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FACTORS AFFECTING ADHERENCE WITH MEDICATION AMONG HYPERTENSIVE PATIENTS ATTENDING KWAHU GOVERNMENT HOSPITAL

BY:

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MAY, 2019

DECLARATION

I declare that except for references to other people's works that have been duly acknowledged, this dissertation is the result of my own research and that this dissertation either in whole or part has not been presented for another degree elsewhere.

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ABSTRACT

Background

Hypertension is a global health threat especially in developing countries because of its high prevalence and concomitant risks of cardiovascular, cerebral and renal injuries. The leading cause of admissions and death in Ghana among adults is hypertension and related complications. Many patients diagnosed of heart failure, stroke and renal failure have underlying high blood pressure, which can be controlled with medications. This study aims to determine the factors affecting adherence to hypertensive medications.

Methods

A descriptive cross-sectional study was conducted at the Kwahu Government Hospital amongst 300 hypertensive patients aged 18 years and above who had been on antihypertensive medication for at least 6 months. Ethical approval was sought from the Ghana Health Service (GHS) Ethics Review Committee.

Medication adherence was measured using the Morisky Medication Adherence Scale (MMAS-8). High adherence was defined as MMAS score of 6 or greater (≥ 6) out of a total score of 8 whilst low adherence was defined as a point of less than six (< 6).

Results

One hundred and thirty-eight (46%) patients had high adherence to antihypertensive medication. Forgetfulness was the major reason for low adherence. After multivariate adjustment, level of education, period since diagnosis, number of tables taken daily, perceived severity and cues to action were significantly associated with adherence. No formal education, period since diagnosis more than 10 years, more than one tablet daily, low perceived severity and low cues to action were associated with low adherence.

Conclusions

Adherence was low among hypertensive patients attending Kwahu Government Hospital

Level of education, period since diagnosis, number of tables taken daily, perceived severity and cues to action influenced adherence.

This prompts for continuous health education to hypertensive patients which should stress on disease severity and health problems they will be prone to if they don't comply with their medications. Health information should also be dissemination to hypertensive patients through multiple sources like health personnel and electronic media.

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LIST OF ACRONYMS

ACE	Angiotensin Converting Enzyme
ARB	Angiotensin Receptor Blocker
BP	Blood Pressure
CVD	Cardiovascular diseases
DBP	Diastolic Blood Pressure
ESH	European Society of Hypertension
ESC	European Society of Cardiology
HBM	Health Belief Model
JNC	Joint National Committee
NHIS	National Health Insurance Scheme
MMAS	Morisky Medication Adherence Scale
NCD	Non-communicable diseases
NICE	National Institute for Health and Care Excellence
OPD	Out Patient Department
SBP	Systolic Blood Pressure
SSA	Sub-Saharan Africa
WHO	World Health Organisation

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Hypertension is a major public health problem globally because of its high prevalence and concomitant risks of cardiovascular, cerebral and renal injuries (Thawornchaisit et al., 2013, Abdissa et al., 2015). Cardiovascular diseases (CVD) are the leading cause of death globally, and accounted for an estimated 17.9 million deaths in 2016. Majority of these deaths are in Africa (Appiah et al., 2017; WHO, 2017). The prevalence of hypertension in Sub-Saharan Africa (SSA) has increased from 9.7% in 1990 to 31.1% in 2010. This high prevalence in Africa is due to urbanization with its associated sedentary lifestyle and obesity (Okwuonu et al., 2015).

In Ghana, CVD is the second leading cause of deaths after diarrheal diseases (Sanuade et al., 2014). Sanuade et al., (2014) posit that, one fifth of all deaths at Korle-Bu Teaching Hospital from 2006 to 2010 were caused by CVD. The second leading cause of admission and fourth cause of death in Ghana are hypertension and stroke respectively. Many patients in Ghana diagnosed of heart failure and renal failure have underlying high blood pressure (Owusu, Adu-Boakye, & Tetteh, 2014; Ghana Health Service, 2017).

Antihypertensive medications are used to reduce high blood pressure to optimal levels. Although clinical trials have proven the efficacy of antihypertensive drugs in controlling blood pressure and reducing co-morbid conditions associated with the disease, adherence to medication among hypertensive in clinical practice is as low as 20-50% (Corrao et al., 2011; Saadat et al., 2015) Adherence refers to patient taking a prescribed drug as prescribed (Ramli, Ahmad, & Paraidathathu, 2012).

Research has identified the following factors which affect adherence. These are: age, gender, level of education, knowledge on condition, duration of treatment, forgetfulness, severity of disease, side effects of drugs, beliefs on condition and co-morbid medical conditions (Corrao et al., 2011, Karakurt, 2012). Many of the factors affecting adherence are due to patients' lack of understanding of hypertension and its treatment, health seeking behaviours and self-perceived beliefs on hypertension and antihypertensive medication (Okoro, 2012; Olowookere et al., 2015). Research has revealed that forgetfulness and long term side effects are the major factors affecting adherence to antihypertensive medication (Ramli et al., 2012; Atinga et al., 2018). Research on these factors will give more insight into adherence behavior of patients (pertaining to antihypertensive drugs) attending Kwahu Government hospital.

1.2 Problem statement

Disease burden is moving from communicable to non-communicable diseases. Sixty three percent (63%) of the estimated 57 million global deaths in 2008 were due to non-communicable diseases (NCDs). Forty-eight percent (48%) of NCD deaths were caused by cardiovascular diseases (WHO, 2012). Hypertension is the leading cause of cardiovascular disease globally (Lacruz et al., 2015).

The prevalence of hypertension in Africa is about 46% in 2014 among adults aged 25 years and above, while the prevalence in Americas is 35% (WHO, 2015a). In Ghana, prevalence is about 19.3% to 32.4% in rural and 54.6% in urban areas (Addo et al., 2012). People with hypertension have increased risk of developing cerebrovascular disease. Low blood pressure has been associated with reduced risk of developing ischaemic heart disease and cerebrovascular accidents (Soler & Ruiz, 2010). Adherence to antihypertensive medication leads to adequate control of blood pressure among hypertensive (Li et al., 2016). Adherence to antihypertensive drugs

reduces the risk of stroke by more than one third and risk of coronary heart disease by 19 to 28% (Semplicini et al., 2017, Law et al., 2009). Non-adherence increase hospital admissions and health cost burden for hypertensive patients compared to adherent hypertensive patients (Suleiman et al., 2010). Evidence shows that adherence among patients with chronic illness drops dramatically after the first six months of treatment (Adisa & Fakeye, 2014). Adherence to long-term therapy of chronic diseases like hypertension is around 50% to 70% globally (WHO, 2013). In Ghana, studies have found adherence to chronic illness to be less than 45% (Atinga et al., 2018, Addo et al., 2018).

There is considerable variation in the level of adherence between developed and developing countries, urban and rural areas. Studies done in urban areas in Ghana found adherence to be between 27.5% to 32.67% (Boima et al., 2015, Twumasi-Ankrah, 2017). There is inadequate data on the level of adherence in rural settings where healthcare infrastructure is limited. More research is needed to examine the level of adherence and factors affecting adherence in rural setting, so that prompt measures will be put in place to improve adherence to medication thereby reducing mortality and morbidity from CVD. This study is aimed at unearthing the level of adherence and factors affecting adherence to hypertensive medication among rural folks.

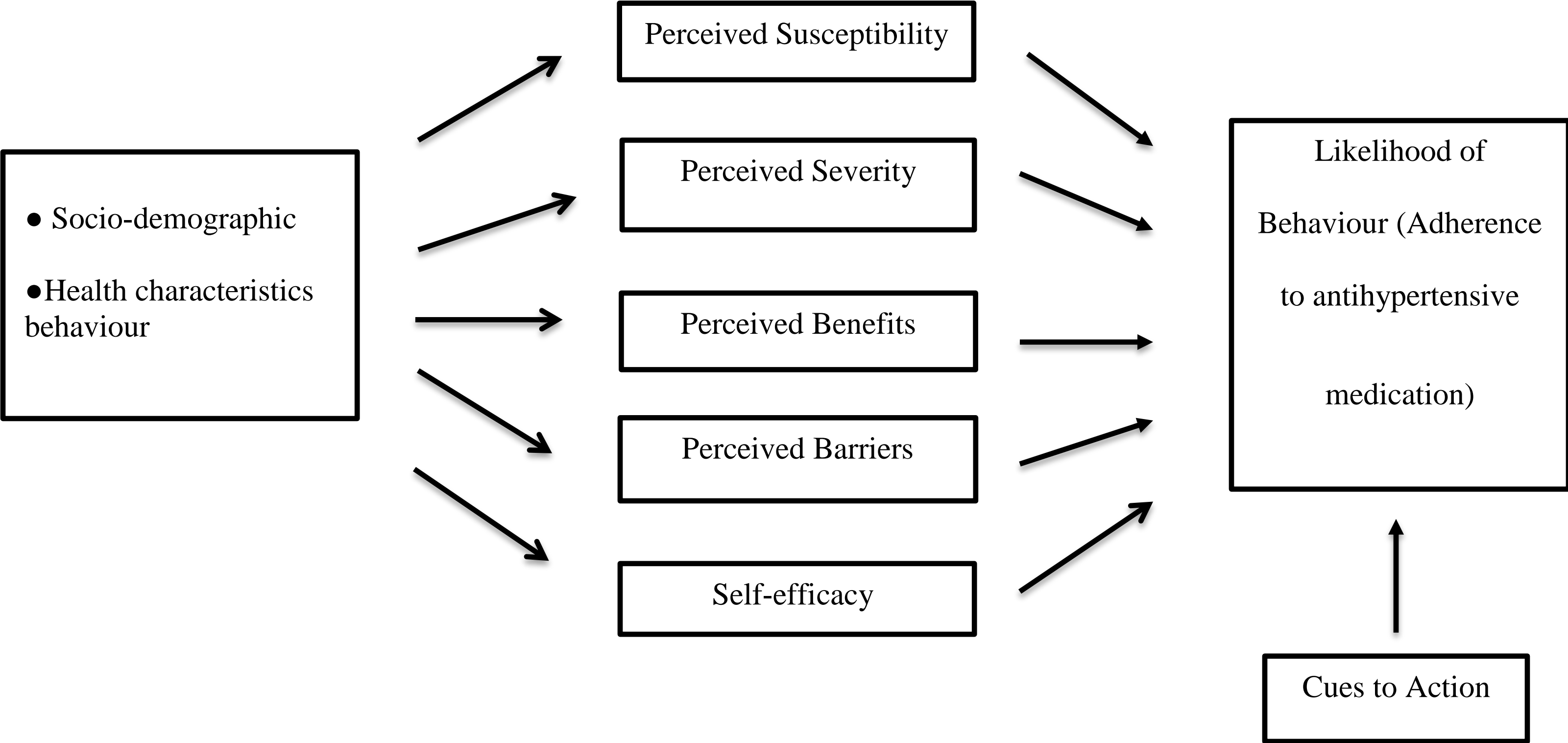
1.3 Justification for study

It is well known that adherence to antihypertensive medication is a major challenge to public health. Non-adherence to therapy is a major reason for poorly controlled blood pressure and leads to serious morbidities among hypertensive patients. In developed countries, hypertension and its complication is a big concern and considerable research is underway to reduce the morbidities and mortalities from hypertension, but less is being done in developing countries like Ghana. With the increase in NCD in Sub-Saharan Africa, understanding the different human

behaviours that affect adherence to medication is of great importance in public health. In resource-limited settings, more research is needed to better understand human adherence behaviour and identify optimal models of care to address this challenge in areas where majority of hypertensive patients will be receiving care. Given the importance and urgency in adopting preventive measures for cerebrovascular and cardiovascular damage among hypertensive patients, research on factors affecting adherence to hypertensive medication would be significant in policy formulation, implementation and practice. Hence, determining the factors affecting adherence to medication and thereby preventing of hypertension complication will be clinically relevant issues in the care of hypertensive patients.

