional Health Directorate. (2011). Out patients morbidity returns, District Health Information Management System-DHIS, Centre for Health Information Management-CHIM; 2014.
17. Cape Coast Metropolitan Planning Coordinating Unit. Annual Composite Progress Report for Medium Term Development Plan (2012-2013) under Ghana Shared growth and development Agenda (GSGDA) 2010 – 2013; 2012. Available:www.ndpc.gov.gh/GPRS/.../CENTRAL/Cape%20Coast.pdf (Accessed 4 January 2013)

18. Ghana Statistical Service. 2010 Population and Housing Census- Population by districts and sex; 2011.
Available:www.ghanadistricts.com/pdfs/2010_pop_census_districts.pdf (Accessed 23 May 2013)
19. Mondzinger NM. The knowledge of young adults on hypertension. Theses, Faculty of Medicine and Health sciences, Stellenbosch University; 2012.
Available:https://scholar.sun.ac.za/bitstream/.../mondzinger_knowledge_2012.pdf?... (Accessed 9 September 2014)
20. Goma FM, Nzala SH, Babaniyi O, Songolo P, Zyaambo C, Rudatsikira E, Siziya S, Muula AS. Prevalence of hypertension and its correlates in Lusaka urban district of Zambia: A population based survey. *International Archives of Medicine*. 2011;4(34).
DOI: 10.1186/1755-7682-4-34
21. Mbah BO, Eme PE, Ezeji J. Prevalence and risk factors of hypertension among middle-aged adults in Ahiazu Mbiase Local Government Area, Imo State, Nigeria. *International Journal of Basic and Applied Sciences IJBAS-IJENS*. 2013;13(1).
22. Siziya S, Rudatsikira E, Babaniyi O, Songolo P, Mulenga D, Muula AS. Prevalence and correlates of hypertension among adults in a mining town of Kitwe, Zambia. *Journal Hypertension*. 2012; 1(105).
DOI: 10.4172/21671095.1000105
23. Muhiri AJ, Njelekela MA, Mpembeni R, Mwiru RS, Mligiliche N, Mtabaji J. Obesity, overweight and perceptions about body weight among middle-aged adults in Daresalam, Tanzania; 2012.
Available:<http://dx.doi.org/10.5402/2012/368520> (Accessed 9 September 2013)
24. Dzudie A, Kengne AP, Muna WFT, Ba H, Menanga A, Kouam CK, et al. Prevalence, awareness, treatment and control of hypertension in a self- selected sub-Saharan African urban population: A cross-sectional study. *BMJ Open*; 2012.
Available:<http://bmjopen.bmj.com/0:e001217> (Accessed 10 October 2014)
25. Ifeoma IU, Chinwuba KI, Basden, J.C. Onwubere EA, Obinna O, Christian O. High prevalence and low awareness of hypertension in a market population in Enugu, Nigeria. *International Journal of Hypertension*. 2011;5.
DOI: 10.4061/2011/869675
26. Jui BY, Ajong DWA, Ismail ELB, Jaffar KAB, Chun LH, Yee LC, et al. A cross sectional study on the levels of knowledge, attitude and preventive practices of hypertension among residents aged 18 years and above in Kampung Baru Ixora, Sarikei; 2006.
Available:ir.unimas.my/241/1/bong_yung_jui.pdf (Accessed 11 October 2014)
27. Pickens J. Attitudes and perceptions- Leadership management.
Available:healthadmin.jppub.com/borkowski/chapter3 on 04/06/13 (Accessed 4 June 2013)
28. Biradar SS, Kapatae R, Reddy S, Raju SA. Role of pharmacist towards knowledge, attitude and practice in compliance with hypertension in North Karnataka in South Indian City a brief overview. *International Research Journal of Pharmacy*. 2012;3(5).
Available:<http://www.irjonline.com> (Accessed 12 March 2013)
29. Boule A. Knowledge of the hypertensive person regarding prevention strategies for coronary heart Disease. Master of Arts, University of South Africa; 2009.
Available:<http://hdl.handle.net/10500/2608> (Accessed 03 January 2014)
30. Slark J, Khan MS, Bentley P, Sharma P. Knowledge of blood pressure in a UK general public population. *Journal of Human Hypertension*. 2014;28:500–503.
31. Mahajan H, Kazi Y, Sharma B, Velhal GD. Health education: An effective intervention in hypertensive patients. *International Journal of Recent Trends in Science and Technology*. 2012;4(2):77-82.
