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BARRIERS TO SELF-MONITORING: A STUDY AMONG HYPERTENSIVE PATIENTS IN ACCRA METROPOLIS

BY

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DECLARATION

I, Charles Lwanga Deong Zieme, declare that this dissertation is the product of my own original research which has not been submitted elsewhere for another degree, and that all pieces of information accessed from other people/sources have been duly acknowledged in the citations and in the reference list.

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DEDICATION

To God be the glory. I solemnly dedicate this work to my understanding wife, Mavis Gbe-song, and my enduring children, Carlyn Maaloo, Carl Del-ngmen, and Claus Yirinayeng, for the neglect they suffered as a result of my absence from home.

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ABSTRACT

Hypertension is a global public health problem that is ravaging the active adult workforce of nations especially in low- and middle-income countries such as Ghana. Health care professionals continue to roll out management interventions aimed at controlling blood pressures and improving patients' well-being. Regular self-monitoring of blood pressure by hypertensive patients is one sure way of improving their health. The practice of self-monitoring in the general population or among hypertensive patients in Ghana is not documented. However, anecdotal evidence suggests that some people, especially patients, perform self-monitoring. This study sought to explore their awareness and knowledge about self-monitoring, how they practice it and any barriers to the practice.

This was a cross-sectional quantitative study where hypertensive patients who regularly attended Specialist Hypertension OPD clinics at Ridge Regional Hospital and La General Hospital in the Accra Metropolis formed the study population. A structured questionnaire was administered by interviewers or self-administered during patients' normal visits to their physicians for review. Data analysis was done using STATA Statistical/Data Analysis software, version 12.0 (Special Edition).

A total of 354 respondents, involving 162 males (45.8%) and 192 females (54.2%) took part in the study, majority of whom were aged between 30 and 60 years (median=50). Only a few respondents (7.1%) had lived with hypertension for 20 years and more, with diabetes affecting 28% of them. This study found that 67.8% of respondents had heard about SMBP, with health workers (70.4%) being their main source of information. The proportion of respondents who were currently self-monitoring with their personal BP apparatus was

31.9%, and less than 1% was practicing SMBP correctly. The main barriers to the practice of self-monitoring identified were lack of awareness and lack of money to purchase a personal BP apparatus.

Awareness about self-monitoring among respondents was high. About a third of them were self-monitoring, but almost all of whom were practicing incorrectly. Patients inability to practice were largely personal, but was also influenced by access to information/education from HCP.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABPM	Ambulatory Blood Pressure Monitoring
AHA	American Heart Association
AMA	Accra Metropolitan Assembly
AOR	Adjusted Odds Ratio
BP	Blood Pressure
COR	Crude Odds Ratio
CVD	Cardiovascular Disease
ESC	European Society of Cardiology
ESH	European Society of Hypertension
GAR	Greater Accra Region
GHS	Ghana Health Service
GP	General Physician
HCP	Health Care Provider/Professional
JSH	Japanese Society of Hypertension
LMIC	Low- and Middle-Income Country
mmHg	Millimeter of Mercury
MOH	Ministry of Health

NCD	Non-Communicable Disease
OPD	Out-Patient Department
PHC	Population and Housing Census
PI	Principal Investigator
SMBP	Self-Monitoring of Blood Pressure
SSA	sub-Saharan Africa
TOD	Target Organ Damage
UK	United Kingdom
USA	United States of America
WHO	World Health Organization

DEFINITION OF OPERATIONAL TERMS

The following terms as used in this study carry the connotation as described/explained herein:

Self-monitoring of blood pressure is the measuring of one's own blood pressure at home using a self-monitoring device.

Self-monitoring device is an instrument used in measuring one's own BP without the assistance of a health care professional.

Barrier describes any situation or factor such as the personal characteristics of a patient, institutional policies/protocols, and health care providers' characteristics, that inhibits a hypertensive patient from self-monitoring his/her blood pressure.

Personal characteristics of patients refer to the socio-demographic characteristics of age, sex, marital status, educational level, occupation/income status, religious belief, awareness, knowledge, forgetfulness, lack of time, and other co-morbidities.

Health care providers' characteristics include attitude, perception and communication skills in relation to self-monitoring.

Knowledge of SMBP refers to patients' ability to state actual value (120/80mmHg) or range of values (100/60-135/85mmHg) of the normal BP, use of personal BP apparatus, and correct practice of self-monitoring.

Correct practice of SMBP refers to patients' ability to identify statements which describe correct practice of self-monitoring from incorrect practice.

CHAPTER ONE

INTRODUCTION

1.1. Background

Self-monitoring in Hypertension is defined as the measuring of one's own blood pressure (BP) outside the usual review visit to a general physician (GP), mostly within one's home (Baral-Grant, Haque, Nouwen, Greenfield, & McManus, 2012). It is the practice where a patient voluntarily measures his/her BP using a self-check device, be it manual or electronic. The contribution of patients in the management of hypertension is important in reducing the complications associated with uncontrolled BP levels (Madhur, 2014). Prevalence and mortality rates are on the increase, and hypertension is the leading risk factor for cardiovascular diseases (CVDs) (Alwan, 2011). In spite of efforts in rolling out innovative management interventions for the control of high BP, many patients still have difficulty keeping to these recommendations (Bosu, 2010). This is evident in the numbers reported to be non-adherent. For instance, in Ghana less than 13% of patients diagnosed with hypertension have controlled BP levels, while some 93% are non-compliant to treatment recommendations (MOH, 2011).

In health-conscious populations such as Austria, self-monitoring of BP (SMBP) is a common practice even in the general population (Hitzenberger & Magometschnigg, 2003). Global prevalence of self-monitoring in the hypertensive population is about 70% (Cuspidi et al., 2005; Krecke, Lütkes, & Maiwald, 1996; Logan, Dunai, McIsaac, Irvine, & Tisler, 2008; Viera, Cohen, Mitchell, & Sloane, 2008). The practice is fast gaining popularity due to the availability of portable devices such as the electronic self-monitors or aneroid

sphygmomanometers (Parati, Stergiou, Asmar, Bilo, de Leeuw, et al., 2008). In the USA for example, almost half of all hypertensive patients have used a BP self-monitor in measuring their BP (Huff et al., 2011).

The conventional method of measuring patients' BP has always been the use of the mercury sphygmomanometer by health care professionals (Pickering et al., 2005). This is mostly performed in the Office of the GP or by other health care professionals (HCP) in a health facility. Pickering et al. (2005) refer to it as the "gold standard" for clinical BP measurement. However, they concede that clinic readings have the tendency to give poor estimates of the patient's true BP due to such problems as "white-coat-effect" and inability on the part of HCP to follow standard BP measuring procedures. Based on the research evidence available, McGowan & Padfield (2010) concluded that "self-monitoring of BP is the way forward" in controlling BP levels. Furthermore, self-monitoring is proven to be more effective in controlling BP levels among patients with hypertension than the usual Office-based periodic monitoring (Hitzenberger & Magometschnigg, 2003). This is because it encourages and motivates the patient's adherence to treatment, especially that they can instantly see their BP and match it against appropriate behaviour (Abdullah & Othman, 2011). Self-monitoring of BP is being recognized worldwide as an adjunct to the "gold standard" of Office BP monitoring (Bo, 2013) and may be the best replacement since it is now considered to be a better predictor of cardiovascular mortality even in the general population (Sega et al., 2005). It is also obvious that the current socio-technological advancement which gives more credit to personal empowerment will greatly influence this transition.

In self-monitoring, patients play an active role in assessing themselves by regularly and frequently measuring their own BP. According to Cappuccio, Kerry, Forbes, & Donald (2004), self-monitoring serves as encouragement and motivation to maintain or adjust patients' actions. This is what Orem refers to as "self-care" which is defined as the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health and well-being (Miehl, 1990). Lack of knowledge on BP levels, sometimes coupled with asymptomatic presentation of the condition in some patients, can lead to unhealthy behaviours that can exacerbate the condition.

1.2. Problem Statement

Hypertension has been recognized as the most common cardiovascular condition, with a global mean prevalence of 40%, Africa with 46% and Ghana recording 36.4% (Alwan, Armstrong, Cowan, & Riley, 2011; MOH, 2011). Cardiovascular diseases account for 12.8% (7.5 million) of deaths globally, and is projected to reach 22% by 2030 (Alwan et al., 2011). A consultative review report on non-communicable diseases (NCDs) in Africa described hypertension as the primary risk factor for CVDs on the continent, and indicated that the socio-economic impact on families deserted by sudden deaths is overwhelming national economies (van de Vijver et al., 2013). Hypertension in Ghana is common among the active working class, about half of whom (47.5%) suffer from target organ damage (TOD)(Addo et al., 2012), while about 18% of all deaths in Ghana are due to CVDs (Alwan et al., 2011). These statistics call for pragmatic measures in the management of hypertension, especially in LMICs.

Managing hypertension requires concerted efforts from both patients and HCP in keeping to recommended treatment regimens, both pharmacological and non-pharmacological. In the Accra Metropolis, several studies were conducted on prevalence, awareness, treatment, risk factors and non-adherence to medications and/or lifestyle modification (Addo, Smeeth, & Leon, 2009; Addo, Smeeth, & Leon, 2007; Awuah, Anarfi, Agyemang, Ogedegbe, & Aikins, 2014). However, investigating the reasons or factors why management efforts are not addressing the menace of hypertension did not receive much attention. Moreover, challenges peculiar to patients in self-management were not explored sufficiently. SMBP by hypertensive patients have been proven to improve BP controls, enhance patient participation in care, facilitate shared decision-making between patient and physician and improve adherence to treatment (Lau et al., 2006). However, the practice of SMBP was not common in the public health care system in Ghana. This study thus examined a cross-section of hypertensive patients in the Accra Metropolis, focusing on the barriers that inhibited the practice of SMBP.