The aim of this study was to describe the adherence behaviour of hypertensive patients to their prescribed medication and also identify factors which influence this observed behaviour. The findings from this work will aid in improving healthcare professionals management of hypertensive patients. It will also help advance scientific knowledge on the factors affecting adherence to antihypertensive medication in rural areas. The findings will aid policy makers (Ministry of Health and Ghana Health Service) in the planning and implementation of intervention to increase patient adherence to therapy. This will reduce the incidence of hypertensive complications, improve the quality of life of patients and reduce health finance burden. This thesis explored the dynamics of the relationship between hypertension and adherence to medication in patients attending hypertension clinic at Kwahu Government Hospital.

Figure 1: Conceptual framework



Health Belief Mode adapted from Glanz et al., 2008

1.4 Conceptual framework

This study adopts the Health Belief model (HBM) as its conceptual framework. The HBM is a psychological model widely used in studying adherence. HBM's effectiveness in predicting adherence has being supported by several studies (Carpenter, 2010; Hasani & Tavafian, 2009; Tanner-Smith & Brown, 2010). The HBM was developed in 1950s to explain and predict health behaviour (Champion & Skinner, 2008).

The HBM is made up of six basic constructs. These are perceived severity, perceived susceptibility, perceived benefits, perceived barriers, self-efficacy and cues to action (Champion & Skinner, 2008). The HBM is divided into two main portions: threat perception and behaviour evaluation. Threat perception covers perceived susceptibility to health problem and anticipated severity of the consequences of health problem. Behaviour evaluation comprises beliefs about the benefits and barriers of adopting good health behaviour and the person's ability to perform the good behaviour (George et al., 2015, LaMorte, 2018). When appropriate beliefs are held, the right internal and external factors can influence adoption good health behaviour. These internal and external factors are termed as cue to action (George et al., 2015). The socio-demographic and health characteristics of an individual influences the 6 constructs of the HBM (Stretcher & Rosenstock, 1997 sited by Schwarzer, 2014).

The model posits that, an individual perception of severity of a disease or its complication leads to behavioural change. If a person believes that high blood pressure or its complication as being serious due to knowledge and beliefs about the illness, it will result in the individual taking measures to adhere to medication. He will not-adhere if he believes high blood pressure or its complication is not serious (Champion & Skinner, 2008). This model states that, individuals who identify themselves as being susceptible to acquiring hypertension and suffering from associated

health problems influence his or her ability to adopt healthier behaviours to reduce their risk of developing the illness and its complication (George et al., 2015). Individuals who consider themselves as being at low risk of getting complications of hypertension may deny their susceptibility to acquiring complications and so will not adhere to medication. Those who consider themselves as highly susceptibility take measures to prevent complications and thereby adhere to medication.

If a person perceives that adherence to medication is beneficial then he adopts that behaviour and vice versa(Champion & Skinner, 2008). Cao et al.(2014) stated that perceived benefits refer to individual's evaluation of the advantage of engaging in health behaviour to decrease the risk of an illness. An individual who believes that adherence to medication will prevent him from acquiring cerebrovascular accident is more likely to practice that compared to those who don't believe.

Perceived barriers refer to an individual evaluation of the obstacle to behaviour change (George et al., 2015). Individual perceptions of barriers to change (e.g. attitude of health workers) affect adherence, especially if perceived barriers outweigh the benefits (Champion & Skinner, 2008). Self-efficacy refers to an individual perception to successfully perform a behaviour (LaMorte, 2018). It was added to the components or variables of the HBM in 1988 (Rosenstock et al., 1988 sited by Carpenter, 2010). This component is based on 3 core assumptions which determine whether or not a person will take a health-related action. These are: conviction that one has the ability to initiate the activity, maintain the activity, and persist in performing the activity in the face of obstacles (Horan et al., 1998 sited by Endicott, 2013). Self-efficacy is rarely included in HBM studies (Zinnerman & Vernberg, 1994 sited by Carpentor, 2010).

Cues to action are events, experiences, information, advices or things that move people to change their behavior. Cues to action trigger or stimulate a health behaviour (Cao et al., 2014). An

individual personal experience about a relative who had a stroke due to high blood pressure is more likely to be adhere to medication compared to someone who does not have that experience (Champion & Skinner, 2008).

1.5 Research questions

1. What is the level of adherence to medication among hypertensive patients?

2. What are the factors influencing hypertensive patients' non-adherence to their medication?

1.6 Research objectives

1.6.1 General objective

The general objective of the study is to examine adherence to medication among hypertensive patients attending Kwahu Government Hospital.

1.6.2 Specific objectives

The specific objectives are:

1. To determine the level of adherence to medication among hypertensive patients
2. To assess factors influencing adherence to antihypertensive medication.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.2 Hypertension

Hypertension is defined as an elevated systolic blood pressure (SBP), diastolic blood pressure (DBP) of 140/90mmHg and above (British Hypertension Society, 2011).

2.2.1 Classification of hypertension

A clinical diagnosis of hypertension is based on the lowest of two or more properly measured seated or supine blood pressure measurements taken at one visit (Gelfer et al., 2015; Mancia et al., 2014). The normal blood pressure is less than 130/85mmHg (Goddard & Turner, 2014). Joint National Committee (JNC 8) hypertension guidelines states normal blood pressure value is less than 120/80mmHg (Farooq & Ray, 2015). Farooq & Ray (2015) and Mancia et al. (2014) showed how ESH/ESC and JNC 8 classified hypertension (table 2.1).

Table 2.1: Classification of hypertension (Farooq & Ray, 2015; Mancia et al., 2014)

ESH/ESC Category	SBP/DBP	JNC 8 Category
Optimal	<120/80	Normal
Normal	120-129/80-84	
Borderline	130-139/85-89	Prehypertension
Hypertension	≥140/90	Hypertension
Stage 1	140-159/90-99	
Stage 2	160-179/100-109	Stage 1
Stage 3	≥180/110	Stage 2

ESH = European Society of Hypertension, ESC =European Society of Cardiology, SBP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure, JNC = Joint National Committee

Prehypertension is not a disease category but stated to inform health care professionals of individuals at high risk of developing hypertension. These individuals are educated on lifestyle

modifications in order to reduce their risk and prevent the disease from manifesting in the future. Individuals with prehypertension are not put on medication (Farooq & Ray, 2015).

High blood pressure is also classified into two main types based on etiology:

Primary (Essential) hypertension is high blood pressure whereby the specific underlying cause cannot be identified (Goddard & Turner, 2014). Ninety-five percent (95%) of hypertensive patients have essential hypertension of cases. Genetic and environmental factors may contribute to its development (Aminoff, Andreadis, & Armstrong, 2015).

Secondary hypertension is high blood pressure caused by medical condition or medication (Goddard & Turner, 2014).

2.2.2 Causes of secondary hypertension

These are the causes of secondary hypertension:

- Chronic Renal Failure
- Alcohol
- Obstructive Uropathy
- Pregnancy (pre-eclampsia)
- Drugs induced or drug related such as oral contraceptives, anabolic steroids, corticosteroids, Nonsteroidal anti-inflammatory drugs (NSAIDs), Carbenoxolone and Sympathomimetic agents
- Coarctation of the aorta
- Endocrine disease such as:

  Phaeochromocytoma

  Cushing's syndrome

  Primary hyperaldosteronism (Conn's syndrome)

Glucocorticoid-suppressible hyperaldosteronism

Hyperparathyroidism

Acromegaly

Primary hypothyroidism And Thyrotoxicosis

Congenital adrenal hyperplasia

Liddle's syndrome and

11-β-hydroxysteroid dehydrogenase deficiency

(Goddard & Turner, 2014)

2.2.3 Epidemiology of hypertension

In 2008, sixty three percent (63%) of the estimated 57 million global deaths were due to noncommunicable diseases (NCDs). Cardiovascular diseases made up Forty-eight percent (48%) of NCD deaths (WHO, 2012). Hypertension is the leading cause of cardiovascular disease globally (Lacruz et al., 2015). The global prevalence of hypertension was 1.39 billion people in 2010, representing 31% of all adults. Three hundred and forty nine (349) million of these people are in high-income countries while 1.04 billion in low and middle income countries (Mills et al., 2016). There was a 5.2% increase in the global prevalence of hypertension between 2000 and 2010 (Bloch, 2016).

The prevalence of hypertension in Africa is about 46% among adults aged 25 years and above, while the prevalence in Americas is 35% (WHO, 2015a). Globally, the top five countries with the highest proportion of women with high blood pressure in 2015 were all in Africa: Niger, Chad, Mali, Burkina Faso, and Somalia. One in three women in these countries had high blood pressure (WHO, 2016).

In Ghana, prevalence of hypertension is 29.9% for men and 27.6% for women (WHO, 2015b). The number of adults with hypertension in low-middle income countries like Ghana with good blood pressure control is 9.9%. Hypertension control is higher in urban communities compared to rural communities in low-middle income countries (Mills et al., 2016).

2.2.4 Hypertension treatment

According to National Institute for Health and Care Excellence (NICE, 2017) guidelines, management of patients with primary hypertension consists of lifestyle modifications and pharmacological treatment.

2.2.4.1 Lifestyle modification

Hypertensive patients should have lifestyle counseling immediately after diagnosis and periodically. Health professionals should find out patients eating and exercise habit because healthy eating habits and regular exercise can reduce blood pressure. Patient should be encouraged to reduce stress by indulging in relaxation therapies as it can increase blood pressure. The consumption of alcohol, food products such as coffee and other caffeine-rich products should be discouraged and patients should be encouraged to keep their dietary sodium intake low, as this can decrease blood pressure. Smokers should be encouraged and assisted to quit (NICE, 2004).