Available:www.scribd.com/.../Health-Education-an-Effective-Intervention-in-Hype (Accessed 03 January 2014)
32. Oliveria SA, Chen RS, McCarthy BD, Davis CC, Hill MN. Hypertension, knowledge, awareness and attitudes in a hypertensive population. *Journal of General Intern Medicine*. 2005;20:219–225.
DOI: 10.1111/j.1525-1497.2005.30353.x
33. Azubuike SO, Kurmi R. Awareness, practices, and prevalence of hypertension among rural Nigerian women. *Archives of Medicine and Health Sciences*. 2014;2(1).
DOI: 10.4103/2321-4848.133791
34. Viera AJ, Cohen LW, Mitchell CM, and Sloane PD. High blood pressure knowledge among primary care patients with known hypertension: A North Carolina

- Family Medicine Research Network (NC-FM-RN) Study JABFM. 2008;21(4). Available: <http://www.jabfm.org> (Accessed 2 December 2013)
35. Nisbet EKL, Gick ML. Can health psychology help the planet? Applying Theory and Models of Health Behaviour to Environmental Actions. *Canadian Psychology*. 2008;49:296-303.
 36. Pender NJ, Walker SN, Sechrist KR, Stromberg MF. Predicting health-promoting lifestyles in the workplace. *Nursing Research*. 1990;39(6):326-332.
 37. Somerall D. Middle range theory evaluation. NUR 731: Philosophical, Theoretical and Conceptual Foundations for Advanced Practice Nursing, Fall term, University of Alabama at Birmingham; 2010.
 38. Bennett C, Perry J, Lawrence Z. Promoting health in primary care. *Nursing Standard*. 2009;23:48-56.
 39. Pender NJ, Murdaugh CL, Parsons MA. *Health promotion in nursing practice* (5th ed.) New Jersey: Pearson Prentice Hall; 2006.
 40. Azizi M, Rahmani-Nia F, Malae M, Khosravi N. A study of nutritional knowledge and attitudes of elite college athletes in Iran Brazilian. *Journal of Biometricity*. 2010;4(2):105-112.
 41. Caribbean Health Research Council. *Managing hypertension in primary care in the Caribbean*; 2007. Available:<http://www.chrc-caribbean.org> (Accessed 6 July 2013).
 42. Tsubota-Utsugi M, Ohkubo T, Kikuya M, Metoki H, Kurimoto A, Suzuki K, Fukushima N, Hara A, Asayama K, Satoh H, Tsubono Y, Imai Y. *Journal of Human Hypertension*. 2011;25:164–171. DOI: 10.1038/jhh.2010.48
 43. Wang L, Manson JE, Gaziano JM, Buring JE, Sesso HD. Fruit and vegetable intake and the risk of hypertension in middle-aged and older women. *Am Journal of Hypertension*. 2012;25(2):180–189. DOI: 10.1038/ajh.2011.186
 44. Boeing H, Bechthold A, Bub A, Ellinger S, Haller D, Kroke A, Leschik Bonnet E. Critical review: Vegetables and fruit in the prevention of chronic, diseases. *European Journal of Nutrition*. 2012;51(6):637–663. DOI: 10.1007/s00394-0120380-y
 45. Israel GD. *Determining Sample Size IFAS*, University of Florida, Gainesville; 2013.
 46. Mupepi SC, Sampsel MC, Johnson TRB. Knowledge, attitudes, and demographic factors influencing cervical cancer screening behaviour of Zimbabwean women. *Journal of Women’s Health*. 2011; 20(6).
 47. Leech NC, Barrett KC, Morgan GA. *SPSS for intermediate statistics: Use and interpretation* (2nd ed.). Mahwah NJ: Lawrence Earlbaum Associates; 2005.
 48. Agyemang C. Rural and urban differences in blood pressure and hypertension in Ghana, West Africa. *Public Health*. 2006;120(6):525-33. Available:<http://dx.doi.org/10.1016/j.puhe.2006.02.002>
 49. Bosu WK. Epidemic of hypertension in Ghana: a systematic review. *BMC Public Health*. 2010;10:418. DOI: 10.1186/1471-2458-10-418
 50. Gaziano TA, Bitton A, Anand S, Weinstein MC. International society of hypertension: The global cost of non optimal blood pressure. *Journal of Hypertension*. 2009; 27:1472-1477.
 51. Addo J, Smeeth L, Leon DA. Hypertension in sub-Saharan Africa: A systematic review. *Journal of Hypertension*. 2007;50: 1012-1018.
 52. Njelekela M, Negishi H, Nara Y, Tomohiro M, Kuga S, Noguchi T, Kanda T, Yamori M, Mashalla Y, Liu LJ, et al. Cardiovascular risk factors in Tanzania: A revisit. *Acta Tropical*. 2001;79:231-239.