1.3. Conceptual framework

Dorothea Orem in 1959 published a nursing theory that describes the abilities and inabilities of a patient. She noted that man needs self-care in a continuum to sustain life and health, recover from disease or injury and cope with their effects (Miehl, 1990) so much so that a deliberate action has to be taken to achieve that result. She further described self-care as the practice of activities that individuals personally initiate on their own behalf to maintain life, health and well-being (Miehl, 1990). Self-monitoring is primarily a personal initiative taken by a patient to participate in the management of his condition. According to Orem, man has two categories of self-care needs: universal self-care and

health deviation self-care. In the health deviation self-care, the patient needs to adjust to ways of meeting his/her universal self-care needs by establishing new techniques to cope with the effects of ill-health. It is in the light of this that self-monitoring becomes a useful tool for the hypertensive patient to be able to manage his/her condition. Similarly, the Patient-driven Health Care Model discussed by Swan (2009) admits the fact that the patient as an individual must become the focus of care, and therefore participation in decisions about his/her care is paramount. The model is characterized by a high level of involvement in the patient's own care through self-initiation. Obviously, the current advancement in information flow and technology has made it much easier for self-care assessment without direct contact with health care providers (Patient-driven healthcare, 2014)

In their attempts to participate in the management of their health conditions, patients are likely to be confronted with certain hindrances, which may include self-created, socio-economic or health-system-generated factors. Fig. 1.1 illustrates the interconnections and interactions that exist between the patient and his/her practice of SMBP.

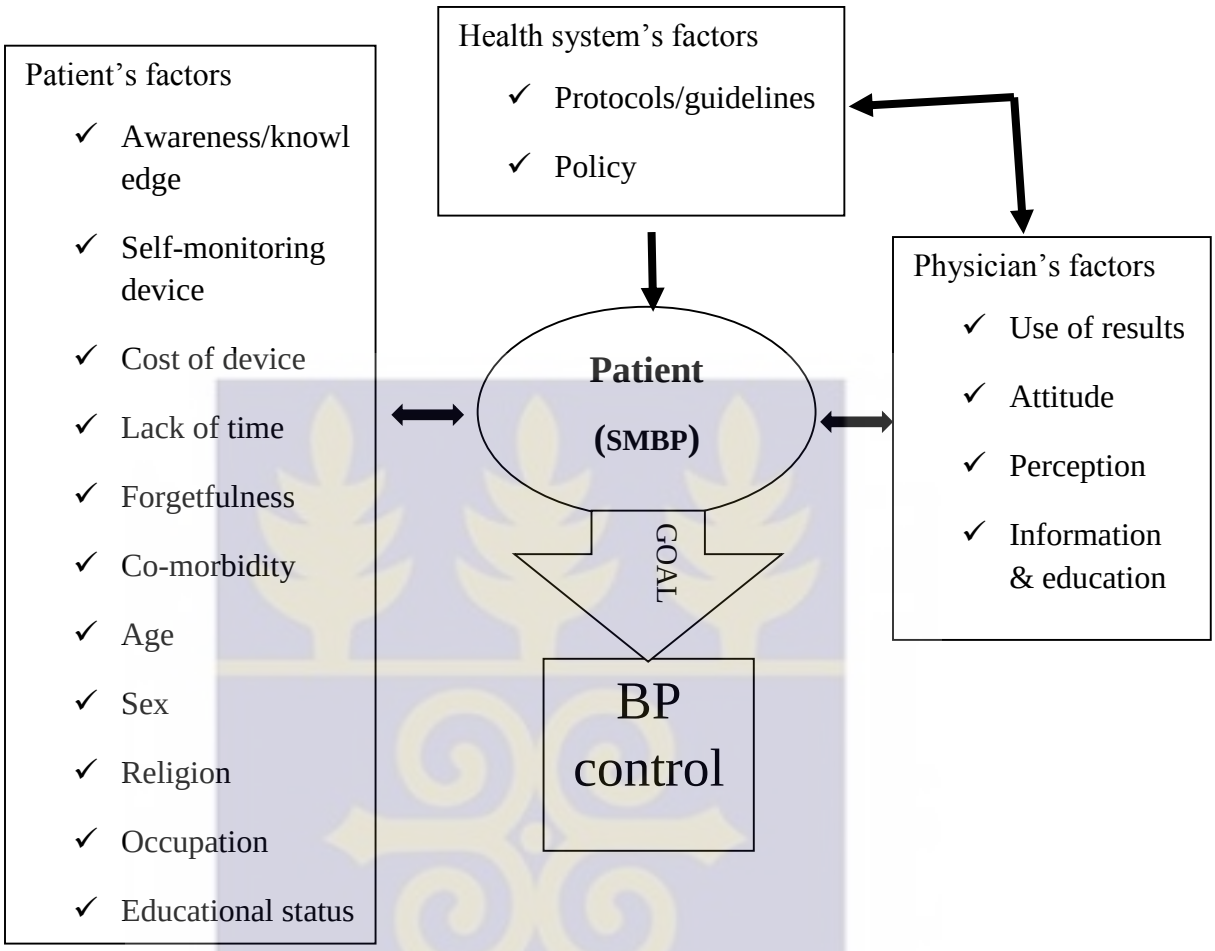


Fig 1.1: Conceptual framework of SMBP

The ultimate goal in the management of any hypertensive patient is to have a controlled BP, thereby preventing complications such as target organ damage. Fig.1.1 shows that the patient, the GP and the health care system must all collaborate to meet their goal. In the centre of this collaboration is the patient monitoring his/her BP and communicating with their GP. This cordial relationship may however not exist because of the factors listed. The patient's lack of awareness/knowledge on SMBP, or non-possession of a self-monitoring device will largely affect the practice of SMBP. Similarly, the patient may also be affected

by socio-economic factors such as level of formal education, or financial ability to acquire and own a self-monitoring device. Furthermore, lack of institutional policies and protocols in health care facilities, coupled with discouraging attitudes, perceptions and lack of information/education from HCP may form the grounds for the non-practice of SMBP. This study sought to assess these factors and how they affected the practice of SMBP by a hypertensive patient.

1.4. Objectives of the Study

1.4.1. General Objective

To assess barriers to the practice of self-monitoring of Blood Pressure among hypertensive patients in the Accra Metropolis.

1.4.2. Specific Objectives

1. To determine the awareness and knowledge of hypertensive patients on self-monitoring of BP.
2. To describe the practice of self-monitoring of BP among hypertensive patients.
3. To identify factors which inhibit hypertensive patients from self-monitoring their BP.

1.5. Justification of the Study

Self-monitoring is helpful to hypertensive patients. This study sought to bring to light the level of involvement of hypertensive patients in the management of their conditions. Policy-makers and health care providers will be better informed on how best to incorporate

the practice of SMBP into the health care system, so as to improve the well-being and longevity of hypertensive patients. It also hoped to provide baseline information on the practice of SMBP in Ghana, serving as a reference point for further research into the subject. Invariably, health care professionals now have empirical evidence that the practice is available and can be used to achieve better BP controls in patients, monitor the development of target organ damage, and avoid sudden cardiovascular-related deaths.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviewed documents on the subject of hypertension and its management with regards to monitoring BP. Extensive web search was done using key words such as "hypertension", "self-monitoring and blood pressure not blood glucose", "home BP monitoring", "effectiveness of self BP monitoring", "barriers to self-monitoring", "management of hypertension", and "guidelines for self-monitoring". All relevant information accessed was synthesized and is presented under the following five thematic areas: a) burden of hypertension; b) practice of self-monitoring; c) procedure, schedule and devices used in self-monitoring; d) arguments about self-monitoring; and e) barriers inhibiting the practice of self-monitoring.

2.2. Burden of Hypertension

Hypertension is one of the NCDs in the category of CVDs, which has become a huge public health problem in many nations. It is diagnosed in an adult who has persistently high BP above 140/90 mmHg in a non-diabetic, or above 130/80 mmHg in a diabetic, based on the average of two or more properly measured blood pressure readings (MOH, 2010). Hypertension is a major risk factor for CVDs, accounting for about 45% and 51% of all deaths due to heart diseases and stroke respectively (WHO, 2013). Cardiovascular diseases are the greatest threat to the world's population as they account for about 48% of deaths resulting from NCDs (Alwan et al., 2011). It is estimated that about 40% of the world's

adult population has hypertension, most of whom live in LMICs (WHO, 2013). The greatest impact is felt on the African region which has 46% prevalence among the adult population of 25 years and above and, mortality rates ranging between 28% and 41% (Alwan et al., 2011; WHO, 2013). These reports note that, contrary to previous knowledge of hypertension being the preserve of the affluent, it is now a common disease among low- and middle-income earners.

Ghana as a developing country and a lower-middle-income economy, also has the problem of hypertension as an increasing public health menace. It is reported that hypertension is the third most commonly diagnosed condition in OPD, and has a prevalence range of 19-48% across all age groups in the Ghanaian population (MOH, 2011). Moreover, according to the report, less than 13% of hypertensive patients in Ghana have controlled BP, while a lot are undiagnosed. It is also observed that the percentage of hypertensive patients seen at OPD continues to increase. The GHS annual report for 2011 indicates an increase of 1.85 – 2.75% between 1985 and 2011, affecting more females (67.1%) and the productive class (52.8%) (GHS, 2011). In the WHO country report for 2011, Ghana recorded an estimated hypertension prevalence of 36.4% and 18% proportional mortality rate on CVDs alone in 2008, most deaths occurring before 60 years (Alwan et al., 2011). Following from this, a systematic review of several studies carried out independently in Ghana suggested a prevalence range of 19% – 55% among the active age group of persons 15 – 59 years (Addo, Agyemang, Smeeth, & Edusei, 2012). This increasing trend in the prevalence of hypertension will have a negative impact on the Ghanaian society with reference to the disease burden on healthcare delivery and family economic status. This is evident in

WHO's projection that over 22% of deaths resulting from CVDs will occur in LMICs by 2030 (WHO, 2013).

Hypertension is one of the chronic diseases that requires life-long management. The main objectives of management include reducing and maintaining BP below 140/90 mmHg (or 130/80 mmHg for diabetics with hypertension), and preventing the occurrence of complications (MOH, 2010). This is often achieved through administration of anti-hypertensive drugs, behaviour modification and regular/periodic monitoring of their BP.