2.2.4.2 Pharmacological treatment

This is the use of drugs to control blood pressure. Blood pressure reduction leads to a reduction in the risk of getting a cerebrovascular and cardiovascular event(Ettehad et al., 2016). Medication is initiated based on various blood pressure thresholds. These thresholds are dependent on the presence and absence of comorbid diseases (Weir et al., 2017). Hypertension

medication is started at systolic blood pressure (SBP) of 130mmHg or higher or diastolic blood pressure of 80 in people with comorbid conditions and systolic blood pressure (SBP) of 140mmHg or higher or diastolic blood pressure of 90 or higher in those without comorbid conditions (NICE, 2011, Whelton et al., 2017). Monotherapy is prescribed for people with SBP < 160 or DBP < 100 while dual, triple and quadruple therapy is for those with SBP ≥ 160 or DBP ≤ 100 (Cybulsky et al., 2016).

As much as possible, hypertensive patients should be put on medication that is taken once a day (Flack & Nasser, 2011). Individuals with disconnected systolic hypertension (systolic blood pressure of 160 mmHg or more) should be offered the same treatment as individuals with both raised systolic and diastolic blood pressure. Patients aged 80 years and over can be offered the same antihypertensive treatment as individuals aged 55–80years, taking into account any co-morbidity (NICE, 2011).

Hypertensive patients below 80years on medication should aim at a target blood pressure below 140/90 mmHg and those 80 years and above aim at blood pressure below 150/90 mmHg provided they do not have comorbid conditions (NICE, 2017). Those with comorbid conditions should aim at lower blood pressure readings (Whelton et al., 2017).

Patients should be educated on the benefits of antihypertensive drugs and undesirable side effects in order for them to be well informed of their condition (Seedat & Rayner, 2011, Obirikorang et al., 2018). Table 2.2 shows the common hypertension medication side effects. People have different attitudes to their medical condition and their experience of treatment (NICE, 2017).

Table 2. 2: Common hypertension medications and their side effects

Class	Drugs	Side Effects
Calcium Channel Blockers	Nifedipine Amlodipine	Palpitations, Flushing, Headache, Ankle swelling

Beta blocker	Atenolol, Labetalol, Propranolol Bisoprolol	Headache, Bradycardia, Insomnia, erectile dysfunction, Cold hands and feet
ACE Inhibitors	Lisinopril	Chronic dry cough, Skin rash
Angiotensin II receptor blockers	Losartan, candesartan	Occasional dizziness
Loop diuretics	Furosemide	Hypovolemia, Hyperuricemia, hypokalemia
Thiazide diuretics	Bendrofluothiazide Hydrochlorothiazide	Hyponatremia, Hypercalcemia, erectile dysfunction, Hyperuricemia
Potassium-sparing diuretics	Spironolactone Amiloride	Hyperkalemia, erectile dysfunction
Central Acting	Methyldopa	Postural hypotension, dryness of the mouth, erectile dysfunction
Vasodialtors	Hydralazine	Severe hypotension, headaches, heart palpitations

(Chrysant, 2015; American Heart Association, 2017; PharmaFactz, 2018)

2.3 Adherence to medication

Irregular intake of medicine by patient can be termed as compliance, adherence, persistence and concordance. These terms are used interchangeable but they have different meanings when it comes to patient and health provider relationship (Hugtenburg et al., 2013). Compliance was first used as a descriptor for patients' obedience to recommendations with prescribed treatments (Sackett & Haynes, 1976 sited by Beena & Jimmy, 2011). Compliance means acting in accordance with prescriber's advice. This portrays a dictatorship attitude towards the patient by the prescriber and not mutual agreement between the patient and prescribe (Aronson, 2007). For this reason the World Health Organization (WHO) in 2003 introduced the term adherence to change the undertone of blame and paternalism associated with compliance (World Health Organization, 2003). Adherence is the extent to which patients' drug intake behaviour corresponds with the recommendations of the prescriber. "Adherence to medication" will be used in the study because it is the current preferred terminology (Aronson, 2007; Hugtenburg et al., 2013). Concordance is sometimes mistakenly used in place of adherence, it means a

prescriber and patient should come to an agreement about the regimen that the patient will take (Aronson, 2007, Hugtenburg et al., 2013). Persistence refers to how long patient stay on prescribed treatment while adherence is about how well he or she follows the prescribed treatment (Hugtenburg et al., 2013). In conclusion, medication adherence consists of persistence and adherence.

Patients who are diagnosed with primary hypertension are supposed to take medications for life. Hypertension treatment requests that patients comply with their medicines as endorsed and ought to return for a refill when medications are depleted (Edo, 2009). Non-adherence is a worldwide problem. Adherence to chronic illnesses is about 50% in developed countries with even lower rates in developing countries (World Health Organization, 2003). Antihypertensive medications have been proven to control blood pressure (Ilea et al., 2018). Adherence with treatment reduces mortality and morbidity. Adherence reduces health care cost to the individual, family and country (Brown & Bussell, 2011). This is especially vital in countries with poorly financed public healthcare framework such as Ghana.

2.3.1 Factors affecting adherence

Patients are adherent when they are actively involved in the decision making process concerning their treatment. They are also more likely to adhere when they have great perceptions concerning the treatment (Baroletti & Dell'Orfano, 2010). Factors which were profoundly associated with adherence in hypertensive patients include socio-demographic, patient knowledge of their condition, absent mindedness or forgetfulness, health beliefs, perception relating to the ailment, therapy-related factors and health system related factors (Cooper et al., 2005; Aggarwal & Mosca, 2010; Duah et al., 2013; WHO, 2015b). Aikens et al. (2009) found that for

antihypertensive drugs, patients' perception about the need for therapy is based on level of satisfaction with medicinal information. Healthcare professionals must provide patients with adequate information about their medications. Other factors related to the medication like the unpleasant side effects of the drugs can lead to patient abandoning the medication. Certain patients assume symptoms like dizziness and insomnia are associated with antihypertensive and discontinue the medications when these symptoms occur.

Hypertension and its related co-morbidities require patients to be on multiple medications. Patients see this as a bother and intentionally miss their daily dose. Sabate (2003), states that expanding the complexity of medication due to co-morbidities, diminishes patient adherence with treatment regimen. Also, patient perception of the healthcare frameworks and suppliers more often impacts patient adherence to treatment. In 2010, the WHO and World Health Assembly on the issue of healthcare frameworks, encouraged all member states to aim for affordable widespread scope and access for all citizens on the premise of value and solidarity and most nations have created approach recommendations to accomplish this objective (Mills et al., 2012). Numerous nations still battle nevertheless, to successfully adjust access to healthcare with quality and cost efficiency. Nations in SSA have taken incredible strides in establishing universal healthcare but patient fulfillment with respects to the quality of care is minimal (Kayima et al., 2013).

There is still a huge influx of patients per facility and the strain related with the visit makes the encounter exceptionally surly. Not only that, but there is also a colossal dissimilarity between districts in terms of health provider dispersion and due to this, patient-provider interaction is exceptionally low lessening the probability of comprehensive care. Medicinal adherence depends intensely on benefit obtained in healthcare facilities and it has been established that patients

return home and avoid medicine due to dissatisfaction with care given by healthcare professionals (Lubaki et al., 2009).

In spite of the fact that stress is a contributing cause to hypertension, believing that it is the sole culprit cause of hypertension encourages non-adherence (Spencer et al., 2005).

According to a research carried out in Accra, Nkoranza and Kintampo, patients professed their unremitting conditions as terminal with the rural groups alluded to it as 'koa nkoro' literally deciphered as 'difficult to fight' (de Graft Aikins et al., 2012). This recognition leads to the lay conviction that hypertension can as it were be overseen but never cured; it underplays the significance of medicine as a mode of treatment. Also, some of the communities portrayed hypertension as the devil's infection ('abonsam yare') or a spiritual disturbance caused by an adversary through divination and witchcraft as a result of envy; while others accepted that ethical transgressions are authentic reasons for ailment and as such hypertension could be a few frame of reformatory equity allotted out to them due to earlier transgressions (de Graft Aikins et al., 2012).

2.4 Components of the Health Belief Model and adherence

Originally, the essential components of the Health Belief Model (perceived susceptibility, perceived severity, perceived benefits and perceived barriers) were inferred from different models of psychological and behavioral hypotheses of cognition. Cognitive scholars propose that health conduct is volitional and to a great extent subordinate on the subjective esteem set by a person on an anticipated result of the activity and the probability that such an activity would accomplish that result. This is alluded to as value expectancy theory (Finfgeld et al 2003; Glanz et al 2002).

As a value expectancy theory, the model conceptualizes that preventive health activities is subordinate upon values put on proposed activities and the intrinsic conviction that the extreme result would be what was expected. On the strength of the model, a patient diagnosed with hypertension would have to consider his or her helplessness to hypertension and its result before making "the judgment as to whether the benefit to be gained from a particular [adherence] behaviour is worth the cost" (Stewart & Eales 2002).

This study seeks to examine the factors that affect adherence to medication among hypertensive patients. This is because, it has been established that blood pressure control includes both medicinal treatment and lifestyle changes. Adherence conduct is a complex and multidimensional experience and different conceivable variables that could impact the conduct have been examined and detailed in the literature (Zhang et al., 2018). The factors reported to influence adherence behavior in literature are perceived severity, perceived susceptibility, perception on benefits, health provider factors and cues to action (such as mass media campaigns, advice from friends, reminder messages from physicians or nurses, newspaper and magazine articles, or being in contact with family members or friends with a similar illness) (Winfield & Whaley 2002).

2.5 Measurement of adherence

Adherence can be measured by direct and indirect methods. Both methods have its advantages and disadvantages and no method is seen as the true gold standard (Lee et al., 2007). Table 2.3 shows the different methods in measuring adherence, its negatives and positives.

Table 2.3: Methods for measuring adherence

Test	Advantages	Disadvantages
Indirect Methods		
Patient questionnaires, (patient self report)	Simple ,inexpensive, most useful in clinical settings	Susceptible to error with increases in time between visits. Results are easily distorted by the patient
Pill count	Objective quantifiable and easy to perform	Data easily altered by the patient e.g. pill dumping
Rates of prescription refills	Easy to obtain data	Prescription refill is not equivalent to ingestion of medicines, requires a closed pharmacy system
Assessment of patients clinical response	Easy to perform	Factors other than medication adherence can affect clinical response
Electronic medication monitors	Precise results are easily quantified, tracks patterns of taking medications	Expensive, requires return visits and downloading data from medication vials
Measurement of physiologic markers e.g. heart rate in patients taking beta blockers	Easy to perform	Marker may be absent for other reasons e.g. increased metabolism, poor absorption, lack of response
Patient diaries	Helps to correct for poor Recall	Easily altered by patient
Direct Method		
Direct observed therapy	Most accurate	Patients can hide pills in their mouth and discard them later, impractical for routine use
Measurement of the level of medicine or metabolite in the blood	Objective	Variations in metabolism. Can give a false impression of adherence and it is expensive
Measurement of the biologic marker in the blood	Objective in clinical trials and can also be used to measure placebo	Requires expensive quantitative assays and collection of bodily fluids

(Osterberg & Blaschke, 2005 sited by Aslani et al., 2018)

In clinical practice adherence is mostly assessed by medication refill history or patient-recall. These methods are easy to perform and inexpensive but they are more crude and therefore less accurate. These methods are seen overestimate medical adherence. It is however suggested that their accuracy is increased significantly when they are used together (Lee et al., 2007).