 53. Marfo AFA, Owusu-Daaku FT, Addo MO, Saana II. Ghanaian hypertensive patients understanding of their medicines and life style modification for managing hypertension. *International Journal of Pharmacy and Pharmaceutical Sciences*. 2014;6(4).
 54. Eugene V, Bourne PA. Hypertensive patients: Knowledge, self-care management practices and challenges. *Journal of Behavioural Health*; 2013. DOI: 10.5455/jbh.20130217103511
 55. Iyalomhe GBS, Iyalomhe SI. Hypertension-related knowledge, attitudes and life-style practices among hypertensive patients in a sub-urban Nigerian community. *Journal of Public Health and Epidemiology*. 2010; 2(4):71-77.
 56. Mishra V, Arnold F, Semenov G, Hong R, Mukuria A. *Epidemiology of obesity and hypertension in Uzbekistan. Demographic and Health Research*; 2005. Available: www.ponline.org/node/257212

57. Fesmire AC. Hypertension in Ghana: Treatment, management and prevention. *Medical Journal of Therapeutics Africa*. 2008;2(2).
58. Rakumakoe MD. To determine the knowledge, attitudes and perceptions of hypertensive patients towards Lifestyle modification in controlling hypertension; 2011.
Available: wiredspace.wits.ac.za/bitstream/.../MY_RESEARCH_SUBMISSION.pdf (Accessed 23 December 2013)
59. Singh KK. World Hypertension Day - Theme: Know your Blood Pressure; 2014.
Available: <http://www.e-pao.net › education › Health Issue> (Accessed 6 August 2014)
60. Kofi JO. Prevention and management of hypertension: A study on knowledge and attitudes of women of childbearing age. Thesis Central Ostrobothnia, University of Applied Sciences; 2011.
Available: www.theseus.fi/bitstream/handle/10024/41325/Kofi_Janet%20pdf.pdf (Accessed 2 September 2013)
61. Busari OA, Olanrewaju TO, Desalu OO, Opadijo OG, Jimoh AK, Agboola SM, Busari OE, Olalekan O. Impact of patients' knowledge, attitude and practices on hypertension on compliance with antihypertensive drugs in a resource-poor setting. *TAF Preventive Medicine Bulletin*. 2010;9(2):87-92.
62. Parmar P, Rathod GB, Rathod S, Goyal R, Aggarwal S, Parikh A. Study of knowledge, attitude and practice of general population of Gandhinagar towards hypertension. *International Journal of Current Microbiology and Applied sciences*. 2014; 3(8):680-685.
Available: <http://www.ijcmas.com> (Accessed 6 June 2014)
63. Almas A, Godil SS, Lalani S, Samani ZA, Khan AH. Good knowledge about hypertension is linked to better control of hypertension; A multicentre cross-sectional study in Karachi. *Pakistan BMC Research Notes*. 2012;5:579.
Available: <http://www.biomedcentral.com/1756-0500/5/579> on 12/04/13 (Accessed 12 April 2013)
64. Lucan SC, Barg FK, Long JA. Promoters and barriers to fruit, vegetable, and fast-food consumption among urban, low income African Americans—A qualitative approach. *American Journal of Public Health*. 2010;100:631–635.
DOI: 10.2105/AJPH.2009.172692
65. Odedosu T, Shoenthaler A, Vieira D, Agyemang C, Ogedegbe A. Overcoming barriers to hypertensive control in african Americans. *Cleveland Clinic Journal of Medicine*. 2012;79(1):46–56.
66. Pawlak R, Colby S. Benefits, barriers, self-efficacy and knowledge regarding healthy foods; perception of African Americans living in eastern North Carolina *Nutrition Research and Practice*. 2009;3(1):56-63.
DOI: 10.4162/nrp.2009.3.1.56
67. The National Obesity Observatory. Knowledge and attitudes towards healthy eating and physical activity: what the data tell us; 2011.
Available: www.noo.org.uk/uploads/doc/vid_11171_Attitudes.pdf 4 (Accessed 12 August 2014)
68. Amoah AGB. Socio-demographic variations in obesity among Ghanaian adults. *Public Health Nutrition*. 2003;6(8): 751–757.
DOI: 10.1079/PHN2003506.
69. Ghana Demographic and Health Survey. Key Findings. Calverton, Maryland, USA: GSS, GHS, and ICF Macro; 2008.

© 2015 Anowie and Darkwa; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://sciencedomain.org/review-history/11291>