2.3. Practice of Self-Monitoring

Self-monitoring of BP is one way of determining the BP level of a patient. It is a practice that is carried out among hypertensive patients and healthy people alike. The conventional practice is that BP is measured by a GP or nurse in OPD of a health care facility using a mercury sphygmomanometer and stethoscope. Others refer to this as the Korotkoff sound technique (Pickering et al., 2005). However, in recent times there are several ways of monitoring BP to establish a diagnosis of or manage hypertension. These methods, categorized as Office and Out-of-Office BP monitoring, include home measurement (self-monitoring), measurement in the office of the GP, measurement by a nurse, measurement by a GP and, ambulatory BP monitoring (ABPM) (Little et al., 2002; Bo, 2013). The American Heart Association (AHA) refers to the Office monitoring as a clinical BP reading taken by a trained health professional in the Office of the GP, whereas Out-of-office measurement is taken by an individual without the involvement of a trained health professional, mostly in the home (Pickering et al., 2005). Furthermore, the AHA makes a distinction between SBPM and ABPM. They describe ABPM as having an automated

oscillometric device fitted on the patient which records BP every 15-30 minutes over a 24-hour duration, whereas SMBP is a personal practice of monitoring BP without the assistance of a HCP (Pickering et al., 2005). ABPM is however reserved for a select group of patients who needs continuous BP observation (Pickering et al., 2005).

In the UK for example, it is estimated that about 10% of the general population self-monitor their BP (McManus et al., 2007). Studies conducted among hypertensive patients in Singapore, Italy, and Oman report of prevalence of 24%, 66% and 40% respectively (Tan, Khin, & Pagi, 2005; Cuspidi et al., 2004; Hadithi, 2012). Globally, self-monitoring prevalence rates though representative of only developed countries, is about 70% among hypertensive patients (Cuspidi et al., 2005; Logan, Dunai, McIsaac, Irvine, & Tisler, 2008; Viera, Cohen, Mitchell, & Sloane, 2008). In similar studies in Malaysia and Canada, 32.3% and less than 50% of patients respectively practice self-monitoring (Beth, Low, & Chung, 2012; Lam & Guirguis, 2010) whereas in the USA, about 50% of patients with hypertension perform BP self-monitoring (Huff et al., 2011). In sub-Saharan Africa (SSA), about 55% of hypertensive patients are aware of self-monitoring but only about 36% of them actually own devices for self-monitoring (Ambakederemo, Ebuenyi, & Jumbo, 2014).

2.4. Schedule, Procedure and Devices Used in SBPM

Various proposals have been put forth on the appropriate procedure for measuring BP. One of such comprehensive guides is given by the European Society of Hypertension (ESH). The ESH guidelines lists the conditions favourable for self-measurement as: 5 minutes rest, or 30 minutes without smoking or caffeine; should be seated, back supported, and arm resting on the table; correct cuff bladder should be placed 2cm above the notch of the

elbow; remain immobile, legs uncrossed, and not talking; repeated readings are taken at 1–2 minute intervals; and, results written down if the device is without memory. Furthermore, the ESH recommends that two measurements are taken for each session, every morning and evening before medication or meals, and only one or two measurements per week for stable and long-term patients (Parati, Stergiou, Asmar, Bilo, de Leeuw, et al., 2008). The Japanese Society of Hypertension (JSH) and the AHA have similar recommendations (Pickering et al., 2005; Imai, Otsuka, & Kawano, 2003).

In operationalizing these guidelines, different forms of self-monitoring devices are used. These may be electronic digital devices (mostly automated) or manual devices (with either mercury or aneroid gauges). The common electronic devices on the market include the upper-arm, wrist and finger self-monitors. Studies conducted across different communities indicate that most patients prefer digital automated self-monitors (Baral-Grant, Haque, Nouwen, Greenfield, & McManus, 2012; Matowe, Abahussain, Awad, & Capps, 2008; Tyson & McElduff, 2003; Tislér et al., 2006). In the UK and Kuwait for instance, more than 80% of respondents would use automated electronic self-monitors as against about 15% going in for the manual devices (Baral-Grant, Haque, Nouwen, Greenfield, & McManus, 2012; Matowe, Abahussain, Awad, & Capps, 2008; Tyson & McElduff, 2003). Furthermore, there is more preference for the upper-arm digital self-monitors than the wrist and finger self-monitors. In the Kuwait study, half of the patients voluntarily bought digital upper-arm self-monitors (Matowe, Abahussain, Awad, & Capps, 2008) whereas over 80% of GPs in Hungary recommended digital upper-arm devices for their patients (Tislér et al., 2006). Obviously, very few patients would use the manual mercury or aneroid devices for self-monitoring. Whatever self-monitoring device that is to be used, it is recommended that

the device should be validated periodically, at least every 6-12 months, to ensure accuracy of the readings (Bo, 2013; Imai et al., 2003; Parati et al., 2010; Pickering et al., 2005). Furthermore, the ESH recommends that auscultatory (aneroid or mercury) devices be used only in special situations such as cardiac arrhythmia, and has to be performed by a trained HCP. Also, in spite of the availability of finger electronic devices, the ESH does not yet approve its use for self-monitoring (Parati, Stergiou, Asmar, Bilo, Leeuw, et al., 2008).

2.5. Arguments about SMBP

Several arguments have been advanced on the suitability or otherwise of SMBP in the management of hypertension. While studies conducted on the practice point to several benefits, it is not also without appreciable limitations. Even though Office monitoring by HCP remains the gold standard for diagnosis and treatment of hypertension, self-monitoring is said to provide a better estimate of the "true" BP because, more readings can be taken at the same time (McManus et al., 2009). Based on its ability to estimate a better "true" BP, it is tested and proven to contribute more towards controlling BP (Cappuccio, Kerry, Forbes, & Donald, 2004). In a randomized clinical trial conducted among patients in a practice setting, it was observed that both systolic and diastolic BP had reduced by 4.2 mmHg and 2.4 mmHg respectively in the self-monitored patients than the control group (McManus et al., 2014). However, critics have also doubted the credibility of self-monitored BP values, citing lack of knowledge on the use of the device or a defective device as being potential for errors in measurement (McAlister & Straus, 2001).

It is also argued that taking one's own BP reduces the frequency with which patients visit healthcare facilities. In their study to determine the effect of self-monitoring on medical

services, Soghikian et al. (1992) found that self-monitored patients had fewer mean visits (1.5) to their GP than the usual care patients (with mean visits of 2.7). Contrary to this assertion, GPs have concerns about the interpretation of self-measured results and may feel reluctant using them to guide practice (Logan et al., 2008; Tislér et al., 2006). In one study to compare the different methods of BP measurements, Tyson & McElduff (2003) found that self-monitored readings were significantly better than all the other methods in the overall score, and that most patients preferred using self-monitors at home. In comparing Self-monitoring and Ambulatory-monitoring, McGowan & Padfield (2010) found that mean BP values were the same for both methods, but that patients showed preference to SMBP rather than to ABPM. Some reasons which accounted for this preference included easy use of the device, its convenience, relatively low cost and the fact that it enhances treatment compliance (Parati, Omboni, & Bilo, 2009; Abdullah & Othman, 2011). Unfortunately, patients have been reported to be obsessed in self-measurement and some even modify their medications without the knowledge of their HCP (Parati et al., 2009).

Another observation about self-monitoring was that it had a better prognostic inference of risk of death than the office BP (Sega et al., 2005), showing an 85% detection rate in the diagnosis of Isolated Clinic Hypertension (ICH)(McAlister & Straus, 2001) and a lower prevalence of Target Organ Damage (TOD) (Coll de Tuero et al., 2006). Nonetheless, only a few GPs would actually prefer self-monitored readings (13%) over office measurement or use self-measured readings (19%) to guide them in managing the condition (Logan et al., 2008). This notwithstanding, Logan et al. (2008) reported large numbers of GPs (63%) recommending and encouraging their patients to practice self-monitoring, which lead to many patients (78%) possessing their own devices. Self-monitoring affords the patient an

opportunity to participate in the management of his/her own condition in a self-motivated manner (Abdullah & Othman, 2011).

In both Canada and Hungary, GPs expressed concerns about lack of validation of devices, training on measuring techniques, and interpretation of results (Logan et al., 2008; Tislér et al., 2006). For these GPs, these challenges may make the results unreliable and unsuitable in clinical decisions. According to the ESH guidelines, lack of standardization or periodic validation of the devices used for self-monitoring will adversely affect the validity and accuracy of self-measured values (Parati, Stergiou, Asmar, Bilo, Leeuw, et al., 2008).

2.6. Barriers to the practice of Self-Monitoring of BP

There are several barriers that can prevent hypertensive patients from participating in their own care. These can range from individual patient factors such as educational status, income status, occupation, health-seeking behaviour, and social support, to as far as the health care delivery system which may/not encourage such interventions. Institutional policies, attitude of HCP, safe-guarding of professional integrity, and lack of adequate health information, education and counselling, can create hindrances to allowing hypertensive patients practice self-monitoring of their BP. Barriers to self-monitoring refer to any factor that will prevent a person from carrying out the practice. In a study conducted by Huff et al. (2011) to identify the reasons for which patients do not adhere to self-monitoring, they found that patients either did not have adequate knowledge on the practice or they usually forgot to check, or they did not have the time to do it or simply due to self-described laziness. For some patients, non-experience of symptoms or no instructions from

their HCP was good enough not to check their blood pressure. In another study among hypertensive African Americans to find better ways of controlling blood pressure, it was found that poor knowledge and false beliefs about hypertension, coupled with low educational and economic status of respondents were preventing the management of the condition (Odedosu, Schoenthaler, Viera, Agyemang, & Ogedegbe, 2012). According to Little et al. (2002), patients do not self-monitor due to forgetfulness, anxiety related to knowing their BP values or they lack knowledge of what to do. Educational status is an important factor in the ownership of a self-monitoring device or the practice of self-monitoring. In the UK for example, it was found that more patients with further education (57.1%) had their own self-monitoring devices as against those with no education (9.1%) (Tyson & McElduff, 2003).

The ability of patients to own a blood pressure apparatus for self-monitoring is dependent on affordability of the device. In a hospital in Malaysia, most in-patients (64%) showed no interest in self-monitoring, 29.5% of them had no knowledge on self-monitoring and just a few of them (6.8%) were financially constrained in acquiring self-monitors (Beth et al., 2012). Similarly in Nigeria, there was low awareness (29.6%) among uneducated patients as against 84.6% among civil servants and business owners; and yet only 11.5% of respondents owned a self-measuring device (Ambakederemo et al., 2014).