2.5.1 Direct methods of assessing adherence

Direct observation is the most accurate direct method of measuring adherence however, it is impossible to use it in an outpatient setting for patients on long term therapy (Hawkshead, 2015). Another way of determining the level of adherence is by biological assays. Biological assays measure the concentration of a drug, its metabolites or tracer compounds in the blood or urine of a patient who ingested the drug. This method is invasive and costly. It may also be misleading because patients may take medications they have skipped some days before they get tested in order for the test not to detect individuals who have been non adherent. Serum concentration of the metabolites may be affected by diet, individual physiology differences, half-life of drug, drug interactions and dosing schedules (Hawkshead, 2015).

2.5.2 Indirect methods of assessing adherence

The pill count is an objective method of measuring adherence. It involves counting the number of dosage units not used and comparing it with the number of units received at the most recent refill. It is useful in both clinical trials and practice. Adherence can be measured using this equation:

$$\%\ \text{adherence} = \frac{\text{Number of doses actively taken}}{\text{Number of doses that should have being taken}} \times 100\%$$

The pill count is easy to do and inexpensive. Its drawbacks includes, its inability to accurately capture the exact time medication was taken and drug holidays and thus may overestimate the level of adherence. Pill count errors may be due to patients' dumping or sharing pills (Hawkshead, 2015; Osterberg & Blaschke, 2005).

Medication events monitoring systems (Electronic monitoring) is the most expensive and technologically advanced means of assessing adherence. It measures dose frequency (number of doses taken), dose time (time and date bottle opened), dose interval (number of hours since the

last bottle opening) and dose timing (frequency of days on which dose was taken at a specific hour). Among the different methods, it is the nearest to a gold standard in measuring adherence. It consist of a standard prescription bottle fitted with a cap which contains a computer chip that records the date and time the bottle is opened. The information gathered can be used by health personnel to evaluate the appropriateness of dosing schedules (Hawkshead, 2015). The drawbacks with this method are : there is no way of finding out if the tablets taken from the bottle are actually ingested by the patient, reactivity bias (behaviour change due to individual knowledge that he or she is being observed) is possible and device is expensive (Hawkshead, 2015).

Prescription refill records or rates is the most practical and least sophisticated of all the methods in measuring adherence. Adherence is assessed by the number of refills obtained by the patient. It involves using dispensing records to note when patient collected their medications and when refill was made. Some of these its advantages are: it is relatively inexpensive, patient privacy is preserved and there is no reactivity bias. Its major disadvantage is that it does not evaluate actual medication ingestion as factors such as forgetfulness may contribute significantly to non-adherence. Another disadvantage is that it can only be used in a closed pharmacy system (Hawkshead, 2015; Osterberg & Blaschke, 2005)

Patients' self-reporting is subjective and simplest method for evaluating medication adherence. It is practical and widely used in research however it overestimates adherence and recall bias may affect its accuracy. Patient kept diaries of medication taking, interviews conducted during office visits and responses to adherence specific questionnaires are some of the methods used in self-reporting (Hawkshead, 2015). Morisky et al. (1986 sited by Peres et al., 2018) developed a 4 item self report medication adherence survey which had shown to predict patient adherence to

medication among outpatients. The 4 items consist of 4 questions on forgetfulness, carelessness and stopping medication when feeling better or worse with a no answer scoring 1 and yes answer scoring 0. The higher the final summed score the stronger adherence to medication(Morisky & Dimatteo, 2014). The 4 item scale was supplemented by adding 4 items to address the psychological and behavioural factors surrounding adherence behaviour (Morisky & Dimatteo, 2014). The eight item scale has a higher sensitivity of 93% than 4 item scale. The 8 item scale involves 7 items on questions with dichotomous responses (yes/no) and 1 item with a 5 point likert scale response. Adherence is classified as low, medium or high based on an overall score (Laryea, 2013). MMAS-4 (Morisky Medication Adherence Scale) is currently mainly used as a crude (informal) method to assess adherence in clinical examination (Morisky & Dimatteo, 2014). The self reporting method is less expensive, simple and assesses sociological and behavioural factors affecting adherence. Its drawbacks are recall bias, evoking social accepted responses thereby leading to overestimation of adherence (Hawkshead, 2015)

2.6 Summary

Literature reviewed provides a fair description of factors affecting adherence in urban communities in both developed and developing countries. The socio-demographics and health characteristic behaviours affecting adherence in urban communities differ from rural communities especially in developing countries like Ghana. However, the literature reviewed is deficient on how these factors affect adherence especially among rural folks. Hence, this study was conducted to bridge this knowledge gap.

CHAPTER THREE

3.0 METHODS

3.1 Study design

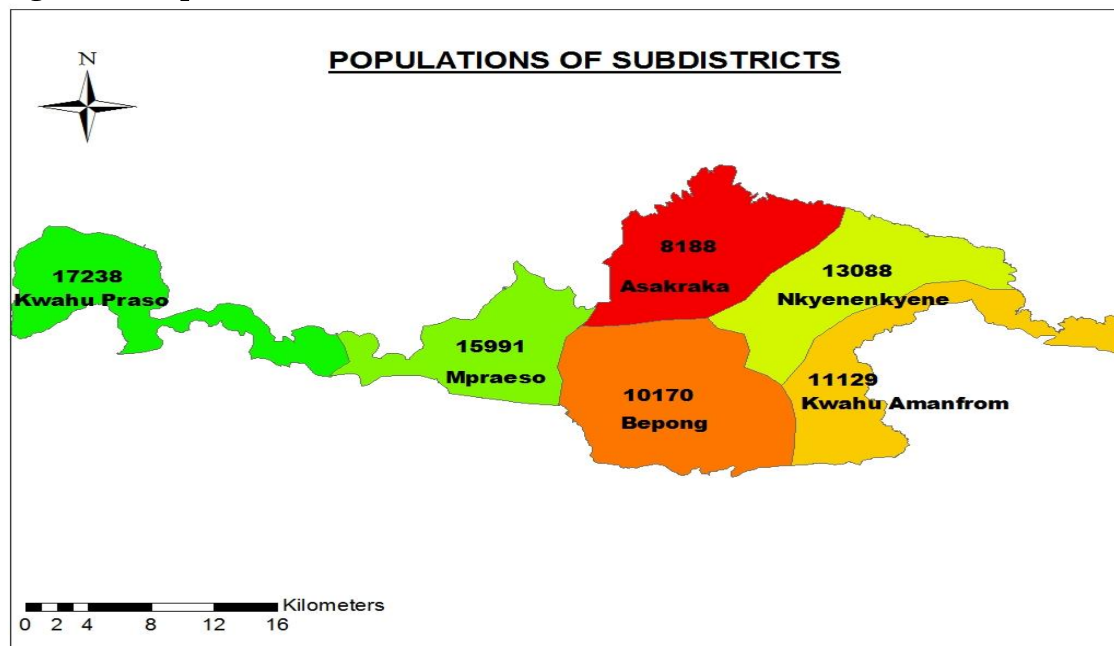
The study, hospital based cross-sectional descriptive study, assessed the factors influencing adherence to hypertension drugs and level of adherence among hypertensive patients. It was conducted in September 2018.

3.2 Study location

The study was conducted at the hypertensive clinic at the outpatient department (OPD) of Kwahu Government Hospital, a district referral hospital located at Atibie in the Kwahu South district in the Eastern Region. This hospital was chosen because patients diagnosed of hypertension in the district are referred to the facility for specialist care and supply of antihypertensive drugs. There are 16 health care facilities in the district made up of six health centers, nine functional CHPS zones with eight having designated compounds (Ghana Statistical Service, 2012).

The Kwahu South District has an estimated population of 72,718 (projected from 2010 census) with growth rate of 3.1%. Figure 3.1 shows the map of Kwahu South District. The district comprises rural, peri-urban and urban communities. Kwahus make up 66% of the inhabitants, Ewes, 15% and Asantes, 17%. Most of the inhabitants are Christians. Agriculture is the dominant occupation in the district.

Figure 3: Map of Kwahu South District



Ghana Statistical Service, 2012

3.3 Study population

All hypertensive patients who reported at the hypertension clinics and out-patient department of Kwahu Government Hospital during the period of the study were sampled.

3.4 Inclusive criteria

Patients included in this study fulfilled all of the criteria below:

- Patients diagnosed with primary hypertension
- Patients above 18 years
- Patients on at least one antihypertensive drug per day
- Patients on antihypertensive medications for at least six months
- Resident of Kwahu South District on antihypertensive medications

3.5 Exclusive criteria

Patients excluded from this study fulfilled any of the criteria below:

- Pregnant woman
- Patients too sick to be interviewed
- Patients who are mentally unstable

3.6 Study variables

3.6.1 Dependent variable

The main outcome variable of this study was adherence among hypertensive patients. This was measured using the Morisky 8 Item Adherence Scale. The responses were either yes or no. ‘Yes’ had a score of ‘1’ and ‘No’ had a score of ‘0’ except question 5 where ‘0’ was for ‘Yes’ and ‘1’ for ‘No’. The last question had a 4-point Likert scale response option; (A) Never (B) Once in a while (C) Sometimes (D) All the time. A had a score of 1 and B to D had a score of 0. The Morisky scale score for the 8 items were summed to create an adherence score range of 0 to 8. Morisky, adherence level could be categorized as high (score 8), medium (score 6 to 7) and low (score <6) (Morisky et al., 2008, Okello et al., 2016). In this study, the adherence score was dichotomized into two (2) levels in order to facilitate its use both in clinical and public health assessment of adherence (Xu et al., 2017). Therefore, adherence level was classified as high adherence (high/medium) with a score of 6 or more and low adherence with a score of less than 6.

3.6.2 Independent variables

The exposure variables were either continuous or categorical variables. These were factors that have been linked to adherence from previous studies. They were sex, age, marital status, level of

education, occupation, insured, period of diagnosis, alcohol intake, co-morbid and complications of condition, number of tablets taken daily, perceived severity, perceived susceptibility, perception on benefits, perception on health provider factors and cues to action.

3.7 Sampling method

Simple random sampling method was used in this study to give every patient equal chance of being selected. All patients who attended hypertension clinic from 8:00am to 5pm on Mondays, Tuesdays, Wednesdays and Fridays in September 2018 in Kwahu Government hospital and met the inclusion criteria qualified for this study. The clinic attends to about 70 patients on each of these days. Patients attending the hypertensive clinic are scheduled for review monthly, therefore a patient is likely to attend the clinic at least once every 16 clinic days.

Ten patients were interviewed each clinic day. Patients were given unique numbers from 1-70, based on the order in which they queued for their vitals to be checked.

Website (www.randomizer.org) generated random sequence of ten unique numbers from 1-70 was generated for each of the 16 clinic days and patients with these numbers were recruited for this study. Any selected person who either did not meet the inclusive criteria or refused to join the study was excluded and the next person inline chosen. After recruitment, participants were taken through the consent process. Sixteen clinic days were used for recruitment of study participants.

3.8 Sample Size

The hospital recorded an average of 1,120 hypertensive cases in September, 2016 for patients aged 18 years and above (Kwahu Government Hospital, 2018)

The sample size was calculated using Epi info StatCalc Version 7.2, using the following parameters:

- Target population size of 1,120 cases
- Adherence level of 27.5% obtained from a previous study of Non-adherence among Hypertensive in Korle-Bu Teaching Hospital in Ghana by Boima et al. (2015).
- Confidence level of 95%
- 5% margin of error

A minimum sample size of 241 was obtained.

It was approximated to 300 participants to make allowances for non-response which was about 24%.

3.9 Data collection technique and tools

Two research assistants administered structured questionnaires to collect data. The questionnaire was framed based on the health belief model (HBM). The questionnaires were administered before the patients were attended to by their physician.

The questionnaire was divided into nine sections. First section, the socio-demographic characteristics of the participants. This section consisted of questions on sex, age, marital status, level of education, occupation and insurance status.

The second section consisted of questions to measure the health characteristics and disease status of the respondents.

The third section contained questions which measured their adherence level using Morisky 8 Item Adherence Scale.

The forth section consisted of a multiple answer question on reasons for low adherence.

The fifth section consisted of questions which measured the perception on severity. The responses were either ‘Yes’ which was coded ‘1’ and ‘No’, as ‘0’. The summed score ranged from 0 to 3 where, 2 or more indicated high severity, and less than two, low severity.

The sixth section contained questions which evaluated the perception of susceptibility (risk of developing complications). The responses were either ‘Yes’ which had a score of ‘1’ and ‘No’ which had a score of ‘0’. The summed score range from 0 to 8 where four or less indicated low susceptibility and more than four indicated high susceptibility.

The seventh section measured perception on benefits of anti-hypertension medication. The responses were either ‘Yes’ which had a score of ‘1’ and ‘No’ which was scored ‘0’. The summed score ranged from 0 to 6 where less than four indicated negative benefit and four or more indicated positive benefit.

Section eight, measured perception on health provider factors which are barriers to adherence. The responses were either ‘Yes’ or ‘No’. ‘Yes’ was coded ‘1’ and ‘No’, ‘0’. The summed score ranged from 0 to 10, where less than six indicated negative health provider factors and six or more indicated positive health provider factors.

The ninth section measured cues to action. The responses were either ‘Yes’ which had a score of ‘1’ and ‘No response’ a score of ‘0’. The summed score ranged from 0 to 10 where less than six indicated low cues to action and six or indicated high cues to action.

3.10 Quality control

The research assistants underwent training for one week. They were trained on the study objectives, methods and how to translate the questionnaire into Twi (local language), and how to document respondent’s response in English. Interviewers were given a set of guidelines on how to read questions exactly as they are written, repeat questions if asked and to accept refusal to

answer questions without being irritated. The filled questionnaires were examined by the principal investigator on a daily basis to check for completeness and consistency to improve quality of the data. Data entry was done using Microsoft excel 2010 and STATA Version 14.

3.11 Data processing and analysis

The data collected were coded, entered twice in separate files and validated using Microsoft excel 2010. STATA Version 14 was used for statistical analysis. Data were presented using tables and charts. Sex, age, marital status, level of education, occupation, insured, period since diagnosis, cigarette smoking, co-morbid and complications of conditions, number of tablets taken daily, reasons for non-adherence, perceived severity, perceived susceptibility, perception on benefits, perception on health provider factors and cues to action were presented as frequencies and percentages, and continuous variables were summarized as means and standard deviations. Age (years) was stratified into categorical variable defined as: 1 (≤50), 2 (51-70) and 3 (≥71). Period of diagnosis (years) was presented as categorical variable with categories defined as: 1(≤10), 2 (11-20) and 3 (≥21). Bivariate analysis was done to assess the association between the independent variables and dependent variable using Fisher and Pearson's chi-square test. P-value 0.5 and less was considered as statistically significant with confidence interval (CI) 95%. Simple and multiple logistic regressions were done to assess the strength of association between selected independent variables and adherence to medication. The level of adherence was estimated using Morisky Medication Adherence Scale (MMAS). The score for each of the 8 items was added to create a total adherence score which range from 0-8. Less than 6 was defined as low adherence and 6 and above as high adherence. The dependent variable was defined as low adherence and high adherence.

3.12 Ethical consideration

The Ghana Health Service Ethics Review Committee Board gave ethical clearance, with approval number GHS-ERC037/03/18 before study was started. Approval was obtained from the Medical Superintendent of Kwahu Government Hospital and voluntary written informed consent was obtained from participants prior to the study. All participants were well informed about the study, its objectives and method of data collection in a language well understood by them. Participants were given sufficient information about the study to enable them to decide whether to take part or not. There was no compensation for any participant and they reserved the right to withdraw from the study at any point in time without penalty. There were no anticipated risks and no immediate personal benefits to the participants in this study. Participants were informed that, the information they provided will be useful for policy makers and development of research in the future. The interviews were conducted in the office of the nurse in-charge away from people including staff of the hospital, friends and relatives of the participants to ensure privacy and confidentiality. Personal identifiers such as telephone numbers, folder numbers and names of respondents were not collected. All data collected were kept and stored electronically under password protection which was only accessible to the principal investigator and supervisor of this study. The principal investigator did not have any conflict of interest in the conduct of this study.

3.13 Pre-test

Questionnaire was pre-tested in New Edubiase Government Hospital in the Adansi South District of Ashanti Region among 30 patients who met the inclusive criteria. This allowed for mistakes and omissions in the questionnaire to be corrected and certain sentences to be rephrased to address the issues under study.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic and Socio-economic characteristics of respondents.

Three hundred people participated in this study. The summary of the demographic and socioeconomic characteristics of the participants are presented in Table 4.1. The mean age was 67.4years (standard deviation (SD) of ± 10.9). The ages ranged from 45 to 98 years. Females form 77% of the respondents. Majority (59.7%) were between 51 and 70 years, followed by those above 71 years (36.7%). A greater number (92.3%) were married or had secondary education (37%). About 94% were employed. A small number (11%) were not on NHIS.

Table 4.1: Sociodemographic characteristics of participants

Characteristics	Frequency=300	Percentage(%)
Sex		
Male	69	23
Female	231	77
Age (years)		
(Mean±SD)	67.41±0.9	
Age Groups		
≤50	11	3.7
51-70	179	59.7
≥71	110	36.7
Marital Status		
Single	23	7.7
Married	277	92.3
Level of Education		
No Education	13	4.3
Primary	27	9
JHS	76	25.3
Secondary	111	37
Tertiary	73	24.3
Occupation		
Unemployed	17	5.7
Employed	283	94.3
Insure		
Yes	289	96.3
No	11	3.7

4.2 Health characteristics of participants

The mean period since diagnosis was 16.7 years (SD of ± 8.5). Majority (39%) of the respondents were diagnosed 11 to 20 years ago and had been on medication. A small proportion (4.7%) took alcohol. Only 2 people (0.7%) smoke cigarette (Table 4.2).

Most of the respondents (94.3%) did not have any co-morbid disease or complication of hypertension. Kidney disease (1.7%) and diabetes (1.3%) were the two common co-morbid diseases and complications of hypertension among the participants. Stroke, heart failure and visual impairment were other co-morbid diseases and complications observed (Table 4.2).

Most of the respondents were on one antihypertensive medication. Calcium-channel blockers (89.7%) was the most used antihypertensive medication among the participants. This was

followed by diuretics. A few were on beta adrenoreceptor blockers. Nine people were on central acting antiadrenergic. The most common combination used by the respondents was calcium channel blockers and diuretics (37.3%). Only a few (1.3%) were on calcium channel blockers, diuretics and angiotensin converting enzyme inhibitors. One person was on four different medications. The antihypertensive tablets taken by participants ranged from 1 to 6 daily with a mean of 2 tablets. Majority (40.7) of the respondents were on 1 tablet daily with 32.7% on 3 tablets daily (Table 4.2).

Table 4.**2**: Health characteristics of participants

Variable	**Frequency=300**	**Percentage (%)**
Period since diagnosis (years)		
(Mean±SD)	16.7±8.5	
≤10	103	34.3
11 to 20	117	39

≥21	80	26.7
Alcohol intake		
Yes	14	4.7
No	286	95.3
Smoke Cigarette		
Yes	2	0.7
No	298	99.3
Co-morbid conditions and complications		
None	283	94.3
Stroke	3	1
Diabetes	4	1.3
Kidney Disease	5	1.7
Health Failure	2	0.7
Visual impairment	3	1.7
Current medication		
Calcium channel blockers	269	89.7
ACE Inhibitors & ARB	59	19.7
Diuretics	134	44.7
Beta adrenoceptor blocking drugs	33	11
Central Acting Antiadrenergic	9	3
A+C	112	37.3
A+B+C	23	7.3
A+B+C+D	1	0.3
Number of tablets taken daily		
1	122	40.7
2	49	16.3
3	98	32.7
≥4	31	10.3

ACE = Angiotensin Converting Enzyme, ARB = Angiotensin Receptor Blocker A= Calcium channel blockers, B= ACE Inhibitors & ARB, C= Diuretics, D= Central Acting Antiadrenergic

4.3 Patient motivators for adherence

Majority indicated that advice from their doctor (93%) and a healthcare worker other than their doctor (80%) motivated them to adhere to their medication. A few respondents were motivated by newspapers (8.7%) and social media or internet (9.7%). Radio and television programs motivated seventy nine percent (79.7) and seventy-five percent of the respondents respectively (Table 4.3).

Table 4.3: Motivators for adherence

Motivators	Frequency=300	Percentage
Advice from doctor	279	93
Advice from health worker other than doctor	240	80
Radio program	239	79.7
TV program	225	75
Death of a relative or friend due to high blood pressure	210	70
Health posters	202	67.3
Advice from friend	73	24.3
Advice from family	48	16
Newspapers	26	8.7
Internet and social media	29	9.7

4.4 Perceived quality of health care

Most of the participants were happy with the quality of healthcare given at the facility. Majority of them reported that they have confidence in their doctor and other health professionals, the waiting time was reasonable and they were satisfied with the time spent with the physicians during consultation. Most (91%) of the respondents obtained their medications from the hospital. Over 70% reported that they were given adequate information by health professionals and their concerns were duly addressed (Table 4.4).

Table 4. 4: Participants report of perceived quality of healthcare

Quality of Healthcare	Yes(%)	No(%)
Confidence in health professional	282(94)	18(6)
Reasonable waiting time	279(93)	21(7)
Adequate consulting time	275(91.7)	25(8.3)
Availability of medication at hospital	273(91)	27(9)
My concerns were duly addressed	231(77)	69(23)
Adequate information given by health professionals	225(75)	75(25)

4.5 Level of adherence and reasons for low adherence

The Morisky Medication Adherence Scale (MMAS) was used to define the level of adherence. The MMAS generated from this study had a score that ranged from 0 to 8 with a mean 4.98 (SD) and median of 5. The results were dichotomized into 2 levels. By this categorization 46% of respondents had low adherence while 54% had high adherence (Fig 4.2).

Forgetfulness was primary reason giving by majority (67%) of respondents for low adherence to medication. This was followed by long time on medication (41.7%), and the least (4.7%) was lack of money to purchase medication (Table 4.5.1).

	N=300 (%)

Table 4.5: The Morisky Adherence Scale of adherence to medications

Medical Adherence questions	Yes	No
Sometimes forget to take medication	201(67)	99(33)
Over the past one week, did you miss a pill?	118 (39.3)	182(60.7)
Stopped taking medications because I felt worse	100(33.3)	200(66.7)
Did not take medications when I travel?	115(38.3)	185(61.7)
Took all medications yesterday	269(89.7)	31(10.3)
Stop taking medications when feeling better	118(39.3)	182(60.7)
Inconvenience of taking medications	41(13.7)	259(86.3)
How often do I find it difficult to remembering to take all my medications?		
Never	117(39)	
Once in awhile	121(40.3)	
Sometimes	61(20.3)	
All the time	1(0.3)	

Figure 4.1 Adherence scores

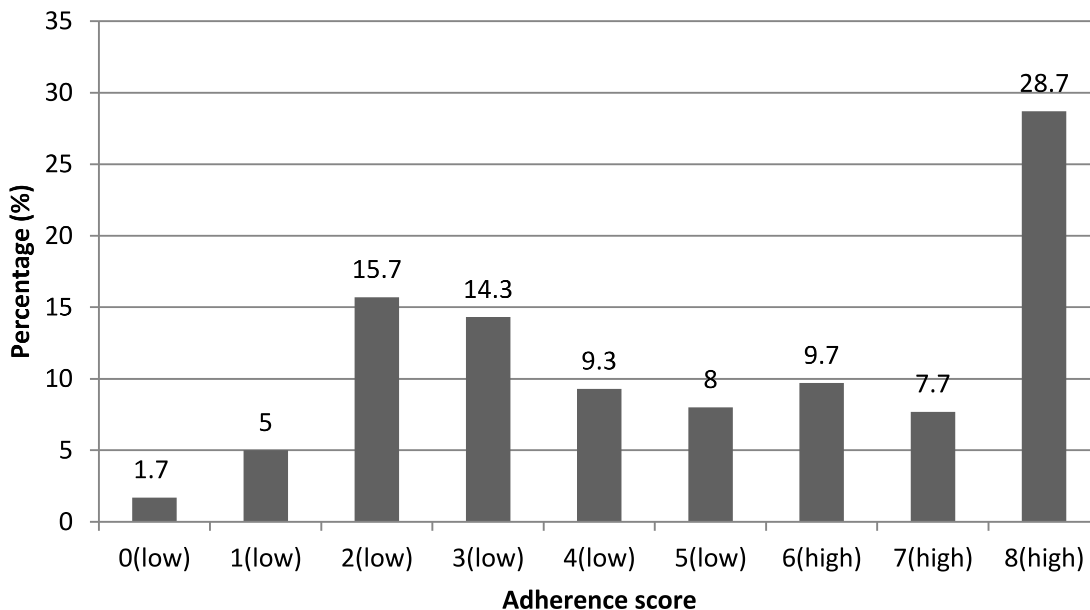


Figure 4.2 Adherence Level

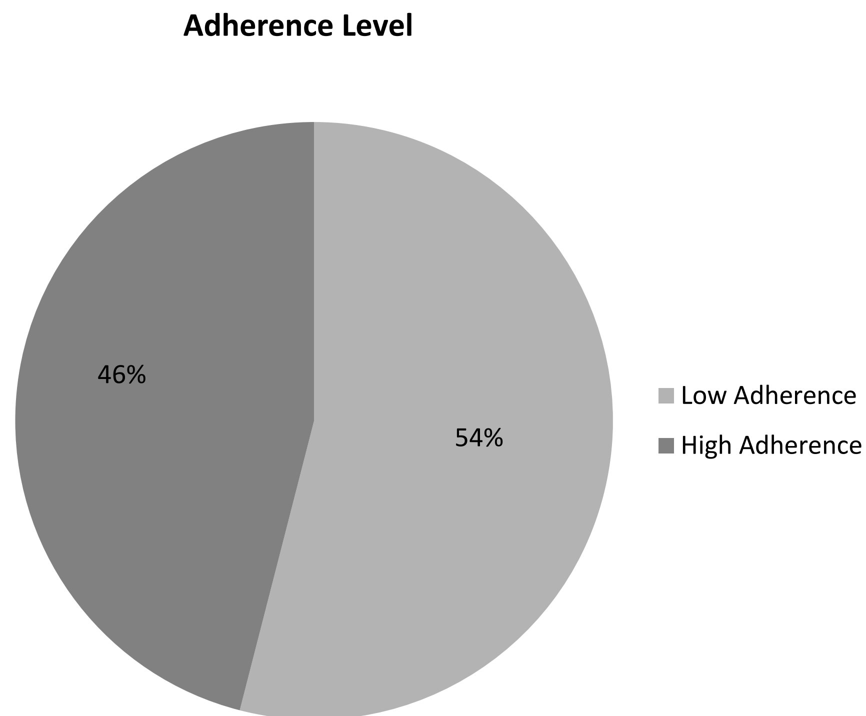


Table 4.5 1 Reasons for low adherence to medications

Reasons	Frequency=300	Percentage
Forgetfulness	201	67
On medication for a long time	125	41.7
Asymptomatic	114	38
Fear of addiction	76	25.3
Use of alternate remedies	67	22.3
Side effects	70	23.3
Frequent change of medication	33	11
Medication is ineffective	26	8.7
Lack of money to purchase medication	14	4.7

4.6 Bivariate association between adherence and background characteristics.

Drug adherence was higher in females than males. Respondents who were, 50 years or less, had high adherence levels compared to those over 50 years. Poor adherence level was more common with the single respondents compared to married respondents. Those with no formal education and the unemployed had low adherence scores. Respondents who were insured had high adherence compared to those who paid out of pocket. Sex, age, marital status and level of education were significantly associated with adherence levels (Table 4.6).

Good adherence levels were observed in participants who had been diagnosed of hypertension 10 years or less. High adherence levels decreased as the number of tables taken daily increased. Respondents who drank alcohol had lower adherence compared to those who don’t drink alcohol, but the association was not significant (Table 4.6).

Table 4.6: Association between adherence and background characteristics

Characteristics	High Adherence N= 138 (%)	Low Adherence N=164 (%)	P-value
Sex			
Male	22(31.9)	47(68.1)	0.007
Female	116(50.2)	115(49.8)	
Age			
≤50	6(54.5)	5(45.5)	0.002
51-70	96(53.6)	83(46.4)	
≥71	36(32.7)	74(67.3)	
Marital Status			
Single	4(17.4)	19(82.6)	0.004
Married	134(48.4)	143(51.6)	
Level of Education			
No Education	2(15.4)	11(84.6)	<0.0001
Primary	9(33.3)	18(66.7)	
JHS	20(26.3)	56(73.7)	
Secondary	60(54.1)	51(45.9)	
Tertiary	47(64.4)	26(35.6)	
Occupation			
Unemployed	6(35.3)	11(64.7)	0.362
Employed	132(46.6)	151(53.4)	
Period since diagnosis (years)			
≤10	63(61.2)	40(38.8)	<0.0001
11 to 20	54(46.2)	63(53.8)	
≥21	21(26.3)	59(73.8)	
Alcohol intake			
Yes	6(42.9)	8(57.1)	0.809
No	132(46.2)	154(53.8)	
Number of tablets taken daily			
1	84(68.9)	38(31.1)	<0.0001
2	23(46.9)	26(53.1)	
3	29(29.6)	69(70.4)	
≥4	2(6.5)	29(93.5)	
Insure(NHIS)			
Yes	134(46.4)	155(53.6)	0.556
No	4(36.4)	7(63.6)	

4.7 Assessment of perceived severity, susceptibility, benefit and cues to action and adherence to antihypertensive medication

The five construct of the HBM involved in this study were perceived severity, perceived susceptibility, perceived benefits, perception on health provider and cues to action.

Majority of the respondents had high perceived severity and susceptibility. Perceived severity, perceived susceptibility, perceived benefits, perception on health provider and cues to action had positive association with adherence. The five construct of the HBM association with adherence was statistically significant (Table 4.7).

Table 4.7: Association between perceived severity, susceptibility, benefit and cues to action and patient's adherence

Characteristics	High Adherence N=138(%)	Low Adherence N=164(%)	P-value
Perceived Severity			
High	137(58.3)	98(41.7)	<0.001
Low	1(1.5)	64(98.5)	
Perceived Susceptibility			
High	129(56.6)	9(12.5)	<0.001
Low	99(43.4)	63(87.5)	
Perceived Benefits			
Positive	102(51)	98(49)	0.014
Negative	36(36)	64(64)	
Perception on Health Provider			
Positive	135(54.9)	111(45.1)	<0.001
Negative	3(5.6)	51(94.4)	
Cues to Action			
High	106(56.7)	81(43.3)	<0.001
Low	32(28.3)	81(71.7)	

4.8 Factors that influence adherence

Initial analysis using chi-square test show that there was an association between adherence and some independent variables. These variables were sex, age, marital status, level of education,

occupation, period since diagnosis, number of tables taken daily, perceived severity, perceived susceptibility, perceived benefits, perception on health provider and cues to action.

Unadjusted logistic models showed that sex, marital status, level of education, period since diagnosis, number of tablets taken daily, perceived severity, perceived susceptibility, perceived benefits, perception on health provider factors and cues to action had an association with adherence (Table 4.8).

Being a male, single, period since diagnosis more than 10 years, those on more than 1 tablet daily, low perceived severity, low perceived susceptibility, negative perceived benefits, negative perception of health provider factors and low cues to action were associated with low adherence while secondary and tertiary education, high perceived severity, high perceived susceptibility, positive perceived benefits, positive perception on health provider factors and high cues to action were associated with high adherence (Table 4.8). Significant association with adherence was found among males, single, secondary and tertiary education, period since diagnosis 10years and above, took more than 1 tablet daily, those with low perceived severity, low perceived susceptibility, negative perceived benefits, negative perception of health provider factors and low cue to action (Table 4.8).

Multiple logistic model was used to analyze all independent variables which showed significant association with adherence. After adjustment, level of education, period since diagnosis, number of tables taken daily, perceived severity and cue to action showed significant association with adherence (Table 4.8).

Respondents who had tertiary education had high odds (AOR=15.61, 95% CI. 1.60, 152.53) of adherence compared to those with no education. Odds of adherence reduced with increasing period since diagnosis. The odds of adherence also decreased as the number of antihypertensive

medication taken daily increased. Those who had low perceived severity had low odds (AOR=0.02, 95% CI. 0.003, 0.21) of adherence compared to high perceived severity. Participants who had low cues to action had low odds (AOR=0.25, 95% CI. 0.11, 0.59) of adherence compared to those with high cues to action (Table 4.8).

Significant association with adherence was found among tertiary education, period since diagnosis more than 10years, those who took more than 1 tablet daily and those who had low perceived severity and low cues to action (Table 4.8).

Table 4.8: Factors association with adherence to hypertension medication

Dependent variable: Adherence level (0= Low, 1= High)				
Variables	**OR(95% CI)**	**P-value**	**AOR(95%CI)**	**P-value**
Sex				
Female	Ref		Ref	
Male	0.46(0.26,0.82)	0.008	0.66(0.28,1.56)	0.347
Age				
≤50	Ref		Ref	
51-70	0.96(0.28,3.27)	0.953	3.07(0.51,18.38)	0.22
≥71	0.41(0.12,1.42)	0.157	3.74(0.54,26.05)	0.183
Marital Status				
Married	Ref		Ref	
Single	0.22(0.07,0.68)	0.008	0.63(0.09,4.31)	0.636
Level of Education				
No Education	Ref		Ref	
Primary	2.75(0.50,15.14)	0.245	4.88(0.44,54.22)	0.197
JHS	1.96(0.40,9.64)	0.406	2.12(0.22,20.69)	0.518
Secondary	6.47(1.37,30.55)	0.018	8.75(0.93,82.61)	0.058
Tertiary	9.94(2.05,48.32)	0.004	15.61(1.60,152.53)	0.018
Period since diagnosis (years)				
≤10	Ref		Ref	
11 to 20	0.54(0.32,0.93)	0.027	0.29(0.12,0.72)	0.007
≥21	0.23(0.12,0.43)	<0.001	0.06(0.02,0.20)	<0.001
Number of tablets taken daily				
1	Ref		Ref	
2	0.40(0.20,0.79)	0.008	0.36(0.14,0.96)	0.042
3	0.19(0.11,0.34)	<0.001	0.25(0.11,0.57)	0.001
≥4	0.03(0.01,0.14)	<0.001	0.02(0.003,0.12)	<0.001
Perceived Severity				
High	Ref		Ref	
Low	0.01(0.002,0.08)	<0.001	0.02(0.003,0.21)	0.001
Perceived Susceptibility				
High	Ref		Ref	
Low	0.11(0.05,0.23)	<0.001	0.38(0.11,1.36)	0.138
Perceived Benefits				
Positive	Ref		Ref	
Negative	0.54(0.33, 0.89)	0.015	1.38(0.54,3.52)	0.50
Perception of Health Provider Factors				
Positive	Ref		Ref	
Negative	0.05(0.01,0.16)	<0.001	0.54(0.11,2.77)	0.462
Cues to Action				
High	Ref		Ref	
Low	0.30(0.18,0.50)	<0.001	0.25(0.11,0.59)	0.001

R^2= 0.28, Adjusted R^2=0.476, p= <0.001, OR= Crude Odds Ratio, AOR= Adjusted Odds Ratio

CHAPTER FIVE

5.0 DISCUSSIONS

5.1 Summary of objectives

The aim of the study was to determine the level of adherence to antihypertensive medication and examine factors that contribute to adherence to medication among hypertensive patients attending Kwahu Government Hospital.

5.2 Key findings of the study

This study showed almost equal number of people had high adherence (46%) and low adherence (54%). Forgetfulness and being on medication for a long period of time were some of the reasons giving by majority of respondents for low adherence. Sex, marital status, level of education, period since diagnosis, number of tablets taken daily, perceived severity, perceived susceptibility, perceived benefits, perception on health provider and cues to action influence adherence to medication. Adjusted logistic regression found, education, period since diagnosis, number of tables taken daily, perceived severity and perception on cues to action showed significant association with adherence.

5.3 Adherence among antihypertensive users

Adherence to medication leads to good blood pressure control among hypertensive patients which reduces patient health cost, morbidity and mortality. This study showed a high adherence of 46%. This study results is similar to an adherence rate of 42.9% found in a study amongst hypertensive patients attending tertiary hospital primary care clinic in Eastern Nigeria reported (Iloh et al., 2013). A similar study done in cardiology and general outpatient department (GOPD) clinic of Ladoke Akintola University of Technology Teaching Hospital in Nigeria reported an

adherent level of 36.8% (Ilea et al., 2018). Studies done in developed countries reported high adherence levels, these include a study conducted in Romania on 525 participants on follow up in a family medicine practice reported an adherence rate of 69.8% (Ilea et al., 2018) and another in United States reported an adherent level of 90.6% (Oliveria et al., 2005 cited by Khatib et al., 2014). The low level of adherence in this study (developing country) may be due to overburdened healthcare providers, limited access to health facility, readily availability of herbal treatment, misconceptions that hypertension is curable and inadequate counseling (Bosu, 2010, Mills et al., 2016). The findings in this research call for stakeholders to put interventions to improve adherence in Africa.

5.4 Factors contributing to level of adherence

Majority of the participants stated forgetfulness as primary reason for low adherence. This is consistent with a study done in Cameroun and Turkey where participants stated forgetfulness as primary reason for low adherence (Adidja et al., 2018; Karakurt, 2012). Most of the participants are self-employed and likely to be traders who have cumbersome work schedules and frequent travels which disrupt daily medication schedules. The use of mobile phone applications, text messaging, alarm clocks, phone calls remainders and/or education of household members about when the drug(s) should be taken could improve adherence (Adidja et al., 2018).

This study showed that participants with tertiary education were more likely to adhere with medication regimen than those with no education. This findings supports the results of a similar study in Turkey (Karakurt, 2012) which reported that adherence to medication increases with level of education. This is because educated people have better knowledge on hypertension and its complications (Karakurt, 2012).

Adherence decreases after participants have being on hypertensive treatment for 10 years or more. This finding is similar to a study done in China (Yue et al., 2015) which found adherence to medication to be high among those with period of diagnosis less than 10 years . This may be because long use of drug(s) would burden the patient financially. It could also lead to forgetfulness which was one of the reasons for low adherence to medication in this study. The frequent visits to the hospital would burden both the patient and family financial. Beside, those on medication for a long time have their blood pressure under control and stop taking the medication because they feel better (Okwuonu et al., 2014). Long duration of treatment may also lead to habituation.

This study found an association between taking one tablet daily with high adherence to medication. Meta-analyses by Nielsen et al. (2016) and Assawasuwannakit, Braund, & Duffull (2015) had similar findings which reported an association between an increase in dosing regimen and non-adherence. Usherwood (2017) found that adherence to medication decreases as number of drugs taking per day increases. This may be because increasing number of medication taking per day turn to confuse patients. This finding could also be due to more risk of side effects when several medications are taken.

Several studies have used the HBM to assess health related behaviours (Carpenter, 2010; Hasani & Tavafian, 2009; Tanner-Smith & Brown, 2010). This study used the HBM to predict factors that influence adherence to medication. Using the model, this study found significant association between perceived severity, cues to action and adherence. Results from this research showed that adherence was high among participants who perceived that their condition is severity. This is similar to studies done in South India (Shameena et al., 2017), China (Yue et al., 2015) and Iran (Kamran et al.,2014) which reported that adherence was high among those who have high

perceived severity. This finding could be because most patients in this study were motivated to be adherent by the death of a relative or friend (7%) and would have witnessed the severity and complications of the disease.

Adherence to medication was high among those with high cues to action. This is similar to studies done in India (Shameena et al., 2017) and Nigeria (Osamor & Ojelabi, 2017) which stated that adherence was high among those with high cues to action. In this study, advice from doctor (93%), advice from health workers (80%) and electronic media (radio=79.7%, TV=75%) were major sources to cues to action. Knowledge gained and constant remainders from these sources motivate patients to be adherent to medication.

This study found perceived severity to be the most important predictor of adherence to treatment among the various components of the HBM. This is similar to studies done in Indonesia (Athiyah, Subarniati, & Yuda, 2017) and Tanzania (Joho, 2012) which reported that among the construct of the HBM, perceived severity is the major predict of adherence to medication.

This study found age, sex, marital status and alcohol consumption, perceived susceptibility, perceived benefits and perception on health provider factors influenced adherence to medication but this was not statistically significant.

Adherence was higher among those above 50 years. This is similar to a study done in Palestine (Al-Ramahi, 2015) which report high adherence to medication among those above 45 years. This may be because those in this age group make up the working class and stressful work schedules maybe the reason for their low adherence.

In this study, females were found to be more compliant than males. This is similar to a meta-analysis by Nielsen et al. (2016) which showed high adherence among women. This is because women tend to seek preventive care and treatment for their symptoms than men. Men may have

low level of adherence because of gender-specific side effects like loss of libido and sexual dysfunction (Manteuffel, Williams, & Chen, 2014).

This study showed that adherence was higher among married participants. This is in agreement with a study done in Ethiopia by Berisa & Dedefo (2018) which reported adherence to be high among married compared to single. This may be due to their partner reminding them to take their medication since forgetfulness was a reason for low adherence in this study.

This study found no association between alcohol consumption and adherence and this is in agreement with a systematic review which showed that life style factors like alcohol had minimal effect on adherence (Bowry et al., 2011).

Results from this study showed that adherence was high among participants who had high perceived susceptibility and high perception on health provider factors. This is similar to studies done in Iran among 671 rural participants (Kamran, Ahari, & Heydari, 2014) and India among 300 rural folks (Shameena et al., 2017) which reported adherence to be high among those with high perceived susceptibility and high perception on health provider factors.

Negative perceived benefit of medication was associated with high adherence but this finding was not significant. This is in contrast to studies done in Nigeria (Kamran et al., 2014) and China (Yue et al., 2015) which found high adherence among those with positive perceived benefits of medication. This finding could be because majority of correspondents do not have any co-morbid condition (94.3%) and therefore cannot appreciate the benefits of their antihypertensive medication. Another reason could be that most of the participants do not have adequate knowledge on the benefits of their medication and therefore gave negative responses in that section of the question. Pharmacist to patient disparity in study area is very wide (Pharmaceutical

Society of Ghana, 2015) because of this, they do not have time to educate patients on the benefits of their medication.

5.4 Limitation and strengths of study

This study used a cross sectional study which is able to establish only association and not causal relationship between the identified factors and adherence to medication. The study was done in a rural setting therefore the findings may not be generalized to involve hypertensive patients in urban areas. Also self-report was used to measure patient adherence and this could to overestimation of adherence due to participants providing socially accepted responses. The responses are based on individual's memory and therefore recall bias is possible.

The strength of this study is the use of adequate sample size and simple random sampling method which gives an accurate representation of the target population therefore the results can be inferred to all hypertensive patients in rural communities.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Based on the findings, the following conclusions are made:

Medication adherence is a big public health problem in rural settings. Adherence was found to be low. The primary reasons respondents gave for low adherence were forgetfulness and being on medication for a long time.

Level of education, period since diagnosis, number of tablets taken daily, perceived severity and cues to action was associated with medication adherence.

Tertiary education, period since diagnosis of 10 years or less, those on 1 tablet daily, high perceived severity and high cues to action was associated with high adherence. Major sources to cues to action are advice from doctor, advice from health workers and electronic media.

6.2 RECOMMENDATIONS

6.2.1 Policy makers and Implementers

i. Ghana Health Services and non-governmental agencies should organized health educational programs purposely to sensitize people that everybody is at risk of hypertension and its complications.

ii. Ghana Health Service (GHS) should incorporate counseling services into the daily activities of health centers, clinics and hospitals to sensitize people about hypertension and its complication.

6.2.2 Recommendation for health care professionals in hypertensive clinics

i. Health care personnel (Doctors and nurses) should at each visit educate hypertensive patients on disease condition with emphasis on severity and consequences of non-adherence with treatment especially with patients who have being on medication for a long time.

ii. They need to stress on the importance of treatment adherence regardless of absence of symptoms.

iii. They also need to stress that hypertension medication is for life and discourage them from using alternate remedies apart from the hospital medications.
iv. They should assist hypertensive patients and care-takers of hypertensive patients to develop ways that will remind them to take their medications.
v. They should make patient drug regimen as simple as possible.
vi. They need to regularly encourage patients to be adherent during consultation.

6.2.3 Recommendation for district health directorate

i. The health directorates in collaboration with community health nurses should embark on vigorous health education campaigns on hypertension, complications and importance of adherence to antihypertensive medication. This should be done through multiple media sources like radio and television. Dramas and documentaries on complications of non-adherence to hypertensive medication should be telecast on electronic media.
ii. The directorate should organize regular in-service training for health personnel on how to provide adherence counseling to hypertensive patients with empathy to improve on their adherence.

6.2.4 Recommendation for Research

i. Studies should be done to find out more reasons for low adherence to medication in rural settings.

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Appendix A: PARTICIPANT INFORMATION SHEET

TITLE: FACTORS AFFECTING ADHERENCE TO MEDICATION AMONG HYPERTENSIVE PATIENTS ATTENDING KWAHU GOVERNMENT HOSPITAL

Principal Investigator: LESLIE KOJO TAY

My name is Leslie Kojo Tay. I am a graduate student from the University of Ghana, School of Public Health undertaking a research on factors affecting adherence to medication among hypertensive patients attending Kwahu government hospital, Eastern Region, Some research assistants will be assisting in the study. The study aims to determine factors affecting adherence to hypertensive medications. Participants are required to share their experiences about adherence to medication by responding to questions to ensure anonymity. You are free to decide to take part in the study or decline or withdraw at any point you want. No one will be upset if you decide not to partake in the study. However, be assured that your privacy and confidentiality will be respected. Be assured that the research come at no risk and no cost except the precious time that they will used to fill the questionnaire. You can choose a place of convenience to answer the questions. Thank you

Appendix B: VOLUNTEER AGREEMENT

I have read or have someone read to me, the above information describing the benefits, risks and procedures for the research title.

"**FACTORS AFFECTING ADHERENCE TO MEDICATION AMONG HYPERTENSIVE PATIENTS ATTENDING KWAHU GOVERNMENT HOSPITAL**"

I have asked questions, received answers regarding participation in this study, and am willing to give consent to participate in this study as a volunteer.

____________________ ____

Date Name and Signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the nature and purpose of this study were read to the volunteer. All questions asked were answered satisfactorily regarding participation in this study, and volunteer gave consent to participate in this study.

____________________ ____

Date Name and Signature or mark of witness

I certify that the nature and purpose of this research have been duly explained to the above individual.

____________________ ____

Date Name and Signature of Person Who Obtained Consent

CONTACTS FOR ADDITIONAL INFORMATION

If you have any further clarification, contact Leslie Kojo Tay on 0249216426.

In case of any concern you can contact the Ethics Administrator, Ms. Hannah Frimpong, GHS/ERC on 024-599-7061.

APPENDIX C: QUESTIONNAIRE

FACTORS AFFECTING ADHERENCE TO MEDICATION AMONG HYPERTENSIVE PATIENTS ATTENDING KWAHU GOVERNMENT HOSPITAL

Patient Code……………………………………………………………………………

SECTION A
DEMOGRAPHIC INFORMATION

No.	Question	Coding Categories	Response
1	Sex	Male……………………..…..1 Female………………………2	[ ] [ ]
2	Age (Completed years)		
3	Marital Status	Single…………………..……..1 Married……………….………2	[ ] [ ]
4	Level of Education	No Education……………..…1 Primary………………………2 JHS……………………..…3 Secondary …………………...4 Tertiary……………………....5	[ ] [ ] [ ] [ ] [ ]
5	Occupation	Unemployed ………..……..1 Employed……………………2	[ ] [ ]
6	Insured	No…………………………....0 Yes……………………………1	[ ] [ ]

SECTION B:
HEALTH CHARACTERISTICS

No.	Questions	Coding Categories	Response
1	Period since diagnosis of Hypertension		
2	Alcohol uptake	No…...0 ⟶ SKIP to 3 Yes……1	[ ] [ ]
3	Co-morbid and complications of Conditions	None…………………..0 Stroke…………………1 Diabetes………………2 Kidney Disease………3 Heart Failure…………4 Visual impairment…...5 Others(specify)…………	[ ] [ ] [ ] [ ] [ ] [ ]
5	How many different kinds of drugs are you on and how do you take per day		

6	How many tablets do you take a day		

SECTION C
MEDICAL ADHERENCE

No.	Question	Coding Category	Response
1	Do you sometimes forget to take your medications?	No…………..……1 Yes…………….0	[ ] [ ]
2	Thinking over the past one week, How many times Did you miss taking a pill?		
3	Have you ever cut back or stopped taking your medications without telling your doctor because you felt worse when you took it?	No………….1 Yes…………0	[ ] [ ]
4	When you travel or leave home, do you sometimes forget to take along your medications?	No………….1 Yes…………0	[ ] [ ]
5	Did you take your medicine yesterday?	No………....0 Yes………..1	[ ] [ ]
6	When you feel you are getting better, do you sometimes stop taking your medicine?	No……..…0 Yes……..…1	[ ] [ ]
7	Do you feel tormented about sticking to your blood pressure treatment plan?	No………...0 Yes………..1	[ ] [ ]
8	How often do you have difficulty remembering to take all your medications?	(A) Never……1 (B) Once in a while…….……2 (C) Sometimes….3 (D) All the time ..4	[ ] [ ] [ ] [ ]

SECTION D
REASONS FOR MEDICAL ADHERENCE (APART FROM FORGETFULNESS)

No.	Questions	Coding Categories	Response
	Reasons why I don't comply with medication (State as many as possible)		…………………… ……………………

SECTION E
PERCEPTION ON SEVERITY OF HYPERTENSION

No.	Questions	Coding Categories	Response
1	Hypertension is severe only when I have symptoms	No………………0 Yes..……………..1	[ ] [ ]
2	I am reluctant on taking my medication when I don't have symptoms	No………………0 Yes..…………….1	[ ] [ ]
3	Hypertension is life-threatening	No………………0 Yes..…………..…1	[ ] [ ]

SECTION F
PERCEPTION OF DEVELOPING HYPERTENSION COMPLICATION

No.	Questions	Coding Category	Response
	I will develop the following complications if I don't take my antihypertensive medication		
1	Kidney problem	No…………………0 Yes..…………..…..1	[ ] [ ]
2	Disrupt my family life	No…………………0 Yes..…………..…...1	[ ] [ ]
3	Disrupt my Social life	No…………………0 Yes..…………..…..1	[ ] [ ]
4	My work will be negatively affected	No…………………0 Yes..…………..…..1	[ ] [ ]
5	Paralysis	No…………………0 Yes..…………..…..1	[ ] [ ]
6	Stroke	No…………………0 Yes..…………..…...1	[ ] [ ]
7	Heart Problems	No…………………0 Yes..…………..…..1	[ ] [ ]
8	Visual problems	No…………………0 Yes..…………..…..1	[ ] [ ]
9	Others (Specify)	…………………… ……………………	…………………… ……………………

SECTION G
PERCEPTION ON BENEFITS OF ANTI-HYPERTENSION MEDICATION

No.	Questions	Coding Category	Response
1	Protects me from high blood pressure complications	No…………………0 Yes..…………..…..1	[ ] [ ]

2	Keeps my blood pressure under control	No…………………0 Yes..……………..…..1	[ ] [ ]
3	Makes me free from symptoms and complications	No…………………0 Yes..……………..…..1	[ ] [ ]
4	Helps me to avoid the added financial burden of treating complications	No…………………0 Yes..……………..…..1	[ ] [ ]
5	Decreases my chance of dying	No…………………0 Yes..……………..…..1	[ ] [ ]
6	Gives me peace of mind (psychologically)	No…………………0 Yes..……………..…..1	[ ] [ ]

SECTION H
PERCEPTION ON HEALTH PROVIDER FACTORS

No.	Questions	Coding categories	Response
1	My Doctor is patient with me	No…………………0 Yes..……………..…..1	[ ] [ ]
2	I have confidence in my Doctor	No…………………0 Yes..……………..…..1	[ ] [ ]
3	My Doctor treats me with respect	No…………………0 Yes..……………..…..1	[ ] [ ]
4	My Health care workers other than the Doctor treat me with respect	No…………………0 Yes..……………..…..1	[ ] [ ]
5	My Doctor clearly explains to me how I should manage my blood pressure condition	No…………………0 Yes..……………..……1	[ ] [ ]
6	My Doctor listens to my concerns	No…………………0 Yes..……………..…..1	[ ] [ ]
7	I think my doctor understands my concerns	No…………………0 Yes..……………..…..1	[ ] [ ]
8	All my hypertension medications are available at the hospital pharmacy	No…………………0 Yes..……………..…..1	[ ] [ ]
9	My Doctor clearly explains my condition to me	No…………………0 Yes..……………..…..1	[ ] [ ]
10	The waiting time at the clinic is reasonable	No…………………0 Yes………………..…..1	[ ] [ ]

SECTION I
PERCEPTION ON CUES TO ACTION

No.	Questions	Coding categories	Response
	Which of the following motivates you to comply with the blood pressure medication?		
1	Advice from my Doctor		[ ]
2	Advice from a health worker other than my Doctor		[ ]
3	TV programs on high blood pressure		[ ]
4	Radio programs on high blood pressure		[ ]
5	Advice from a family member		[ ]
6	Advice from a friend		[ ]
7	Death to a relative or friend due to high blood pressure		[ ]
8	Health posters displayed		[ ]
9	Newspapers		[ ]
11	Information on internet and Social media		[ ]
13	Others (Specify)	…………………. …………………..	…………………. ………………….