The interaction between patients and healthcare practice can either discourage or encourage the practice of self-monitoring among patients. In the USA for example, even though 32% of HCP would recommend self-monitoring to over 90% of their patients, poverty (26%) would prevent them from acquiring the device (Tirabassi, Fang, & Ayala, 2013). Some HCP do not also recommend or utilize self-monitored results because of the fears they

express about the validity of self-measured results (Logan et al., 2008; Tirabassi et al., 2013; Tislér et al., 2006).

CHAPTER THREE

METHODOLOGY

3.1. Study design

This research was a cross-sectional study. It used quantitative methods in the collection and analysis of data.

3.2. Study location/area

Accra Metropolis is one of the sixteen political administrative districts of the Greater Accra region of Ghana. It accommodates the City of Accra, the National Capital of the Republic of Ghana. It has a land area of 173km^2, a human population of 2.29 million (projection in 2013 from 2010 PHC at a growth rate of 3.36%) (GAR, 2013). It has diverse socio-cultural and economic characteristics. Besides the native Ga and the predominant Akan languages, there are several other Ghanaian languages and dialects spoken in the City.

For administrative convenience the Metropolitan Health Directorate divided the Metropolis into six sub-metros namely Osu-Klottey, Okai-Koi, Ablekuma, Ashiedu-Keteke, Ayawaso and Kpeshie, each administered by a sub-metropolitan health director. There are over 200 health care facilities in the Metropolis including state-owned, quasi-government and private providers. Majority of these facilities are owned by private health providers (over 180 facilities), the State owning only about 20% (GAR, 2013).

In the Metropolis, GHS provides health care services from La General hospital, Ridge Regional hospital, Achimota hospital, Princess Marie Louise Children's hospital and

several Health Centres/Clinics. This study was conducted at the Ridge Regional hospital and La General hospital. Ridge Regional hospital was purposively selected because it is the main referral health facility for the Greater Accra region and therefore has the potential to receive patients from all social classes, and also has the requisite professional expertise to diagnose and manage hypertension. La General hospital was also purposively selected to incorporate patients from the periphery of the Metropolis who may not have access to the Regional Hospital by way of referral.

3.3. Study population

The study population included all hypertensive patients who attended Specialist Hypertension Clinics in La General hospital and Ridge Regional hospital within the period between 12th May and 2nd June, 2015. All patients' diagnoses were confirmed by reference to their medical records in the Patient Folder.

3.4. Study variables

3.4.1. Dependent variable

- Self-monitoring of Blood Pressure

3.4.2. Independent variables

1. Patient factors: these included awareness/knowledge of self-monitoring, ownership of self-monitoring device, cost of device, lack of time, forgetfulness, co-morbidity, educational status, occupation, marital status, religion, sex, and age

2. Physician/health system factors: these include institutional protocols, attitude and perception of HCP, use of self-monitored results, and information/education from HCP to patients

3.5. Sampling Methods

3.5.1. Sample Size

The sample size for this study was calculated using the Cochran's formula for calculating sample size at 95% confidence level within 5% precision. The formula is

$$n = (z^2pq) / e^2$$

where,

n = sample size

Z = z value for 95% confidence level (z = 1.96)

p = population standard deviation

q = 1-p

e = 5% precision level (e = 0.05)

Using a hypertension prevalence of 36.4% in Ghana (Alwan et al., 2011) the estimated population standard deviation was 0.36. Substituting the respective values into the formula, produced

$$n = [(1.96)^2 * 0.36 * 0.64] \div (0.05)^2$$

$$\rightarrow n = (3.8416 * 0.36 * 0.64) \div 0.0025$$

➔ n = 0.88510464 ÷ 0.0025

➔ n = 354.041856

Thus, 354.041856 was approximated to 354 persons. Therefore, the sample size for the study was 354 hypertensive patients.

3.5.2. Sampling Procedure

The sample size for the study was proportionately distributed between La General Hospital and Ridge Regional Hospital based on their average OPD monthly attendance as recorded in the respective Clinic Registers.

Individual patients were randomly selected on each Clinic day by a YES or NO balloting. La General Hospital had an average monthly OPD attendance of about 160 hypertensive patients, while Ridge Regional Hospital saw over 300 hypertensive patients per month. Both hospitals had two Special Clinic days in a week, which gave an average daily attendance of about 20 and 37 for La and Ridge hospitals respectively. By proportionate sampling, 123 participants were drawn from La, and 231 from Ridge, through a daily sampling of 16 and 29 participants from La and Ridge respectively. At each Clinic, participants were selected by having all eligible patients pick from a box of YES or NO ballots, the YES ballots representing the sample size for that day. Where the expected daily averages varied significantly, the daily sample sizes were also varied accordingly. Where patients picked YES and declined to participate, or was too ill to be interviewed, this ballot was put back for the next patient. This process continued at every Clinic until the required sample size of 354 participants was obtained.

3.6. Data Collection Techniques

Structured questionnaire was used to collect data. The questionnaire covered socio-demographic characteristics of respondents, the history of hypertension and co-existing morbidities, awareness/knowledge/practice of SMBP and barriers to the practice of SMBP. A two-item Likert Scale of "disagree and agree" was used to elicit information on the practice of SMBP from respondents. All participants were selected at their usual visit to their GP. Interviews were conducted while patients waited to be attended to by their GP, so as not to interrupt clinic procedures or influence clinic BP readings. Once a patient met the eligibility criterion, s/he was given the participant's information sheet to read (or have it read) and then sign/thumbprint the consent form before the instrument was administered. Every participant was interviewed in a convenient and conducive place, ensuring maximum comfort and confidentiality during the interaction. A maximum of fifteen minutes were spent in administering the questionnaire. This process took place at each Clinic between the hours of 8:00 am and 2:00 pm local time, during which time most patients visited the clinic.

3.7. Quality Control

The principal investigator (PI) had adequate knowledge in research methodology and was supervised by a seasoned researcher. Three Research Assistants were recruited and trained on effective communication and administration of the questionnaire. The data tool was translated to patients who could not read and write English, into their preferred language of choice. All completed questionnaires were immediately entered into a data software by the PI and a data entry clerk, both working independently but collaborating to ensure no

data was lost or missed. The questionnaire was piloted which also facilitated proper structuring of the questionnaire such that the appropriate responses were obtained from all respondents.

3.8. Data Processing and Analysis

All data collected were entered into STATA Statistics/Data Analysis version 12 (Special Edition) for generation of summary statistical values and tables. All data were then stored in my personal E-mail Inbox and in an external hard disk password-protected for maximum security and safety.

Descriptive summary statistics were generated on the socio-demographic characteristics and illness history of respondents, awareness and knowledge of SMBP among respondents, and barriers inhibiting patients from practicing SMBP as shown in chapter four. A two-item Likert Scale of "disagree and agree" was used to analyze respondents' practice of SMBP. Further analysis of the data was carried out using Pearson chi-square and logistic regression tests, forming the basis for describing the relationships between self-monitoring and the independent variables religion and knowledge.

3.9. Ethical Considerations

Ethical approval was granted by the Ethics Review Committee of the Ghana Health Service (attached as Appendix C). Also, institutional permission was obtained from the Accra Metropolitan Health Directorate to use the premises of La General Hospital and Ridge Regional Hospital, as well as their clients as subjects for this study. Every participant was adequately informed about the purpose of the study, how much time the interview would

take, and that the information collected would be securely stored in electronic password-protected mode, and utilized only for the purpose for which it was collected. Subject's privacy and confidentiality was assured by using unique identity numbers to represent each participant on the data forms. Subjects were also invited voluntarily, and they could choose to withdraw from the study at any time without any adverse effect on their service quality.

Participants were informed of inconveniences related to the use of their time, disclosing personal information and interfering in their normal hospital procedures. Selected patients who were too ill to be interviewed were replaced. All interviews were conducted while patients waited to see their GP. Maximum respect was given to all participants for very personal information in the most culturally acceptable manner, seeing that most participants were chronologically older than the interviewers.

All hypertensive patients who voluntarily agreed to be interviewed signed or thumbprinted on the Consent Form.

3.10. Pilot Study

The questionnaires were administered to hypertensive patients of the University of Ghana Hospital by the PI and the recruited research assistants. Ambiguities and difficult questions were identified and re-constructed.

CHAPTER FOUR

RESULTS

4.1. Introduction

This chapter presents a summary of the findings obtained from respondents. Analysis of the data was done using STATA Statistics/Data Analysis Version 12.0 (Special Edition) and presented in summary statistical tables and measures of association. Presentation was done under four thematic headings namely: a) socio-demographic characteristics and illness history; b) awareness and knowledge of SMBP; c) practice of SMBP; and d) barriers to SMBP.

4.2. Socio-demographic Characteristics and Illness History of Respondents

A total of 354 respondents involving 162 males (45.8%) and 192 females (54.2%) took part in the study. All respondents were hypertensive patients who regularly attend Specialist Hypertensive Clinic at the Ridge Regional Hospital and La General Hospital in the Accra Metropolis. Large proportion of the respondents were aged 30-59 years (66.1%). A median age of 50 years was recorded, with slight variation between males (49.5) and females (53.0), and a bimodal age of 30 and 60 years. It was found that only a little proportion of respondents (7.3%) had lived with hypertension for 20 years and more, while about a third of them (31.1%) were also diagnosed with other conditions such as diabetes, cancer and asthma. The rest of the details on personal characteristics and illness history of the respondents are summarized in Table 4.1.

Table 4.1: Socio-demographic characteristics and illness history of respondents

	Frequency	Percent
Age (in years as at last birthday) (N=354)		
Less than 30	17	4.8
30 – 39	70	19.8
40 – 49	70	19.8
50 – 59	94	26.5
60 – 69	71	20.1
70 and over	32	9.0
Sex (N=354)		
Male	162	45.8
Female	192	54.2
Highest educational level completed (N=352)		
No formal education	45	12.8
Some education (primary/middle/JHS/JSS)	155	44.0
Further education (secondary/coll/poly/university)	152	43.2
Marital status (N=352)		
Single/never married	52	14.8
Currently married/living with partner	208	59.1
Widowed/divorced/separated	92	26.1
Religion (N=353)		
Christianity	248	70.2
Islam	80	22.7
African traditional religion	24	6.8
Hinduism	1	0.3
Occupation (N=352)		
Unemployed	46	13.1
Self-employed (trading/artisan/voc…)	92	26.1
Public servant (gov't)	96	27.3
Private business employee	33	9.4
Retired/elderly	84	23.9
Farmer	1	0.3
Number of years diagnosed with hypertension (N=354)		
0 – 9	253	71.5
10 – 29	75	21.2
20 – 29	24	6.8
30 and over	2	0.5
Co-morbidity (N=354)		
None	244	68.9
Diabetes	99	28.0
Cancer	10	2.8
Asthma	1	0.3

4.3. Awareness and Knowledge of SMBP

Awareness of self-monitoring of BP among respondents was found to be 67.8%, while their knowledge on the value of the normal BP and use of the self-monitoring BP apparatus was 14.4% and 38.6% respectively. The main source of information on SMBP for respondents was health workers (70.4%). Similarly, most respondents were instructed on the use of the self-monitoring device by health workers (64.7%). The details are shown in Table 4.2.

Table 4.2: Awareness and knowledge of SMBP

	Frequency	Percent
Knowledge of normal BP		
Recall of correct normal BP value	51	14.4
Incorrect value/don't know	303	85.6
Awareness of SMBP		
Yes	240	67.8
No	114	32.2
Source of information on SMBP		
Health worker	169	70.4
Friend/family member	47	19.6
Media	20	8.3
School	4	1.7
Ownership of SMBP device		
Yes	113	31.9
No	241	68.1
Ability to use SMBP device		
Yes	136	38.6
No	216	61.4
Source of instruction on use of SMBP device		
Self	22	16.9
Health worker	84	64.7
Friend/family member	22	16.9
School	2	1.5

4.4. Practice of SMBP among Respondents

A two-item Likert Scale of "disagree and agree" was used to identify respondents' practice as correct or incorrect. One hundred and thirteen respondents made up of 55 males (48.7%) and 58 females (51.3%) were found to be self-monitoring their BP. About half of these respondents (52.8%) agreed with the correct practice statements, but some also agreed with some incorrect practice statements. After cross-tabulating correct responses with wrong ones, only 0.9% (1) was able to distinguish correct practice statements from wrong ones. A summary of their responses to the statements is presented in Table 4.3.

Table 4.3: Practice of SMBP

	N	Percent
Currently self-monitoring	113	31.9
Correct practice		**52.8**
SMBP before medication	108	52.8
Sit on chair to self-monitor	108	95.4
Keep a BP chart	103	68.9
See Physician after SMBP	104	87.5
Incorrect practice		**47.2**
Lie down to self-monitor	105	41.9
Stand to self-monitor	103	9.7
SMBP when feels like	104	22.1
Adjust medication after SMBP	104	84.6
Correct for ALL statements		**0.9**

4.5. Barriers to SMBP

4.5.1. Barriers Reported by Respondents

This section sought to identify possible reasons for respondents' inability to self-monitor besides the mere lack of owning a personal SMBP device. Respondents were asked to agree or disagree to suggested reasons for not self-monitoring their BP. A large proportion of respondents (61.5%) attributed their non-practice of SMBP to lack of money to purchase the device. Also, about half of the respondents (41.7%) were not self-monitoring because their HCP never asked them to do it, or because they were discouraged by their HCP (14.2%). A summary of their responses is presented in Table 4.4.

Table 4.4: Barriers to SMBP as reported by respondents

	N	% Disagree	% Agree
Don't have money for SMBP device	239	38.5	61.5
SMBP not important	239	90.8	9.2
SMBP not beneficial	240	93.8	6.2
Never asked to self-monitor	240	58.3	41.7
Being discouraged by HCP	240	85.8	14.2

4.5.2. Association of SMBP with other Factors

To determine the relationship between SMBP and the independent variables such as the socio-demographic and other characteristics of respondents, a Pearson Chi-squared analysis was conducted. Variables that were statistically significant ($p<0.05$) were then selected for further analysis in a simple logistic regression as presented in Table 4.5. Only religion was found to be significantly associated with the practice of self-monitoring ($p<0.05$).

Table 4.5: Association between SMBP and other factors (simple logistic regression)

	COR (95% CI)	p-value
Lack of money for SMBP device	1.0 (0.97 - 1.01)	0.156
SMBP not important	1.0 (0.97 - 1.01)	0.185
Being discouraged by HCP	1.0 (0.96 - 1.00)	0.099
Religion	0.6 (0.39 - 0.89)	0.012
Co-morbidity	1.5 (0.97 - 2.36)	0.064
Educational level	1.0 (0.97 - 1.04)	0.680
Marital status	1.0 (0.97 - 1.02)	0.673

In a further logistic regression to determine the degree of association with religious denominations, respondents who practiced ATR were found to be 0.2 times more likely not to self-monitor compared to respondents who were Christians (Table 4.6.).

Table 4.6: Factors associated with no SMBP (multiple logistic regression)

	COR(95% CI)	p-value	AOR (95% CI)	p-value
Religion				
Christianity	Ref			
Islam	0.6 (0.36 - 1.12)	0.114		
African traditional religion	0.2 (0.04 - 0.71)	0.015	0.2 (0.04 - 0.76)	0.020

COR=crude odds ratio, AOR=adjusted odds ratio, CI=confidence interval, Ref=reference outcome

CHAPTER FIVE

DISCUSSION

5.1. Introduction

This chapter discusses in detail major findings of this study in relation to the objectives which included determining patients' awareness/knowledge of SMBP, how patients practice SMBP, and barriers to patients in the practice of self-monitoring. Conceptually, this study sought to identify patients' factors, health facility's factors, and health care professionals' factors that can prevent hypertensive patients from self-monitoring their BP. SMBP is a self-care activity aimed at encouraging participation in personal health care management, with the collective goal of controlling BP within acceptable norms.

The major findings in this study included above average awareness of SMBP (67.8%), very poor knowledge about the practice of SMBP and patient-centred factors as barriers to practicing SMBP, which will be the focus of this discussion.

5.2. Awareness and Knowledge

In this study, the proportion of respondents found to have heard the practice of self-monitoring was 67.8%, slightly higher than the 54.7% awareness level of respondents measured by a similar study in Nigeria (Ambakederemo et al., 2014). This proportion may be premised around the efforts often made by HCP to inform and educate patients on helpful practices that can enhance their illness recovery or promote their health status. It may also be due to the fact that these respondents were regular attendants at Specialists Hypertension Clinics where adequate information is made available to clients by experts.

The proliferation of mass-media communication channels such as radio, television, newspapers, and internet through which advertisements and/or sales promotions on health products are run might have also accounted for this level of awareness among the respondents. In addition, the high literacy proportion of the respondents (87.3%) could also increase their awareness since formal education may promote healthy behaviour. The proportion of respondents who claimed ignorance about SMBP could belong to the category of city-dwellers who get too engrossed with business to the neglect of their health, or deliberately ignore health promotion messages. It is possible that a further increase in awareness could equally result in a higher prevalence of SMBP; and the reverse is also true.

In assessing respondents' knowledge about SMBP, this study found 38.6% of them reporting that they could self-monitor their BP given the device, 14.4% recalled the value of the normal BP (120/80 mmHg) and less than 1% could identify correct SMBP practices from incorrect ones. This low level of knowledge among respondents may be attributed to low quality of health education by HCP since most of them reported they were taught by their HCP. This lack of knowledge could form the basis for misapplication, wrong practice and misinterpretation of self-monitored results, thereby complicating the management of hypertension and impairing BP control. Since practice is the experimentation of knowledge, it is without prejudice to conclude that lack of adequate knowledge would affect self-confidence of respondents and prevent them from practicing SMBP.

5.3. Practice of SMBP

The low prevalence of SMBP found among respondents was below the global prevalence of 70% among hypertensive patients in developing countries (Cuspidi et al., 2005; Logan et al., 2008), probably due to their advanced health care systems that makes people more conscious of their health needs. However, a prevalence similar to our finding was found in Nigeria (36%) and Malaysia (32.3%) among patients in a hospital attributed to only few patients possessing a personal BP apparatus (Ambakederemo et al., 2014; Beth et al., 2012). The low proportion in our study could also be due to the fact that the practice of SMBP was focused on patients self-monitoring with their personal BP apparatus at home. There is also anecdotal evidence which suggests that a form of self-monitoring is practiced in Ghana whereby patients visit "BP Monitoring Vendors" at private locations, pharmacy shops or on the streets, to check their BP. This observed practice can be attributed to the low economic status of most patients as a result of the illness, who find it difficult to buy personal self-monitors their costs ranges between GHc150.00 and GHc300.00. In the light of this "adulterated" self-monitoring therefore, the prevalence of patients who self-monitor might actually be higher than 31.9%, but with compromised quality.

It is also evident from this study that the high proportion (99%) of respondents who could not differentiate correct practice from the wrong one, could have done so for lack of clarity in their understanding of instructions on the practice of SMBP. These findings point to a probable error in the delivery of messages by HCP, BP Monitoring Vendors, or sales/promotions' agents of health care products/services to respondents on the correct practice of self-monitoring. Recalling that most patients were either informed or instructed by HCP, it is probable that educational information was inadequate, not understood, or

misapplied. Inadequate or inappropriate information and education from HCP to patients can be a major barrier to the practice of SMBP as suggested in the conceptual framework. The fact that almost all of them did not know which practice was right or wrong, performed self-monitoring contrary to the recommendations of ESH and similar societies (Parati et al., 2008; Bo, 2013; Imai, Otsuka, & Kawano, 2003; Pickering et al., 2005). Other patients could have avoided the practice for the reason that they could not follow the prescribed instructions, or for their lack of formal education. These findings thus confirm the fears of some Physicians that self-monitored results are unreliable and cannot be used in making clinical decisions (Logan et al., 2008; McAlister & Straus, 2001). These findings also agree with Tyson & McElduff (2003) who found that patients in primary care facilities had uncoordinated knowledge and uncertainty about SMBP, making them unable to practice appropriately. Therefore, by inference this study can conclude that the practice of self-monitoring among patients in the study population was very poor, and HCP in the Metropolis need to pay close attention to the patients' uptake of appropriate health information and education, whilst cautioning them against unaccredited sources of health messages.

5.4. Barriers to the practice of SMBP

The primary focus of this study was to assess any barriers that might inhibit hypertensive patients from taking personal initiatives to monitor their BP outside the control of their HCP. The findings were however limited to the personal factors of respondents as institutional policies were not reviewed, or HCP interviewed. After a comprehensive analysis of the data, it was found that lack of awareness and lack of money for respondents

to purchase personal BP apparatus were the factors which had varying degrees of inhibition on the practice of self-monitoring among them.

Access to information on SMBP and subsequent internalization of the procedures involved in practice are a necessary conduit for decision-making with regards to self-monitoring. The lack of information about SMBP to some respondents in this study could be the sole reason for their non-practice of SMBP. Increased awareness about SMBP in the study population could increase the proportion of respondents practicing SMBP; and the reverse would also be a possibility. Adequate information and education by HCP and other health partners can play an important role in encouraging patients to practice SMBP. This is particularly important in Ghana as health messages received from HCP, especially Physicians and Nurses, is believed to be authentic. The low knowledge on the general practice procedures of self-monitoring among respondents corroborated similar findings by Huff et al. (2011) where hypertensive patients in primary care centers did not practice SMBP as a result of their lack of knowledge on BP. Personal initiatives about self-care cannot be taken without being properly informed and educated on the benefits, importance and procedures of self-monitoring.

Furthermore, the majority of respondents who reported the lack of money to buy personal BP apparatus as their reason for not practicing SMBP corroborates with a similar study by Beth et al. (2012) where respondents stated financial constraints as a reason for them not practicing SMBP. This could be particularly important for the elderly and retired respondents. However, given that a large proportion of the respondents (62.8%) were gainfully employed, other financial commitments in the management of hypertension may have been given priority over the acquisition of a personal BP apparatus as many

hypertensive patients are said to be impoverished by high cost of treatment (Rao, Kamath, Shetty, & Kamath, 2014). This attitude of patients may change if the importance of SMBP is adequately explained to them by HCP as being an integral component of managing their BP control (Hadithi et al., 2012).

5.5. Conclusion

The findings in this study show an interplay of patient-HCP interactions in the areas of information, education, attitude and behaviour towards the practice of SMBP. Patients' knowledge of correct practice of SMBP was dependent on health information and education provided by HCP. As indicated in the conceptual framework, the lack of access to information and adequate knowledge about SMBP among respondents in this study affected their practice of SMBP negatively. Similarly, even though ownership of a personal BP apparatus was a major barrier to the practice of SMBP, it did not guarantee the practice among respondents since some of them reported that their HCP did not inform/encourage them to self-monitor. Therefore, even though itemized separately, the patient-factors of awareness, knowledge and ownership of BP apparatus in this study can largely be influenced by the Physician-factors of health information, education and attitude. The use of facility-based SMBP protocols could regularize the practice and thus motivate both patients and Physicians to participate in it.

5.6. Limitations

This study was not without limitations. First and foremost, the scope of the study area and population was restricted as it excluded health care workers and a review of policy documents. The small sample size and population thus have the potential to reducing the

robustness of the statistical significance of the data. Generalizing the findings of this study should therefore be done with precaution. Also, being a cross-sectional study, the findings were confined to a limited period which could exclude other potential participants, since some patients are often given two or more months to their next review visit. Furthermore, this was the first time such a study was conducted in Ghana and did not have any in-country data to compare with. Moreover, the questionnaire were developed by the PI without reference to any previous tool of similar study.

In spite of these limitations, due diligence was done in the administration of the research instruments. The methods used in arriving at the findings in this study were consistent with standard research practices, implying that this study can be replicated in similar populations.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

Self-monitoring of blood pressure by hypertensive patients in the Accra Metropolis was a reality among 31.9% of them. This is expected as more people especially patients become increasingly aware of self-care practices in the maintenance and promotion of their health. Patients' desire to participate in the management of their illness through self-monitoring and taking appropriate actions, can be a complimentary measure to the efforts of HCP in the comprehensive management of hypertension. However, patients should be given adequate training/instruction on the procedures/techniques of self-monitoring, accurate recording and interpretation of results, and appropriate actions to take after self-monitoring. If maximum awareness about SMBP is created among patients and the general public, if SMBP is institutionalized in our health care system, and if HCP accept, adopt and monitor SMBP as an additional management protocol, both patients and HCP can derive maximum benefits from the practice as needless sudden strokes and deaths will be avoided.

6.2. Recommendations

1. Hypertensive patients should be trained/instructed by their HCP, especially doctors and nurses, on the correct procedures/techniques of self-monitoring and appropriate post-SMBP actions.
2. Hypertensive patients should be financially supported by the National Health Insurance Authority, or other public-spirited individuals and organizations, to acquire personal BP apparatus for self-monitoring.

3. Further research should be conducted on patients who are self-monitoring in the Metropolis, to determine the type and quality of self BP monitors being used.

References

Abdullah, A., & Othman, S. (2011). The influence of self-owned home blood pressure monitoring on primary care patients with hypertension: a qualitative study. *BMC Family Practice*, *12*(1), 143. doi:10.1186/1471-2296-12-143

Addo, J., Agyemang, C., Smeeth, L., de-Graft Aikins, A., Edusei, A. K., & Ogedegbe, O. (2012). A review of population-based studies on hypertension in Ghana. *Ghana Medical Journal*, *46*, 4–11. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3645150/pdf/GMJ462S-0004.pdf

Addo, J., Smeeth, L., & Leon, D. a. (2007). Hypertension in sub-saharan Africa: a systematic review. *Hypertension*, *50*(6), 1012–8. doi:10.1161/HYPERTENSIONAHA.107.093336

Addo, J., Smeeth, L., & Leon, D. a. (2009). Socioeconomic position and hypertension: a study of urban civil servants in Ghana. *Journal of Epidemiology and Community Health*, *63*(8), 646–50. doi:10.1136/jech.2008.081828

Alwan, A. (2011). *Global status report on noncommunicable diseases 2010*. Geneva. Retrieved from http://www.cabdirect.org/abstracts/20113168808.html

Alwan, A., Armstrong, T., Cowan, M., & Riley, L. (2011). *Noncommunicable diseases country profiles 2011*. *World Health Organization*. Geneva. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Noncommunicable+Diseases+country+profiles#0

Ambakederemo, T. E., Ebuenyi, I. D., & Jumbo, J. (2014). Knowledge and attitude to self-monitoring of blood pressure in a Cardiology Clinic in Nigeria. *IOSR Journal of Dental and Medical Sciences*, *13*(5), 63–65. doi:10.9790/0853-13556365

Awuah, R. B., Anarfi, J. K., Agyemang, C., Ogedegbe, G., & Aikins, A. de-G. (2014). Prevalence, awareness, treatment and control of hypertension in urban poor communities in Accra, Ghana. *Journal of Hypertension*, *32*(6), 1203–10. doi:10.1097/HJH.0000000000000165

Baral-Grant, S., Haque, M. S., Nouwen, a, Greenfield, S. M., & McManus, R. J. (2012). Self-monitoring of blood pressure in hypertension: a UK primary care survey. *International Journal of Hypertension*, *2012*, 582068. doi:10.1155/2012/582068

Beth, M., Low, S., & Chung, P. (2012). A study to assess the knowledge on self-blood pressure monitoring among hypertensive patients in selected wards of Hospital Lam Wah Ee, Malaysia. *Ginseng Roots*, *6*(2), 43–45. Retrieved from http://web.imu.edu.my/imuejournal/approved/8.Research_Mini_p43-45.pdf

Bo, M. (2013). 2013 Practice guidelines for the management of arterial hypertension of the European Society of Hypertension (ESH) and the European Society of Cardiology (ESC): ESH/ESC Task Force for the Management of Arterial Hypertension. *Journal of Hypertension*, *31*(10), 1925–38. doi:10.1097/HJH.0b013e328364ca4c

Bosu, W. K. (2010). Epidemic of hypertension in Ghana: a systematic review. *BMC Public Health*, *10*, 418. doi:10.1186/1471-2458-10-418

Cappuccio, F. P., Kerry, S. M., Forbes, L., & Donald, A. (2004). Blood pressure control by home monitoring: meta-analysis of randomised trials. *BMJ (Clinical Research Ed.)*, *329*(7458), 145. doi:10.1136/bmj.38121.684410.AE

Coll de Tuero, G., Boreu, Q. F., Creus, R., Sanmartin, M., Rodriguez-Poncelas, A., Salleras, N., … Barcelo, M. A. (2006). Assessment of self-monitoring of blood pressure in the diagnosis of isolated clinic hypertension. *Blood Pressure*, *15*(July), 227–236. doi:10.1080/08037050600912203

Cuspidi, C., Meani, S., Fusi, V., Salerno, M., Valerio, C., Severgnini, B., … Zanchetti, A. (2004). Home blood pressure measurement and its relationship with blood pressure control in a large selected hypertensive population. *Journal of Human Hypertension*, *18*, 725–731. doi:10.1038/sj.jhh.1001737

Cuspidi, C., Meani, S., Lonati, L., Fusi, V., Magnaghi, G., Garavelli, G., … Zanchetti, A. (2005). Prevalence of home blood pressure measurement among selected hypertensive patients: results of a multicenter survey from six hospital outpatient hypertension clinics in Italy. *Blood Pressure*, *14*, 251–256. doi:10.1080/08037050500210765

Ghana Health Service. (2011). *Ghana Health Service 2011 Annual Report*. Accra. Retrieved from http://www.ghanahealthservice.org/includes/upload/publications/GHS 2011 Annual Report Final 14-8-

12.pdf/nhttps://www.pse.com/aboutpse/HydroLicensing/Documents/2011_Annual_Reports/300/BAK SA 303 Annual Report 2011.pdf

Greater Accra Region. (2013). Retrieved from ghanadistricts: http://www.ama.ghanadistricts.gov.gh/?arrow=atd&_=3&sa=1151

Hadithi, D. Al, Nazmi, A. S., & Khan, S. A. (2012). Self monitoring of blood pressure among hypertensive patients in Muscat- a pilot study. *Journal of Applied Pharmaceutical Science*, *2*(9), 155–157. doi:10.7324/JAPS.2012.2930

Hitzenberger, G., & Magometschnigg, D. (2003). Blood pressure characteristics of hypertensive patients in Austria as determined by self-monitoring (SCREEN-II). *Blood Pressure*, *12*(3), 134–138. doi:10.1080/08037050310001471

Huff, L. S., Zittleman, L., DeAlleaume, L., Bernstein, J., Chavez, R., Sutte, C., … Parnes, B. (2011). What keeps patients from adhering to a home blood pressure program? *Journal of the American Board of Family Medicine : JABFM*, *24*(4), 370–9. doi:10.3122/jabfm.2011.04.100266

Imai, Y., Otsuka, K., & Kawano, Y. (2003). Japanese Society of Hypertension guidelines for self-monitoring of blood pressure at home. *Hypertension …*. Retrieved from http://files.sld.cu/hta/files/2009/03/2003-japanese-society-of-hypertension-jsh-guidelines-for-self-monitoring-of-blood-pressure-at-home.pdf

Krecke, H. J., Lütkes, P., & Maiwald, M. (1996). Patient assessment of self-measurement of blood pressure: results of a telephone survey in Germany. *Journal of Hypertension*, *14*, 323–326. doi:10.1097/00004872-199603000-00008

Lam, J., & Guirguis, L. (2010). Patients' blood pressure knowledge, perceptions and monitoring practices in community pharmacies. *Pharmacy Practice*, *8*(3), 187–192. Retrieved from http://scielo.isciii.es/pdf/pharmacin/v8n3/original5.pdf

Lau, E., Kaczorowski, J., Karwalajtys, T., Dolovich, L., Levine, M., & Chambers, L. (2006). Blood pressure awareness and self-monitoring practices among primary care elderly patients. *Canadian Pharmacists Journal / Revue Des Pharmaciens Du Canada*, *139*(6), 34–41. doi:10.1177/171516350613900607

Little, P., Barnett, J., & Barnsley, L. (2002). Comparison of acceptability of and preferences for different methods of measuring blood pressure in primary care. *British Medical Journal*, *325*(August), 258–259. Retrieved from http://www.bmj.com/content/325/7358/258.abstract

Logan, A. G., Dunai, A., McIsaac, W. J., Irvine, M. J., & Tisler, A. (2008). Attitudes of primary care physicians and their patients about home blood pressure monitoring in Ontario. *Journal of Hypertension*, *26*, 446–452. doi:10.1097/HJH.0b013e3282f2fdd4

Madhur, M. S. (2014, September 30). *Hypertension*. Retrieved from Medscape: http://emedicine.medscape.com/article/241381

Matowe, W. C., Abahussain, E. a, Awad, A., & Capps, P. a. (2008). Self-monitoring of blood pressure and the role of community pharmacists in Kuwait. *Medical Principles and Practice : International Journal of the Kuwait University, Health Science Centre*, *17*(1), 27–31. doi:10.1159/000109586

McAlister, F. A., & Straus, S. E. (2001). Evidence-based treatment of hypertension : measurement of blood pressure : An Evidence Based Review Committee. *British Medical Journal*, *322*(7291), 908–911. Retrieved from http://www.jstor.org/stable/25466753

McGowan, N., & Padfield, P. L. (2010). Self blood pressure monitoring: a worthy substitute for ambulatory blood pressure? *Journal of Human Hypertension*, *24*(12), 801–6. doi:10.1038/jhh.2010.15

McManus, A. R. J., Mant, J., Roalfe, A., Oakes, R. A., Bryan, S., Pattison, H. M., & Hobbs, R. (2005). Targets and self monitoring in hypertension : randomised controlled trial and cost effectiveness analysis. *British Medical Journal*, *331*(7515), 493–496. doi:10.1136/bmJ38558.393669.E0

McManus, R. J., Glasziou, P., Hayen, A., Mant, J., Padfield, P., Potter, J., … Mant, D. (2009). Blood pressure self monitoring : questions and answers from a national conference. *British Medical Journal*, *338*(7685), 38–42. doi:10.1136/bmj.a2732

McManus, R. J., Ryan, a, Greenfield, S., Pattison, H. M., Clifford, S., Marriott, J., & Wilson, S. (2007). Self measurement of blood pressure: a community survey. *Journal of Human Hypertension*, *21*(9), 741–3. doi:10.1038/sj.jhh.1002217

Miehl, J. L. (1990). Nursing theories: the base for professional nursing practice. *AORN Journal*. doi:10.1016/S0001-2092(07)69211-4

Ministry of Health. (2010). *Standard treatment guidelines* (6th edition.). Accra: Ministry of Health. Retrieved from www.ghndp.org

Ministry of Health. (2011). *National policy for the prevention and control of chronic non-communicable diseases in Ghana*. Accra. Retrieved from http://www.iccp-portal.org/sites/default/files/plans/national_policy_for_the_prevention_and_control_of_chronic_non-communicable_diseases_in_ghana%281%29.pdf

Odedosu, T., Schoenthaler, A., Viera, D. L., Agyemang, C., & Ogedegbe, G. (2012). Overcoming barriers to hypertension control in African Americans. *Cleveland Clinic Journal …*, *79*(1), 46–56. doi:10.3949/ccjm.79a.11068

Parati, G., Omboni, S., & Bilo, G. (2009). Why is out-of-office blood pressure measurement needed ?: home blood pressure measurements will increasingly repalce ambulatory blood pressure monitoring in the diagnosis and management of hypertension. *Hypertension*, *54*, 181–187. doi:10.1161/HYPERTENSIONAHA.108.122853

Parati, G., Stergiou, G. S., Asmar, R., Bilo, G., de Leeuw, P., Imai, Y., … Mancia, G. (2010). European Society of Hypertension practice guidelines for home blood pressure monitoring. *Journal of Human Hypertension*, *24*, 779–785. doi:10.1038/jhh.2010.54

Parati, G., Stergiou, G. S., Asmar, R., Bilo, G., Leeuw, P. De, Imai, Y., … Staessen, J. A. (2008). European Society of Hypertension guidelines for blood pressure monitoring at home : a summary report of the Second International Consensus Conference on home blood pressure monitoring. *Journal of Hypertension*, *26*(8), 1505–1530.

Patient-driven healthcare. (2014, october 24). Retrieved from medpartners: http://www.medpartnershim.com/2014/10/health-information-management-patient-driven-healthcare/

Pickering, T. G., Hall, J. E., Appel, L. J., Falkner, B. E., Graves, J. W., Hill, M. N., … Roccella, E. J. (2005). Recommendations for blood pressure measurement in humans: an AHA Scientific Statement from the Council on High Blood Pressure Research Professional and Public Education Subcommittee. *The Journal of Clinical Hypertension*, *7*(2), 102–109. doi:10.1111/j.1524-6175.2005.04377.x

Rao, C. R., Kamath, V. G., Shetty, A., & Kamath, A. (2014). Treatment compliance among patients with hypertension and type 2 diabetes mellitus in a coastal population of Southern India. *International Journal of Preventive Medicine*, *5*(8), 992–998.

Sega, R., Facchetti, R., Bombelli, M., Cesana, G., Corrao, G., & Mancia, G. (2005). Prognostic value of ambulatory and home blood pressures compared with office blood pressure in the general population. *Circulation*, *111*, 1777–1783. doi:10.1161/01.CIR.0000160923.04524.5B

Soghikian, K., Casper, S. M., Fireman, B. H., Hunkeler, E. M., Leo, B., Tekawa, I. S., & Vogt, T. M. (1992). Home blood pressure monitoring: effect on use of medical

services and medical care costs. *Medical Care*, *30*(9), 855–865. Retrieved from http://www.jstor.org/stable/3765726

Swan, M. (2009). Emerging patient-driven health care models : an examination of health social networks , consumer personalized medicine and quantified self-tracking. *International Journal of Environmental Research and Public Health*, 492–525. doi:10.3390/ijerph6020492

Tan, N. C., Khin, L. W., & Pagi, R. (2005). Home blood-pressure monitoring among hypertensive patients in an Asian population. *Journal of Human Hypertension*, *19*, 559–564. doi:10.1038/sj.jhh.1001865

Tirabassi, J., Fang, J., & Ayala, C. (2013). Attitudes of primary care providers and recommendations of home blood pressure monitoring-DocStyles, 2010. *Journal of Clinical Hypertension*, *15*, 224–229. doi:10.1111/jch.12059

Tislér, A., Dunai, A., Keszei, A., Fekete, B., Othmane, T. E. H., Torzsa, P., & Logan, A. G. (2006). Primary-care physicians' views about the use of home/self blood pressure monitoring: nationwide survey in Hungary. *Journal of Hypertension*, *24*, 1729–1735. doi:10.1097/01.hjh.0000242396.15097.f3

Tyson, M. J., & McElduff, P. (2003). Self-blood-pressure monitoring--a questionnaire study: response, requirement, training, support-group popularity and recommendations. *Journal of Human Hypertension*, *17*(1), 51–61. doi:10.1038/sj.jhh.1001510

Van de Vijver, S., Akinyi, H., Oti, S., Olajide, A., Agyemang, C., Aboderin, I., & Kyobutungi, C. (2013). Status report on hypertension in Africa--consultative review for the 6th Session of the African Union Conference of Ministers of Health on NCD's. *The Pan African Medical Journal*, *16*, 38. doi:10.11604/pamj.2013.16.38.3100

Viera, A. J., Cohen, L. W., Mitchell, C. M., & Sloane, P. D. (2008). How and why do patients use home blood pressure monitors? *Blood Pressure Monitoring*, *13*, 133–137. doi:10.1097/MBP.0b013e32830263b7

World Health Organization. (2013). *A global brief on hypertension: World Health Day 2013*. Geneva. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:A+global+brief+on+Hyper++tension+World+Health+Day+2013#8

APPENDIX A:

INFORMATION SHEET FOR PARTICIPANTS

"BARRIERS TO SELF-MONITORING: A STUDY AMONG HYPERTENSIVE PATIENTS IN ACCRA METROPOLIS"

Introduction

My name is Charles Lwanga Deong Zieme, a Master of Public Health student of School of Public Health, University of Ghana. I am carrying out a research in this health facility to identify the factors that prevent hypertensive patients from monitoring their BP levels in their homes. I would be grateful if you could be one of my participants. Kindly read (or have it read to you) the information provided in this paper for details about your participation.

Study Procedure

I have a set of questions I will like to ask you for very short answers. It will take about fifteen minutes to complete. You may simply say Yes or No, or choose among a number of suggestions I will read to you.

Benefits

This study will not offer you any direct or immediate benefits following your participation. However, the study will help us suggest ways of improving the care of hypertensive patients.

Risks and discomfort

Your participation in this study will not in any way negatively affect the services you receive from this hospital. You will however be inconvenienced by spending your time to respond to my questions, and the difficulty of providing answers to some of the questions that may border around personal information.

Confidentiality

I am not recording your name. Every piece of information you give me will be known to me only and meant purposely for this study. The completed questionnaire will be stored in my personal electronic email inbox. Your name will not be mentioned anywhere in connection with this information when compiling and analyzing the set of data collected, or publishing any report emanating from this study.

Voluntary participation and withdrawal

Your decision to participate in this study is purely voluntary. If you don't feel like answering a particular question, you are free not to. If in the course of answering the questions you decide not to continue, you are also free to do so. Then we will stop the interaction. But this decision will not affect you in any way.

Contacts

If you have questions regarding this study, or clarification on any aspect of your participation, kindly contact me on 0543283669 or any of the following persons:

1. Dr. Phyllis Dako-Gyeke (Academic Supervisor) on 0207970370
2. The Chair, GHS Ethical Review Committee on 0302681109/0302679323

PARTICIPANT'S CONSENT

I have read (or it has been read to me) all the details about my participation in this study. I have understood everything and cleared my mind of all doubts by asking questions for clarification. I have not denied myself of any right by taking part in this study. I willingly volunteer to be a participant in your study as indicated by my signature/thumbprint below:

Signature Thumbprint

……

APPENDIX B:

SAMPLE QUESTIONNAIRE

Respondent's ID Number: …….

Name of Facility: ……

Date of Interview: ……..

Name of Interviewer: ……

A: ILLNESS HISTORY

Let us start with the history of hypertension in you. Tick the appropriate box

1 How many years now since you were told by a Doctor that you have hypertension? (write the number of years) ……

2 Have you been told by a Doctor to have any other disease? (refer to Folder to confirm)

0 None ☐

1 Diabetes ☐

2 Cancer ☐

3 Other (specify)……

B: AWARENESS/KNOWLEDGE

Tick the appropriate box(es)

3 Do you know the normal Blood Pressure?

0 Yes ☐

1 No ☐

4 If Yes to Q.3. write the value here ……mmHg

5 Have you heard about self-monitoring of BP (i.e. personally checking your BP)?

0 Yes ☐

1 No ☐

6 Do you own a personal self-monitoring BP machine?

0 Yes ☐

1 No ☐

C: PRACTICE

7 Do you currently self-monitor your BP (i.e. check your BP by yourself using a self-monitoring BP machine)?

0 Yes ☐

1 No ☐ (if NO, go over to Question number 16)

*Now, let me find out how you self-monitor your BP. For each of the statements in **8 – 15**, indicate whether you **1. Disagree OR 2. Agree** by writing the corresponding **number** in the boxes provided to your right.*

8 I check my Blood Pressure before taking my medication ☐

9 I check my BP sitting on a chair ☐

10 I check my BP lying down ☐

11 I check my BP while standing ☐

12 I check my BP as and when I feel like doing it ☐

13 I write down my BP in a book/chart after checking ☐

14 After checking, if my BP is above normal I see/inform my doctor/nurse immediately ☐

15 I adjust my lifestyle/medication based on my results after self-checking ☐

D: BARRIERS

Now I would like to know why you do not self-monitor. For each of statements ***16 – 21*** *indicate whether you* ***1. Disagree OR 2. Agree*** *by writing the corresponding* ***number*** *in the boxes provided to your right.*

16 I don't have money to buy the machine for self-monitoring ☐

17 It is not important to self-monitor my BP ☐

18 Self-monitoring of BP has no benefits for me ☐

19 My doctor/nurse never asked me to self-monitor ☐

20 My doctor/nurse discourages me from self-monitoring ☐

21 My doctor/nurse does not use my self-monitored BP results? (check in Folder to confirm) ☐

E: PERSONAL INFORMATION

Please, tick the appropriate box

22 What is your sex?

1 Male ☐

2 Female ☐

23 What is your age (as at your last birthday) ……*(please write)*

24 What is your highest educational level completed

0 No formal education ☐

1 Primary ☐

2 Middle/JSS/JHS ☐

3 Secondary/SSS/SHS/vocational/technical ☐

4 Tertiary (university/polytechnic/college) ☐

25 What is your marital status?

1 Single, never married ☐

2 Currently married or living with partner ☐

3 Widowed ☐

4 Divorced/separated ☐

26 What is your religion?

1 Christianity ☐

2 Islam ☐

3 African Traditional Religion ☐

4 Other (specify)……

27 What is your occupation?

0 Unemployed ☐

1 Public servant (gov't) ☐

2 Self-employed (trading/artisan/vocational, etc) ☐

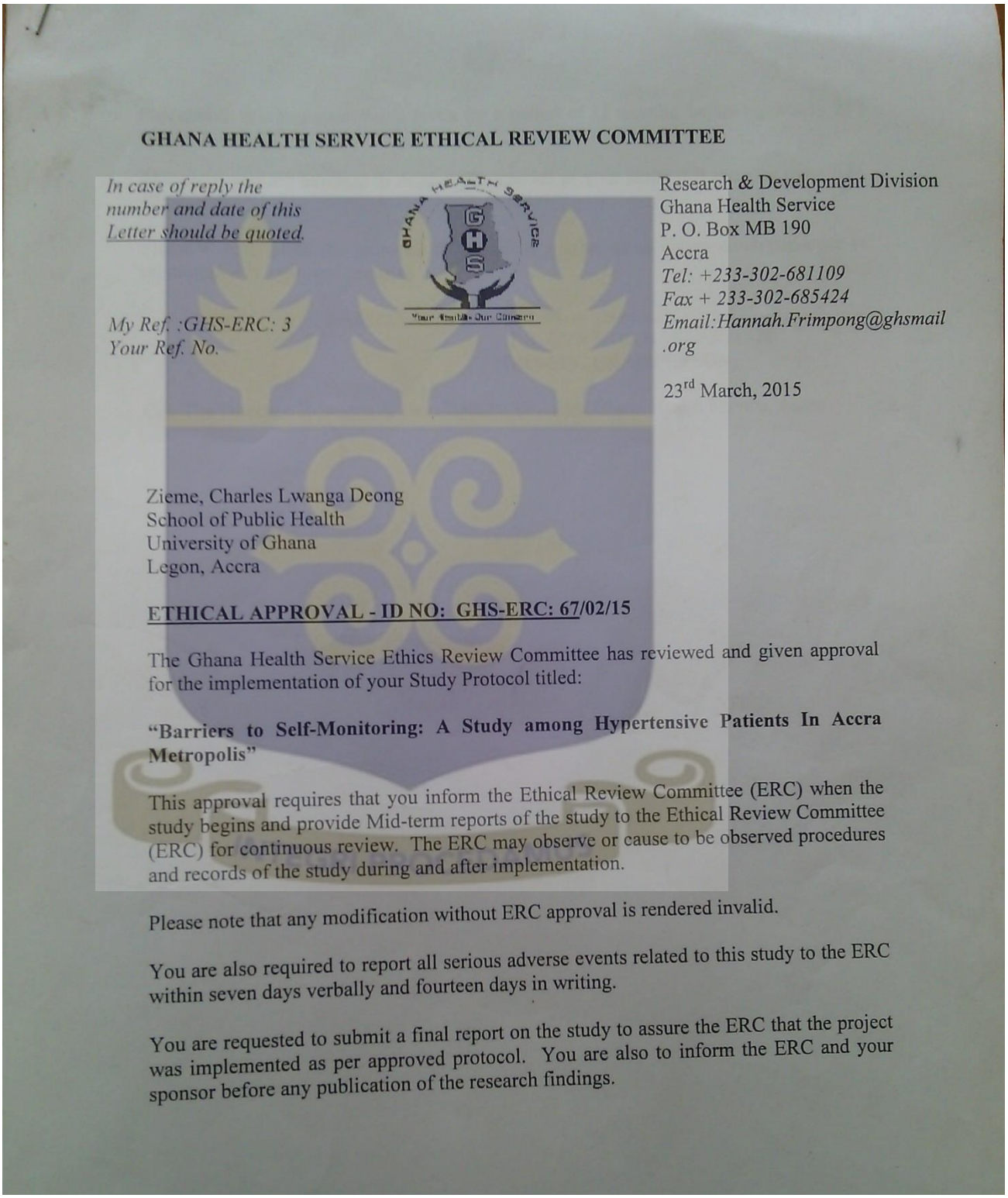
3 Private business employee ☐

4 Retired/elderly ☐

5 Other (specify)……

APPENDIX C:

ETHICAL APPROVAL



GHANA HEALTH SERVICE ETHICAL REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

My Ref. :GHS-ERC: 3
Your Ref. No.

Research & Development Division
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Email:Hannah.Frimpong@ghsmail .org

23rd March, 2015

Zieme, Charles Lwanga Deong
School of Public Health
University of Ghana
Legon, Accra

ETHICAL APPROVAL - ID NO: GHS-ERC: 67/02/15

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

"Barriers to Self-Monitoring: A Study among Hypertensive Patients In Accra Metropolis"

This approval requires that you inform the Ethical Review Committee (ERC) when the study begins and provide Mid-term reports of the study to the Ethical Review Committee (ERC) for continuous review. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification without ERC approval is rendered invalid.

You are also required to report all serious adverse events related to this study to the ERC within seven days verbally and fourteen days in writing.

You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your sponsor before any publication of the research findings.

Please note that this approval is given for a period of 12 months, beginning March 23rd 2015 to March 22nd 2016.

However, you are required to request for renewal of your study if it lasts for more than 12 months.

Please always quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....

DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra