

**Medical and Psychological Factors Associated with  
Medication Adherence among Hypertensive Patients at  
Menelik II Referral Hospital, Addis Ababa, Ethiopia**

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**COLLEGE OF EDUCATION AND BEHAVIORAL STUDIES**

**SCHOOL OF PSYCHOLOGY**

**August, 2020**

**Addis Ababa Ethiopia**

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Menelik II Referral Hospital, Addis Ababa, Ethiopia**



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**A Thesis Submitted to the School of Psychology of Addis Ababa University, in  
Partial Fulfilment of the Requirement for the Degree of Master of Arts in Health  
Psychology**

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## ***Abstract***

*Studies that examined the multidimensional factors in hypertension patients' medication adherence are scant. The present study aimed at investigating the effects of demographic, medical and psychological factors over hypertension patients' medication adherence. A hospital-based, cross-sectional study was conducted among 367 hypertensive patients who were receiving treatment and on follow-up at Menelik II Referral Hospital. Data was collected using questionnaire assessing patients' demographic, medical, psychological characteristics as well as their adherence. Adherence to medication was assessed by the Morisky's Medication Adherence Scale (MMAS-8). Descriptive and inferential statistics were used to analyse the data collected. In the present study it was revealed that 72.5% of the respondents were adherent to their medication. Besides, the independent effects of demographic, medical and psychological factors were found to be insignificant. Further, patients with controlled BP were found to have higher adherence level than their counterparts. Finally it is concluded that the cumulative effects of demographic, medical and psychological factors over patients' adherence far exceeds their independent effects. Therefore, it is recommended that interventions to improve patients' adherence need to consider variables from the three domains equally.*

**Key words:** Medication, Adherence

## **Acknowledgments**

First of all I would like to thank God for his unlimited helps to work this study from starting point up to its completion. I would also like to extend my sincerest gratitude to my advisors Dr. Dawit Mekonnen and Dr. Assefa (my former advisor) and who helped me with their constructive ideas and feedback on time throughout my study. My gratitude also goes to Addis Ababa University School of Psychology coordinator Mr. Solomon who supported me by giving updated and helpful information throughout my study. Furthermore, I would like to acknowledge all the Menelik II Referral Hospital staffs especially to my data collectors and the participants of this study who kindly volunteered to answer to the questionnaires. Finally, I am also grateful to the Medical Director and head nurse of outpatient clinic of Menelik II Referral Hospital for their unreserved support.

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## **List of Acronyms**

<b>AHA</b>	American Heart Association
<b>BP</b>	Blood Pressure
<b>CVD</b>	Cardio Vascular Disease
<b>HP</b>	Health Professional
<b>HTN</b>	Hypertension
<b>JNC</b>	Joint National Committee
<b>M-II-RH</b>	Menelik II Referral Hospital
<b>MMAS-8</b>	Morisky Medication Adherence Scale8-item
<b>PI</b>	Principal Investigator
<b>WHO</b>	World Health Organization

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# CHAPTER ONE

## INTRODUCTION

### 1.1. Background of the Study

Hypertension is one of the most important chronic non communicable diseases with increasing trend worldwide. By the year 2025 the numbers of hypertension adult population in the world is expected to rise to 1.56 billion from 972 million in 2000. Besides, it is anticipated that majority of the cases are going to occur in low and middle income countries (Addo et al, 2007; Kearney et al, 2005).

Recent evidences indicated that an estimated 1.13 billion people have hypertension worldwide. Out of these, the majority (around two thirds) were located in low and middle income countries. The prevalence ranged from 27% in the World Health Organization (WHO) Africa region to 18% in the WHO region of Americans. The high rise in the prevalence of hypertension was attributed to the increase in the risk factors such as physical inactivity, the consumption of tobacco and alcohol, unhealthy diet, overweight and obesity in those population groups (WHO, 2019; and Salem et al., 2018).

In sub Saharan Africa (SSA) countries like Ethiopia, published information on the prevalence of hypertension is sparse. In SSA, hypertension prevalence varied from 6% to 48% and the prevalence will be 68% by 2025, that is 125.5 million (Shona et al., 2011; and Ogah and Rayner, 2013). A meta-analysis disclosed that blood pressure control to the target level in most countries in Sub-Saharan Africa is reported to be less than 30% (Ataklte et al., 2015). From the studies done in Ethiopia, Kenya, Nigeria and Tanzania, the reported prevalence of hypertension ranged from 10.1% in Southern Ethiopia to 23.7% in Tanzania (Shishani ,

Dajani and Khader, 2013; Hendriks et al., 2012; Gidey and Tadese, 2011; and Van et al., 2006). Previous reports from Ethiopia on prevalence of hypertension were as high as 31.5% and 28.9% among males and females respectively in Addis Ababa (Tesfaye, Byass and Wall, 2009) and 28.3% from Gondar (Awoke et al., 2012). In another study conducted in Addis Ababa the overall prevalence of hypertension was found to be 25% (Abdisa, Feleke and Awol, 2015).

In both developing and developed countries, uncontrolled hypertension is a major public health problem with a number of medical and psychosocial challenges. Even if the causes, preventive and control mechanisms are well acquainted, the negative outcomes that result from the disease will perhaps stay for many years. This makes the illness the biggest and greatest terrible social and health challenges (Kretchy et al., 2015).

Hypertension (HTN) is a major contributor to the growing global pandemic of cardiovascular disease and stroke (Bonsa, Gudina and Hajito, 2014). It is a modifiable cardiovascular risk factor for which medication is operative to regulate the elevated blood pressure as well as to obstruct the complications are existing. But, the maximal valuable effect of an appropriate treatment strategy can be achieved merely if patients firmly adhere to the recommendations.

Poor adherence to antihypertensive medications is a problem to the management of hypertension that result in high frequency of hospitalization and death (Kimmo et al., 2013; and Ong et al., 2007). Poor adherence undermines the efforts of health service providing facilities, health professionals, and policy makers for the modification and improvement of the health of the patients. It will be the source of medical and psychological complications and has an influence on patients' quality of life, deteriorating health care resources and reducing individual's trust towards the health care system (Balkrishnan, 2005).

Poor adherence is responsible for unnecessary over-prescription of drugs, substantial worsening of diseases, increases in avoidable hospital admission rates and longer hospital stays which all leading to a significant medical burden such as reduced optimal clinical benefit and increased risk of cardiovascular events (Mazzaglia et al., 2009, Osterberg and Blaschke, 2005; Mensah, 2008). Additionally, findings in clinical practice have raised issues about under treatment and non-adherence to antihypertensive treatment hampering the effectiveness of the medications (Ezzati et al., 2002). Therefore, it is advisable to conduct studies on patients' adherence/non-adherence in different contexts.

## **1.2. Statement of the problem**

Taking antihypertensive medications properly is a central point in the management of hypertension. Effective antihypertensive treatment should be maintained indefinitely to reduce the relative threat of cardiovascular disease including stroke (Dragomir et al., 2010). However, due to the asymptomatic nature of the disease and indefinite treatment duration, medication adherence remains a significant challenge among these patients.

There are several factors that influence the behaviour of a hypertensive patient regarding his/her antihypertensive medication adherence. Identifying factors that affect medication adherence is the first step towards improving adherence (Hyans, Taylor and Sackett, 2010).

A strong emphasis is placed on understanding the multitude of the factors that may affect patients' adherence to antihypertensive medication. This is because of the high reported occurrence of hypertension complications associated to improper adherence to antihypertensive medication (Degli Esposti et al., 2004).

The factors identified are associated with definite patient characteristics, medication-related, health-related, healthcare provider and health system related factors. All these diverse factors

were examined simultaneously in numerous studies to gauge their effect on patients' adherence to their antihypertensive medication. The results of these studies conducted in the field disclosed similarities to inconsistent results across diverse studies that were conducted in dissimilar contexts. On the other hand a number of studies have tried to determine the influence of a single factor such as sex differences (Holt et al., 2013) or smoking status (Zeller et al., 2007). However, the issue of non-adherence/adherence to medication is multifactorial. Consequently, exploring the multiple factors is vital to draw any strong conclusions. Besides, there is a shortage of information about the levels of medication adherence for antihypertensive and its determinant factors in Ethiopia (Mekonnen et al., 2017). Therefore, the present study tried to investigate the independent and cumulative effects of three main dimensions of factors affecting medication adherence: demographic factors; medical factors and psychological factors.

### **1.3. Research questions**

The study attempted to answer the following research questions:

- What are the medication adherence levels of hypertension patients at Menelik II referral hospital?
- Are there statistically significant differences in medication adherence based on demographic variables?
- Are there statistically significant differences in medication adherence based on medical and psychological variables?
- Can medical, psychological and demographic variables independently predict patients' medication adherence?

## **1.4. Objectives of the Study**

### **1.4.1. General objective**

The general objective of this study is to investigate the medical and psychological Factors associated with Medication Adherence among Hypertensive Patients at Menelik II Referral Hospital

### **1.4.2. Specific objectives of the study**

Specifically the study is intended to:

- Assess patients' level of adherence to their medication adherence
- Look into mean differences in patients' adherence level based on demographic variables
- Assess mean differences in medication adherence based on medical and psychological variables
- Examine the independent and cumulative predictive abilities of medical, psychological and demographic variables

## **1.5. Significance of the Study**

In the developed world hypertensive patients' medication adherence level and the factors associated with their adherence or non-adherence are extensively examined. Doing so will help to increase clinical outcomes and to decrease complications, risk factors and associated costs of ill managed high blood pressure. However, the studies conducted in Ethiopia, despite

the startling increase of the incidence of hypertension, to identify hypertensive patients' medication adherence and associated factors are not sufficient.

Finding the adherence levels of antihypertensive medications is an important step for understanding patient's pharmacological management, detection of adherence related issues early and preventing complications associated with poor adherence. Important factors were identified from different studies here and there. However, the factors identified elsewhere may not be applicable in all settings, including to hypertensive population in Ethiopia. This is because of difference in cultural contexts, demographic profiles of hypertensive patients and the healthcare system in Ethiopia and other countries.

Understanding the factors related with adherence to antihypertensive medications from the growing literature needs an understanding of the significance of these factors in relation to antihypertensive medications adherence in global studies. However, it does not necessarily mean that these factors are applicable to hypertensive patients in Ethiopia. Therefore, conducting this study in Ethiopia may lead to an altered understanding. Consequently, identifying patients' medication adherence level and associated factors will lead to development of appropriate interventions that may contribute to alteration of medication-taking behaviour of hypertensive patients in Ethiopia.

## **1.6. Scope of the study**

In terms of area the study was delimited to hypertension patients who were receiving anti-hypertensive treatments and follow ups at Menelik II Referral Hospital, Addis Ababa. The hospital is selected because it is referral and it is believed that it will have diverse population groups than general hospitals.

In terms of variables the study is delimited to selected demographic, medical and psychological variables that are associated with medication adherence.

It is, however, acknowledged that the study would have been better had it included patients from other hospitals and variables like income, distance from hospital, etc. But financial, technical and administrative related factors would delimit the scope of the study and this could be taken as a limitation of the study.

### **1.7. Limitation of the study**

The cross-sectional nature of the study could be considered as one of the limitations of the present study. Data collected at a single point in time may not reflect the whole thing. It is thus advisable to collect longitudinal data to get the whole picture of patients' medication adherence. However, the present study is cross-sectional in nature that may not reflect the whole picture.

Data on monthly income of the respondents were collected as categorical data (see appendix 1 and 2). But later it was felt that the categorization of the income levels was incorrect and lacks enough base for the categorization. Thus, this could be taken as the other limitation of the study.

### **1.8. Organization of the Study**

This thesis is organized into five chapters. Chapter 1 is an introduction which contains background of the study, statement of the problem, research question, significances of the study, scope/delimitation of the study and objectives of the study. Chapter two provides an overview of the state of the art analysis of the existing literature. Chapter 3 presents the methodology used in this thesis which includes the research design as well as describes the

data collection and analysis methods used. Chapter 4 analyses and presents the research findings obtained through the thesis methodology by showing how each of the research questions has been answered and how these findings together contribute to the main purpose of the study. Finally, Chapter 5 ends the thesis with summary, conclusions and a set of recommendations derived from the research findings and the conclusions of this work.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITRATURE**

In this chapter literature related with medication adherence will be presented. Specifically, the chapter will begin by clarifying the global and national prevalence of hypertension. The next section discusses about the treatment options for hypertension. Medication adherence among hypertensive patients are presented in the third section of the chapter. Factors related to medication adherence will be elaborated in the fourth section of this chapter. Last but not least conceptual framework of the study will be presented.

#### **2.1. Hypertension Prevalence**

##### **2.1.1. Global prevalence and burden of hypertension**

The prevalence of hypertension is in a high rise worldwide over time (Salem et al., 2018) and the prevalence varies across the different regions and country income groups. According to the World Health Organization (2011), an estimated 40% of global adult population aged 25 years and above had been diagnosed of hypertension in 2008. In terms of numbers, the report indicated that the population with hypertension had increased from 600 million in 1980 to one billion in 2008.

According to Kearney and colleagues (2005), the world's adult population with hypertension is likely to increase from the year 2000 figure of 972 million to 1.56 billion (1.54 billion - 1.58 billion) by the year 2025. Most of this increase however, is expected to occur in low and middle income countries (Addo et al, 2007, Kearney et al, 2005).

Recent evidences indicated that an estimated 1.13 billion people have hypertension worldwide. Out of these, the majority (around two thirds) were located in low and middle income countries. The prevalence ranged from 27% in the World Health Organization (WHO) Africa region to 18% in the WHO region of Americans. The high rise in the prevalence of hypertension was attributed to the increase in the risk factors such as physical inactivity, the consumption of tobacco and alcohol, unhealthy diet, overweight and obesity in those population groups (WHO, 2019; and Salem et al., 2018). Apart from the high prevalence of hypertension in low and middle income countries, more people are also affected in these countries because more people live in these countries (WHO, 2013).

Though hypertension is a major challenge in many parts of the world, commitment by global bodies towards its prevention, detection, treatment and control is not adequate (Lim, et al. 2012). This is especially so in low and middle income countries (LMICs) where priority of global agencies is directed towards funding communicable diseases at the expense of chronic and non-communicable diseases.

In the 2012 World Health Statistics, WHO estimated that, 13% of all global deaths in 2008 were attributable to raised blood pressure (WHO, 2013). According to Lim, et al (2012), an average of 9.4 million deaths occurred every year between 1990 and 2010 due to complications from hypertension. The WHO (2008) has estimated that about 80% of all complications and deaths from hypertension occur in low and middle income countries. This is due to weak health systems which lead to high undiagnosed, untreated and uncontrolled cases of hypertension (WHO, 2013).

### **2.1.2. Prevalence of Hypertension in Ethiopia**

In sub Saharan Africa (SSA) countries like Ethiopia, published information on the prevalence of hypertension is sparse. In SSA, hypertension prevalence varied from 6% to 48% and the prevalence will be 68% by 2025, that is 125.5 million (Shona et al., 2011; and Ogah and Rayner, 2013). A meta-analysis disclosed that blood pressure control to the target level in most countries in Sub-Saharan Africa is reported to be less than 30% (Ataklte et al., 2015).

From the studies done in Ethiopia, Kenya, Nigeria and Tanzania, the reported prevalence of hypertension ranged from 10.1% in Southern Ethiopia to 23.7% in Tanzania (Shishani , Dajani and Khader , 2013; Ong et al., 2007; Hendriks et al., 2012; Gidey and Tadese, 2011; and Van et al., 2006). Previous reports from Ethiopia on prevalence of hypertension were as high as 31.5% and 28.9% among males and females respectively in Addis Ababa (Tesfaye, Byass and Wall, 2009) and 28.3% from Gondar (Awoke et al., 2012). In another study conducted in Addis Ababa the overall prevalence of hypertension was found to be 25% (Abdisa, Feleke and Awol, 2015).

The latest WHO published data in 2017 indicated that deaths attributed to hypertension reached 11,050 deaths or 1.74% of the total deaths in Ethiopia. The age adjusted death rate in Ethiopia was 25.14 per 100,000 of population and this ranked Ethiopia 38th in the world. Hypertension was ranked 11th out of the top 20 causes of death in the country (WHO, 2017). Ethiopia was prone to double burden of diseases, both infectious and non-infectious diseases, that requires urgent government actions (Misganaw et al., 2015).

## **2.2 Treatment of Hypertension**

### **2.2.1 Non Pharmacologic Treatment**

Adoption of healthy lifestyles by all persons is critical for the prevention of high BP and is an indispensable part of the management of those with hypertension (Whelton et al., 2002). Several lifestyle interventions have been shown to reduce BP. Apart from contributing to the treatment of hypertension; these strategies are beneficial in managing most of the other CVD risk factors (Weber et al., 2014). Life style modifications for the management of hypertension includes maintaining normal body weight, eating a food rich in fruits, vegetables, and dairy products with a reduced content of dietary cholesterol as well as saturated and total fat; reducing dietary sodium to no more than 2.4 g of sodium, engaging in regular physical activity including brisk walking 30 minutes per day for at least in most of the week days, limiting alcohol intake to no more than two drinks day per in men most, no more one drink than day in per women and persons with lighter weight (WHO/ISH writing group, 2003; Chobanian et al., 2003; FMHACA, 2014).

A cross sectional study conducted in Addis Ababa showed that 13.5% of males and less than 1% of females were cigarette smokers, while 10.7% adults reported regularly adding salt to their plate, 20.2% of males and 37.7% of females were overweight and more females (31.2%) than males (16.9%) were classified as being sedentary (Tesfaye et al., 2009). A study from South Africa reported that 56.3% of treated hypertensive patients were implementing at least one life style modification (Onwukwe & Omole, 2012).

### 2.2.2 Pharmacologic Treatment

Drug treatment of hypertension depends on the degree of BP elevation and presence of compelling indications (Chobanian et al., 2003). The main benefits of antihypertensive treatment are due to lowering of BP per se and are largely independent of the drugs employed (Mancia et al., 2013). According to JNC 8; thiazide-type diuretics, ACEI, ARBs, and CCBs are now the initial therapy of choice (James et al., 2014). A meta-analysis of randomized controlled trials also showed that all these drug classes have comparable outcome benefits (Fretheim et al., 2012).

A systematic review reported that the treatment of hypertension ranged from 5% in a rural Nigerian community to 91.2% in urban North African populations. The review also stated that East African populations had the lowest levels of treatment while North African countries had the highest levels (Kayima et al., 2013). Different studies described antihypertensive drugs used in the treatment of hypertension at primary care and hospital level.

A study from health center (HC) of Oman showed the most frequently used antihypertensive drugs to be  $\beta$ -blockers (58.2%) followed by diuretics (56.3%) (Al-saadi et al., 2011). On the other hand, a study conducted in Chilean HCs showed ACEIs (59.5%), diuretics (48.0%), calcium channel blockers (CCB) (28.3%), and  $\beta$ -blockers (24.4%) to be the frequently used drugs (Sandova et al., 2012). Similarly, a study from primary care unit of United States of America (USA) reported that the most frequently used drugs to be ACEI, thiazides,  $\beta$ -blockers and CCB (Ornstein et al., 2004). Moreover, a study by Onwukwe & Omole in HC of South Africa reported that the most frequent group of antihypertensive medications used were

diuretics (81%), ACEI (72.3%), CCB (55%) and  $\beta$ -blockers (4.3%) (Onwukwe & Omole, 2012).

Since more than two-thirds of hypertensive individuals cannot be controlled on one drug and combining antihypertensive medications from different classes is recommended to achieve target BP (Chobanian et al., 2003). Many studies reported majority of hypertensive patients to be on combination of antihypertensive drugs (Ornestin et al., 2004; Al-saadi et al., 2011; Shelly et al., 2011; Sandova et al., 2012). On the contrary, a study from Zimbabwe showed majority of the patients to be on monotherapy (Goverwa et al., 2014).

### **2.3. Adherence to anti – hypertensive medications**

It is one of the biggest challenges to the health care professionals to adhere the patients to prescribed regimens (Yenesew, Gashi and Tatiparthi, 2015). Anti – hypertensive medication adherence was assessed among 514 patients who receive secondary care in UK and the results showed that only 22% were non-adherent (Grant, 2013). A population based study conducted in rural Bangladesh to describe hypertension and the factors affecting adherence to treatment among hypertensive patients, showed that from the 29960 individuals who participated 13.67% were hypertensive and of those who started treatment upon being diagnosed with hypertension, 26% discontinued the use of medication (Khanam et al., 2014). African studies conducted to assess anti-hypertensive medication adherence found lower adherence figures. For instance, a Nigerian study which involved 140 participants found out that BP control and medication adherence rates were 35.0% and 42.9%, respectively (Iloh et al., 2013). In another part of Nigeria, a community based study on 440 hypertensive patients revealed the level of compliance to be 51% among the participants (Osamor and Owumi, 2011). A study which included 2 teaching hospitals in Ghana and Nigeria involved 357

patients as study participants portrayed the medication adherence to be 33.3% (Kimuyu, 2006). A cross sectional study in Kenya which involved approximately similar number of participants showed that 62.4% of the respondents attending Kiambu District Hospital were fully adherent to treatment. Similarly a study in Tanzania shows that majority of patients (168 of 300, 56.0%) had high MA (Alphonse, 2012). One could expect the magnitude of non-adherence to be high in Ethiopia. However, the numbers on few researches conducted in the thematic area show adherence is relatively higher than some other African countries. For example, a study conducted to assess the magnitude of adherence and the factors associated with non-adherence to anti- hypertensive medication in Dessie Hospital, found out that, from 100 individuals that participated, only 26% were non adherent (Chelkeba, et al., 2013). But percentages for adherence were lower in studies done at other health institutions in Ethiopia. Studies done at Black lion and Adama (Hareri, Abebe and Asefaw, 2014) referral hospitals show 69.2% and 59.5% of medication adherence among participants, respectively.

#### **2.4. Factors associated with adherence to anti-hypertensive drugs**

In this particular study, review of literature over demographic, medical and psychological factors associated with medication adherence has been presented.

##### **Demographic factors**

Demographic patient characteristics were usually examined and the results fluctuated between studies. In this literature review demographic factors associated with medication adherence among hypertensive will be reviewed. The factors include age, gender, educational status, marital status, employment status and income level.

## **Age of the patient**

Hypertension happens at any age if an individual has the causal risk factors that could contribute to have high blood pressure. However, aging is the risk factor central which contributes to the of primary occurrence hypertension. Aging as a risk factor in to addition supplementary factors risk such as lifestyle unhealthy family and history of hypertension. Secondary hypertension, a type of hypertension that resulted from major health such as issues renal insufficiency, happens also at any age. Understanding that happens hypertension at any age researchers stimulated to consider age as a risk factor when evaluating factors related to medication adherence among hypertensive patients.

Thus, age is considered as an impelling factor in patients' adherence to their medication. Although diverse studies have conveyed inconsistent results about the implication of age in relation to patients' adherence medication antihypertensive, the variation of behaviours adherent among hypertensive from patients' dissimilar groups were age apparent.

The increase age is reported as having an inverse association with adherent behaviour. For example, a cross-sectional study among 1,000 hypertensive patients in Greece conveyed that better adherence to antihypertensive medication was found amongst patients younger than 60 years of age. The study employed a questionnaire to adherence measure behaviour among three groups age: hypertensive patients whose age is less than 40 years; whose age is between 40 to 60 years; and patients whose age is above 60 years. Adherence to their antihypertensive medication was better among patients whose age is between 40 to 60 years (i.e. 22.3% of 589 patients were adherent patients) compared to those whose age is above 60 years old (3.8% of the 395 patients were adherent) (Yiannakopoulou, Cokkinos, Papadopulos, and Mountokalakis, 2005).

Another research that measured antihypertensive medication adherence among 750 hypertensive patients in Turkey from diverse age groups revealed a gradual decrease in adherence to antihypertensive medication with patients' age increase. Adherence to antihypertensive medication was evaluated by asking patients to reply to questions with dichotomised response (Yes/No) if patients were taking their medications as prescribed. In 51.9% of 160 hypertensive patients below the age of 49 poor adherence to antihypertensive medication was found and the poor adherence level increased as the age of the patients increased (age ranges 50–59, 60–69, 70–79) where poor adherence were reported in 75.8% of the 33 patients whose age is older than 80 years (Karakurt & Kaşıkçı, 2012). The decrease in self-reliance because of declining psychomotor abilities could explain the decreased to adherence to antihypertensive medication among aged individuals (Hashmi et al., 2007; Karakurt & Kaşıkçı, 2012).

However, an increase in medication adherence with aging is reported in other studies. For example, a cross-sectional study in Pakistan among 199 male and 239 female hypertensive patients reported an increase in medication adherence with increasing age. Specifically the study revealed that poor antihypertensive medication adherence was reported in patients younger than 40 years old and the highest mean adherence level is reported from patients whose age is older than 70 years. Social support is considered to contribute to the increase in medication adherence among these patient groups (Hashmi et al., 2007). Similar finding was reported from a study conducted in Malaysia that has similar social support structure with Pakistan (Hassan et al., 2006).

Age is an important demographic in any study. Different studies have found varying result with regards to its effect on medication adherence (Hill & Robert, 2011). While some studies findings show association between age and adherence, other findings show no correlation

(Jing, et al, 2008). On studies which found association between age and adherence, adherence increased with age (Sirey et al, 2001, Kim et al, 2002, Senior et al 2004, Hertz et al 2005).

However, other studies found that adherence is inversely proportional to age and that adherence gets worse with advance age (Balbay, et al. 2005, Okuno, et al. 1999). A study by Iihara and colleague (2004) in Japan however, did not establish any association between age and adherence.

## **Gender**

Gender is considered as an important factor that influence hypertensive patient's adherent behaviour. While examining patients' medication adherence between genders, it is desirable to consider other personal factors including educational background and income level.

In different studies different results were reported in relation to the effects of gender over patients' adherence to their antihypertensive medication (Braverman & Dedier, 2009).

A cross-sectional among 144 Chinese study immigrants (75 women and 69 men) in the USA explored the relationship demographic and between factors cultural-related associated with adherence to antihypertensive medication. The study found that women have higher adherence level to their medication than their men counter parts. Specifically it was revealed that 69% of the male patients and 75% of female patients were found to have higher adherence to their antihypertensive medication (Li et al., 2008).

Another study in the United States of America reported different finding. The study is conducted among 21 males and 49 females hypertensive to the patients' assess relationship among antihypertensive adherence medication, demographic, cognitive and clinical factors. The study testified levels of education that were a significant predictor of antihypertensive

medication adherence among African-American women and men. Specifically, the study reported that men education with lower level were more adherent to their antihypertensive medications than those with higher education level (91% vs. 72%, respectively). Opposite finding was observed for women: those patients with high school less than education were less medications adherent to their than those with formal higher education (61% and 74%, respectively) (Braverman & Dedier, 2009).

Other factors contributed that to the difference in medication behaviour adherence between genders, for representation/perception example illness, are reported in other studies. Different genders coped in a different way to their illness and that could contribute to differences in their health behaviour such as medication adherence. Coping with illness are products of illness perception. Some of the illness perception constructs that were found to bring differences in medication adherence between women and men were personal control (personal controllability) and identity illness (i.e. symptoms associated with illness experienced). For example a longitudinal study among 118 hypertensive patients (74 male and female 44 participants) in Taiwan used Medication the Adherence (MAI) Inventory scale to assess medication antihypertensive adherence. The study assessed the relation gender between and medication antihypertensive adherence. The study that found difference in gender was in significant factor patients' medication adherence and that adherence to antihypertensive medication was higher among men than their women counterparts (Chen, Lee, Liang, & Liao, 2014). The study reported constructs of illness that representations were associated difference with in medication adherence between genders.

Accordingly, when examining into variances in medication adherence between genders, a holistic view of other related factors needs to be considered.

## **Marital status**

The involvement of marital with a relationships spouse definitely contributed health to management. It is important to contemplate the role of marital in adherence to antihypertensive medication. This was because marital relationship was considered as an indicator of a social network that in turn could serve as a supportive factor for patients during their illness management (Sperber, Sandelowski, & Voils, 2013).

A cross-sectional 636 hypertensive among study patients at Duke Centre Medical University in the USA investigated emotional well-being of unmarried and married hypertensive individuals in regard to their adherence to antihypertensive medication. In the study it found that being married was related with high antihypertensive medication adherence (Trivedi, Ayotte, Edelman, & Bosworth, 2008).

Similarly another study conducted in the USA among 1,326 patients with coronary artery disease undergoing cardiac catheterisation examined the medication adherence of the patients 12 months after hospital discharge. In the study unmarried individuals accounted for 30% of the participants and 24.7% of these participants reported lower adherence to their cardiovascular medication. Besides, the multivariate analysis showed that being married contributed to better medication adherence among the study participants (Kulkarni, Alexander, Lytle, Heiss, & Peterson, 2006).

Spouses were found to provide practical support including reminding patients to take their medication in time (Trivedi et al., 2008). On the other hand patients with chronic illness, for example patients with heart failure, who don't get marital support were found to have poor management of their illness and increased complications resulted from the poor management (Wu et al., 2012).

## **Income**

Income was linked with medication adherence among patients with chronic illness, including among patients with hypertension. The association between economic status and medication adherence was linked to the ability of the patients to afford the costs of medications. Prices for medications antihypertensive fluctuate ranging reasonable from prices to prices expensive (Després et al., 2014; Goldman, Joyce, & Zheng, 2007).

The role of patients' income in association with adherence to medication was not limited to the ability of the patient to afford for medications. The association extended to the enrichment of medication adherence through the monetary pathway or through education or knowledge pathways. This is because individuals with higher income are likely to have better education thereby better knowledge about adherence to medication (Shehadeh-Sheeny, Eilat-Tsanani, Bishara, & BaronEpel, 2013). Thus, it is argued that patients with higher economic status work better towards management of their illness including adherence to their medication.

Patients with low-income could have poor illness management because of the daily challenges to seek they faced afford healthcare treatments or services. Low-income status was an issue associated with poor adherence for subgroups in communities that didn't obtain effective health care as was the case for low-income African-Americans in the USA (Ibrahim, 2003; Shaw & Bosworth, 2012), and for patients in urbanised communities in rural areas of Eastern Uganda (Bagonza, Rutebemberwa, & Bazeyo, 2015).

Some studies considered the role of a patient's income in relation to antihypertensive medication adherence, however, the results exposed were not noteworthy for this factor

(Zyoud, AlJabi, Sweileh, & Morisky, 2013). The nature of the health care provision for antihypertensive medications was perhaps the reason for the contrary results.

### **Employment status**

Employment was a predictive factor for patients' adherence to antihypertensive medication. A study conducted among 241 older hypertensive patients in Korean displayed that being hired, compared to retired or unemployed, was associated to a higher chance of adherence to antihypertensive medication. In the study the reported amount of poor adherence to antihypertensive medication was 41%. The relation with employment status and adherence to antihypertensive medication was argued from two sides. The first was the accessibility of personal financial support to access medical treatments and services; and second was the availability of daily work-related routine that boost patient's cognitive and functional status. Both the financial support and the boost in functional status aided the patients having a better medication adherence routine (Park, Kim, Jang, & Koh, 2013).

On the other hand it was that argued management illness medication and adherence was among impacted employed patients a hectic work/lifestyle due to where adhering to customs medication might not fit in. A study that examined the role of employment in illness medication management and adherence to among 440 malaria patients in outpatient setting in Nigeria has a negative reported between association and medication employment adherence (Okuboyejo, Mbarika & Omoregbe 2014). A significant for explanation the findings was malaria that medications some need time where the patient work was off expected to continuously visit the clinic to receive injections and to undertake rehabilitation therapy.

## **Education status**

The existing literature has repeatedly conveyed a strong association between lower education level and poorer health outcomes. Patient's educational status significant positive relation to adherence to displayed antihypertensive medication (Wu et al., 2012; Zyoud et al., 2013).

A study conducted among in Palestine 410 hypertensive patients examined socio-demographic in relation to factors adherence to medication using the Morisky Medication antihypertensive Adherence Scale (MMAS). The study reported significant between the patient's educational relation level and medication adherence. The results that increases in disclosed MMAS scores (scale scores ranged from 0 to 8) was associated the increase with in level of education (Zyoud et al., 2013).

Another study in the USA examined the between health association literacy and medication adherence among refill 1,549 patients chronic illness with. Cumulative Medication Gap employed (CMG) was as a of medication measure adherence refill. Low adherence defined was as  $CGM \geq 20\%$ . The results showed that 929 (60%) of the patients have adequate adherence ( $CGM < 20\%$ ) and patients' level of education was a significant predictor of medication refill adherence. This was demonstrated by the minimum the reporting of rate of adequate adherence patients with among less educational status and the medication refill adherence maximum among patients with educational status high (Gazmararian et al., 2006). Health literacy was path between a potential level of education and health outcomes including medication adherence (van der Heide et al., 2013).

This is because patients who undergone through any form of education about medication were found to be more adherence to antihypertensive medication (Bader et al., 2015).

Educated patients were potentially advantageous in that they would seek additional health information about their health conditions than patients who were less educated.

## **Religion**

Studies revealed that religion is an important predicting factor in patients' medication adherence. For example a study in Ethiopia which found Muslims to three times more likely to be adherent to their therapy than Christians (Habtamu et al, 2014).

## **Psychological factors**

### **Knowledge about hypertension**

A considerable step in understanding how the individual patients were managing their illness is examining their knowledge about their illness. Hypertensive patients worldwide have reported to have low of knowledge levels and awareness their illness about its treatment (Kim et al., 2007). This has poor contributed to blood control pressure thereby the occurrence of cardiovascular complications.

Areas of knowledge that are understood poorly by hypertensive include causes of patients' hypertension, risk, symptoms, factors prevention, complications, target pressure, onset and blood dietary management. Studies on antihypertensive adherence medication has showed of knowledge lack among patients hypertensive about required duration of medication antihypertensive, long term of the medication side effects the importance and of antihypertensive to pressure medications control blood complications and prevent.

An attempt made was to evaluate current about various knowledge facets of high blood of 530 pressure primary care hypertensive patients in the United States of America. A questionnaire of six items examined specific knowledge about hypertension. The questions

were related to the importance of high blood pressure. The collected data was showed that 44% of the patients responded correctly to all items, 34% responded incorrectly to one item, and 22.3% responded incorrectly to two items. Among the items, most often the item responded incorrectly related to was hypertension symptoms (26.2%), hypertension prevention (22%), and antihypertensive medications (19%) (Viera, Cohen, Mitchell, & Sloane, 2008).

In another study conducted in Sudan among 242 hypertensive patients, knowledge about hypertension was also symptoms patients found to be a matter with hypertensive (Osman, Suleiman, & Elzubair, 2007). In the study only 38.8% of the patients showed high scores on knowledge of the symptoms.

Another study was conducted in the USA among 1,762 hypertensive patients and assessed associated specific aspects with diastolic/systolic blood pressure. The study that a high revealed percentage of were unable to participants recognize the target of systolic blood pressure and diastolic blood pressure. Specifically, 71.7% of the patients were unable to recognize the target for systolic blood pressure and 61% were to identify unable the target diastolic pressure blood (Alexander, Gordon, Davis, & Chen, 2003).

Knowing various sides of hypertension is important condition to medication since such adherence knowledge contributed to therapeutic the illness management. Knowing the target level pressure blood was of the part goal that a patient might setting during the medication consider regimen. Hypertensive who reported patients a good knowledge of their target blood pressure showed optimum adherence to their antihypertensive medications (Karaeren et al., 2009). The reasons for antihypertensive the importance medications and the duration of

taking antihypertensive are medications areas which a lack of showed knowledge antihypertensive about medications (Kim et al., 2007).

Hypertensive patients to perceive inclined that antihypertensive medications for short term were usage and could be stopped once the outcome was achieved. A cross-sectional study among 347 from primary patients' health care centres in city evaluated Tabuk the antihypertensive medications using a rate pill counting method and the factors associated with adherence. According to patient knowledge the study about the adherence need for antihypertensive to medications was a significant predictor of their adherence actual (Khalil & Elzubier, 1997). Another cross-sectional study in Arabia Saudi comes up with similar findings. The study recruited patients attending 190 hypertensive primary health care centres in and assessed Al-Khobar city hypertensive patients' misconception and knowledge about hypertension. According to the study, 43.7% of patients antihypertensive medications thought that could be stopped once pressure control blood had been achieved (Al-Sowielem & Elzubier, 1998).

The patient's circumstantial information and knowledge about medications themselves affected their belief (Magadza, Radloff, & Srinivas, 2009). Significantly, healthcare service providers should play role an active in explaining the action antihypertensive medication on high blood pressure as a health condition including the consequences of long term use or poor use of these medications.

## **Beliefs**

Existing literature suggested that patients' beliefs have a significant and major role in influencing adherence medication. Beliefs medications are about use classified into two: general beliefs and specific beliefs. General beliefs about use medication include harm and

overuse. Beliefs about comprised harm the beliefs that were harmful, poisonous medications, addictive, and should use not be continuously. Overuse denotes to that the belief medications were overused or overprescribed by physicians (Horne, Weinman, & Hankins, 1999). The specific beliefs denotes to those that impact patients' appraisals of medication/s including the prescribed, the perception of the need for personal treatment (belief of necessity), and the concern about the medications' long term use (belief of concern) (Horne et al., 2013; Horne et al., 2001). The belief necessity of medication/s reflected of taking the patients' understanding of the illness and their significance of the medications for treating their illness. This, therefore, determined their motivations to take the medication/s. Instead, patient's medication apprehensions of arose from misunderstandings of believed they knew with regard what they to the medications. For example, patients had concerns about the presence of side effects due to the long term use of medications (Magadza et al., 2009; Saleem et al., 2015). A recent meta-analysis and systematic review of affirmed ninety-four studies that specific belief concepts, concepts including the necessity and concern was an adequate conceptual framework to understand patients' viewpoints of prescribed medications (Horne et al., 2013).

A study conducted among 324 patients with chronic illness in London and Brighton in the United Kingdom investigated these two components of medication belief was (Horne & Weinman, 1999). This cross-sectional study the relationship between the beliefs about medications and medication adherence assessed. The results showed that belief about their medications patients' (necessity and concern) was predictor for medication the strongest adherence, explaining 19% of the variance in the reported medication adherence.

Another cross-sectional study in the United Kingdom was conducted among 242 hypertensive patients and assessed the medications role of belief on adherence to medication

antihypertensive (Ross, Walker, & MacLeod, 2004). Medication adherence was using the Morisky assessed Medication Adherence Scale (MMAS) and medication belief using the Belief about assessed Medicines Questionnaire (BMQ). The results reported that patients with high necessity belief to medications were more antihypertensive likely to be that adherent and patients who concerns about described potential adverse were less likely to be adherent effects.

A number of studies investigated role of the medications belief (necessity and concern) in influencing medication antihypertensive adherence (Fernandez-Arias et al., 2014; Rajpura & Nayak, 2014). Results of the studies reinforced that about the strong patients' medications beliefs necessity of taking the contributed substantially to positive adherence medication. On the contrary, those patients with amplified levels of concern about using medications contributed to poor medication adherence.

The belief (necessity and concern) specific concepts were investigated in Saudi Arabia in association with long-term medication adherence among 408 patients with different chronic illness (AlHewiti, 2014). Adherence to medication was measured using the 8-item Morisky Medication Adherence Scale (MMAS-8) and the belief measured about medications using the BMQ. Specific use belief about medications was found to 27.7% of the variation in medications adherence.

A study was conducted among 136 hypertensive patients from three government hospitals in Jordan and hypertensive patients' assessed beliefs about their antihypertensive adherence using the General medications Belief about Medication Questionnaire (BMQ). The study depicted that the negatively BMQ scores General Harm were correlated medication adherence with and the BMQ score General Benefit was positively with medication

correlated adherence. These indicate that negative beliefs about medication and an increase in beliefs positive a reduction in medication adherence improve (Alhalaiqa, Deane, Nawafleh, Clark, & Gray, 2012).

### **Worry about medication payment**

The high out-of-pocket charges spent in form of payments for medications could create financial load over patients with chronic illness. In hypertension, affording the price of antihypertensive medications was a challenge for all patients (Després et al., 2014; Pesa et al., 2012). Hence, the hypertensive antihypertensive patient's medication adherence needs behaviour to be identified in association with their concern/worry about the expenditures for their medication.

### **Medical and/or clinical factors**

The medical related factors include those factors that are related to patient's medical and clinical behaviours. Some of these factors include the years of diagnosis with hypertension, numbers of medication, the presence of other health conditions in addition to hypertension, etc.

### **Duration of hypertension**

The experiences that hypertensive patients come across dealing when with antihypertensive medications throughout their treatment according differ to the years since diagnosed they are with hypertension. During the initial of hypertension periods treatment, healthcare workers usually offer and continued close monitoring of situation to assess the patient's the effectiveness of the prescribed and the need to fine-tune medications the treatment regime, which could altering the include medication, adding medications or further altering the

quantity medication (Mazzaglia et al., 2009; Valcárcel, Jiménez, Arístegui, & Gil, 2003). Therefore, medication adherence found to differ has been between patients who are newly diagnosed and patients with diagnoses and treatment long-term regimes.

Although studies that investigated the differences in adherence between new medication and long-term hypertensive reported no patients significant association (Zyoud et al., 2013), adherence antihypertensive medication fall rates reportedly in newly diagnosed patients (Baggarly, Kemp, Wang, & Magoun, 2014; Friedman, McAlister, Yun, Campbell, & Tu, 2010). Thus, examining adherence to antihypertensive behaviour medication by considering hypertension duration is of diagnosis substantive importance.

There were reasons which contributed diverse to different medication adherence antihypertensive behaviour among and new patients long-term. For newly diagnosed patients, the lack of knowledge medications was relevant about antihypertensive since some hypertensive patients held belief that taking the mistaken medications is only when experiencing the signs needed of high blood pressure (Familoni et al., 2004). Hypertension is a long-term and hence it is mandatory condition to maintain continuous medication behaviour to taking achieve an appropriate pressure control blood. Adjusting to this long-term regime treatment was challenging for diagnosed individuals newly with chronic illnesses. For example, some medication produced hostile type side effects such as frequent experienced with urination diuretics (Mazzaglia et al., 2009). Oppositely, hypertensive patients with long time diagnosis of hypertension developed different medication taking manners. So, it is important the influence of years to consider of diagnosis of hypertension with adherence to antihypertensive in association medication.

## **The presence of comorbidities**

The presence of comorbid illness should be taken into consideration when examining medication adherence behaviour. Hypertension is a chronic illness that could be alone or with another diagnosed illness such as diabetes, renal insufficiency or hyperlipidaemia.

Individuals diagnosed are with comorbidities stunned with for controlling their poly-medications illnesses. Therefore, the medication adherence of such patients' behaviour may be different from the of patients diagnosed behaviour with only hypertension. Studies have conveyed results concerning the various influences of comorbidities on adherence to antihypertensive medication (Khanam et al., 2014; Park et al., 2013).

A study that was conducted among 144 male hypertensive patients in two governments in Saudi Arabia hospitals various assessed aspects of adherence for patients including diet, hypertensive medications and exercise among hypertensive patients and the associated factors to adherence. The results the study of found that presence of the commitment was comorbidities a significant factor in the medications to antihypertensive, a healthy diet and regular exercise (Elbur, 2015).

Habit formation the factor that swayed was found to be medication adherence patients with comorbidities among (Reach, 2005). Medications in chronic adherence illnesses may explain the earlier of development habits that and a patient maintained initiated during the treatment regimen (Reach, 2005). The role of health awareness and of knowledge conditions is another factor underlying that should be considered when explaining adherence medications with patients for comorbidities (Ghembaza, Senoussaoui, Tani, and Meguenni, 2014).

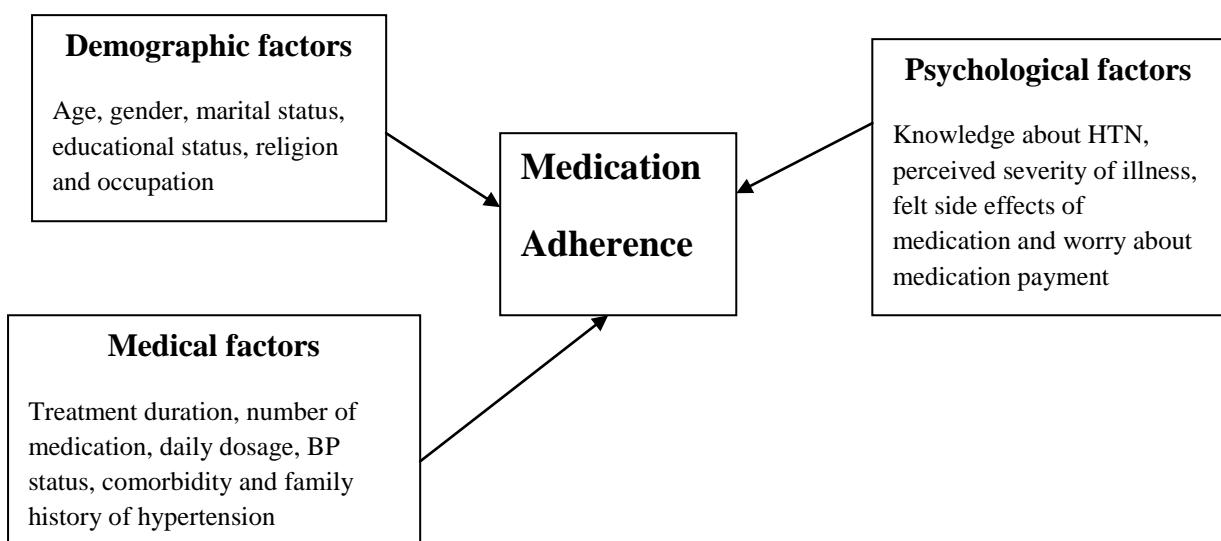
On the contrary a study among 250 hypertension patients in United Arab Emirates noted that the presence of comorbidity is not a significant predictor of adherence to antihypertensive

medications (Bader et al., 2015). Other studies also have found that are not comorbidities significant predictors to adherence in relation to antihypertensive medication (Hashmi et al., 2007; Park et al., 2013).

## 2.5. Conceptual Framework of the study

In both national and global literature it can be seen that a number of factors influence hypertensive patients' medication adherence. Needless to say almost all studies examined the effects of demographic factors associated with medication adherence. Besides, some studies examined the effects of medical factors while others examined the effects of psychological factors over hypertensive patients' medication adherence. In the present study it is believed that both medical and psychological factors are important predictors of patients' adherence. Hence, the independent and cumulative effects of these factors alongside with demographic factors are examined.

Based on the literature consulted the following framework is developed by the researcher to guide the study.



## **CHAPTER THREE**

### **METHODS**

#### **3.1. Research Design**

The purpose of this study was to investigate the medication adherence levels among hypertensive patients attending the outpatient department of a referral hospital in Addis Ababa and to identify the factors associated with their medication adherence. To achieve this objective, the study implemented a cross-sectional research design, using the self-reporting survey method for data collection.

Along with the cross sectional nature of this study, descriptive research design was employed for detail description of the findings displayed in tables and charts. Besides, the present study employed descriptive research approach to describe the medication adherence levels of hypertension patients at Menelik II referral hospital.

In terms of approach, quantitative approach has been used for the data that were collected from respondents through questionnaire. So the research design of the present study is quantitative descriptive survey design.

#### **3.2. Study Area**

Addis Ababa, which is the capital city of Ethiopia, is selected as a study site. Addis Ababa is located at 9° 2' N, 38° 44' E, in the plateau of mountain ranges at a height of 2000 to 2400 meters above mean sea level. Addis Ababa has more than 540 Km<sup>2</sup> coverage (Uli, 2008). According to 2007 population census, the population of Addis Ababa was amounted to 3,000,384.00. It has 10 sub-cities with 116 woredas and 328 Kebeles. Moreover Addis Ababa is the main centre of commerce, manufacturing, and many other institutions (Addis Ababa City Administration, 2014).

The present study was conducted at Menelik II Referral Hospital which is found in Addis Ababa, Ethiopia. Menelik II Referral Hospital is one of the pioneering medical institutions in Ethiopia which was established in 1910. Since its renovation as referral hospital, it has been serving as referral hospital for people with Hypertension, Diabetes, Glaucoma and other chronic diseases.

### **3.3. Population**

The population of this study were adult patients at Menelik II Referral Hospital who were receiving antihypertensive treatments, and who were on follow up for their medications for at least three months before the study were conducted. The total numbers of hypertension patients who were under treatment and follow up were 2608 and these patients serve as the population of the study.

#### **Inclusion and exclusion criteria**

All adult ( $\geq 18$  years old) hypertensive patients who were on anti-hypertensive treatment and follow up for at least 3 months at time of data collection were included in this study. However, unconscious and critical ill hypertensive patients and pregnant mothers were excluded.

### **3.4. Sampling Technique and Sample Size**

A sampling frame was created using the patients' medical registration number and participants were selected using simple random sampling technique from the sampling frame. Simple random sampling was also known as chance sampling where each and every item in the population has an equal chance of inclusion in the sample.

In this study, sample size was determined as a single population proportion formula. Taking prevalence of adherence to antihypertensive drugs  $P = 62\%$  which was conducted in Jimma

University Specialized Hospital on hypertensive patients (Asgedom *et al.*, 2018). This study was assumed to obtain the sample size at 95% confidence level and 5% degree of precision.

$$n_i = \frac{Z^2 (\alpha/2)^2 P (1-P)}{d^2}$$

Where

n= minimum sample size required for the study

z= Standard normal distribution (Z=1.96) with confidence interval of 95% and (alpha = 0.05)

p= the prevalence of patients adherence to antihypertensive drugs

d= Absolute precision or tolerable marginal error.

$$n_i = \frac{Z^2 (\alpha/2)^2 P (1-P)}{d^2} = \frac{(1.96)^2 * 0.62 * 0.38}{(0.05)^2} = 362$$

Adding 5% for non-response rate, the final sample size is 380. Thus, data were collected from 380 patients. However, 13 questionnaires were found to be incomplete and/or improperly filled.

### 3.5. Data collection instrument

The study employed structured questionnaire. On the basis of items used in the literature and the objectives of this research, the researcher generated a pool of sample measures. The measurement scale of the study constructs includes three sections and they are presented below:

**Demographic Variables:** The personal characteristics of the respondents were measured with a single question each about their age, gender, marital status, educational status, religion and occupational status.

**Medication Adherence:** The second section includes a measure for medication adherence. Respondents' medication adherence is measured using Morisky Medication Adherence Scale. The scale was first designed by Morisky in 2008 (Dehghan, Nayeri, Karimzadeh, & Iranmanesh, 2015) and used to find out how much patients adhere to treatments in their use of medication. It is a self-report questionnaire with a total of 8 items. Items from 1 through 7 are dichotomous based on a "Yes" or "No" response. Concerning scoring of these items, each "no" response is rated as "1" and each "Yes" is rated as "0" except for item 5, in which case, a "Yes" response is rated as "1" and a "No" is rated as "0". The last item (item 8) has a 5-point Likert response choice. The choices are never, once in a while, sometimes, usually, and all of the time. The score for each choice respectively are 1, 0.75, 0.50, 0.25, and 0. The total score of all the 8 items ranges from 0 to 8 points and it can be categorized into three levels of adherence (the cut-off points): 'high adherence' (score = 8), 'medium adherence' (score of 6 to <8), and 'low adherence' (score < 6).

In this study, adherence measure was used as scale. The score of each item was added and the total sum score was used as continuous data in assessing mean differences and in the regression analysis. Also, adherence was used as ordinal measure. The data were categorized into two divisions to determine the level of adherence: low adherence and adherence. So, scores 0 - 6 (low adherence) to be considered as non-adherence, and scores greater than 6 to 8 as adherence as per the suggestion of the scale developer. Adherence is a dependent variable in this study.

**Medical and Psychological Variables:** The third section of the questionnaire includes items related with medical and psychological variables. The medical variables include treatment duration, number of medication/drugs, daily dosage of drugs, BP status, comorbidity condition, and family history of hypertension. Each variable is measured using items drawn from the literature. Feeling the side effects of the medication, worry about medication payment, knowledge about hypertension and perceived severity of their illness were the psychological variables included in the present study. Feeling the side effects of the medication is assessed using an item developed from the literature. In order to assess patients' worry about medication payment two items were developed (one about who pays and the other about their worry about the payment). But the second item is used in the analysis. A pool of six items was developed from the literature to measure perceived severity. The items were measured on 5-point Likert-type scales, with anchors of 1 = *strongly disagree* and 5 = *strongly agree*. Higher score in this measure indicates higher satisfaction. Knowledge about hypertension is measured using the hypertension evaluation of lifestyle and management (HELM) scale which has 14 items. The questions were modified to 10 as the questions "7 and 8" were country specific and questions "12 and 13" did not meet with the study objectives. The tool contains selected response items with the right answer coded as "1" and wrong answer as "0". Respondents with scores above the mean value on the HELM scale were taken as having good knowledge about hypertension

### **3.6. Procedures of data collection**

First the researcher get support letter from the School of Psychology which requested cooperation with him. Then the researcher goes to Menilik II Referral Hospital and explained the scope, purpose of the study to the Medical Director and head nurse of the outpatient clinic to secure permission to conduct the study.

For the ease of respondents, the original questionnaire developed in English was translated to Amharic language and again backward translation was made again with the help of two experts (one Psychology PhD candidate and one legally recognized translator). Then, the researchers proceeded to the pilot testing and verify the validity and reliability of the questionnaire despite the translation. The pilot study was conducted among 30 randomly selected patients at Yekatit 12 Hospital Medical College. Unclear and ambiguous items were corrected; items difficult to reply were identified and corrected based on the pilot study.

After the pilot testing, data collection of the main study begun. Thus, with the help of the nurses in the outpatient ward the researcher attempted to contact and gathers the required data from the informants. The researcher also established appropriate rapport with the participants to facilitate situations for the research activities. All the respondents were informed about the purpose of the study and how to complete the questionnaire.

### **3.7. Methods of data Analysis**

Both descriptive and inferential statistics were used to analyze and interpret the findings of the present study. Specifically:

- Frequency and percentages were used to describe respondents' demographic, medical and psychological variables
- Frequency, means and standard deviations, minimum scores and maximum scores were used to analyze respondents' medication adherence level.
- Independent sample t-tests were employed to look in to mean differences in medication adherence based on gender, BP status, family history of hypertension, felt side effect, worry about cost of medication and perceived severity.

- Series of ANOVA tests were used to assess mean differences in medication adherence based on demographic, medical and psychological variables with more than two categories.
- Last but not least multiple-linear regressions were computed to look in to the independent and cumulative predictive powers of demographic, medical and psychological variables on the criterion variable (medication adherence).

All data were computed using SPSS (Statistical Package for Social Sciences) Version 23.

### **3.8. Ethical Consideration**

In this research permission was obtained from all respondent after the necessary explanations about the objective of the study were given to each of them. Respondents were treated with dignity and informed about the purpose of the questionnaire, and assured of anonymity and confidentiality of the information that they supplied. They also were informed verbally as well as in writing that any information obtained through the questionnaire will be purely used for academic purpose and will be handled with the highest order of confidentiality and do not affect their life in any way and anytime.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

This chapter will first present results of the present study. In doing so, it will describe the analysis and interpretation of the collected data from Menelik II referral hospital. As reported in chapter three, 380 questionnaires were distributed and all were collected. However, thirteen questionnaires were found to be incomplete thereby excluded from the final analysis. In other words 367 valid questionnaires were analyzed. Hence, the results reported here are based on the data from these 367 questionnaires. Besides, discussions of major findings will be presented in this chapter.

#### **4.1. Results of the Study**

In this sub-section results of the statistical computations and interpretations of the computations will be presented.

##### **4.1.1. Description of the Respondents' Demographic characteristics**

For the purpose of describing respondents characteristics, frequencies and percentages were computed. The summaries of the computations are presented on Table 1 below.

Table 1

*Demographic characteristics of the respondents (N=367)*

<b>R/N<sub>o</sub></b>	<b>Variable</b>	<b>Category</b>	<b>F</b>	<b>%</b>
1	Age	18-40 Years	63	17.2
		41-60 years	223	60.8
		>60 years	81	22.1
2	Gender	Male	172	46.9
		Female	195	53.1
3	Marital status	Married	245	66.8
		Single	70	19.1
		Widowed	29	7.9
		Divorced	23	6.3
4	Educational status	Can't Read and write	107	29.2
		Primary	73	19.9
		Secondary	80	21.8
		Diploma	63	17.2
		Degree	41	11.2
		MA and above	3	.8
5	Religion	Orthodox	247	67.3
		Muslim	70	19.1
		Protestant	26	7.1
		Catholic	24	6.5
6	Occupational status	Governmental-employed	84	22.9
		Non-governmental employed	38	10.4
		Self-employed/merchant	38	10.4
		Unemployed	104	28.3
		Housewife	73	19.9
		Retired	30	8.2

As can be seen from Table 1 above 60.8% of the respondents (223 in numbers) are aged between 41 and 60 years, 22.1% of them aged greater than 60 years and the remaining 17.2% of them are aged between 18 and 40 years. In terms of gender, 195 of the patients are females while the remaining 172 of them are males. Two hundred forty five of the respondents are married and seventy of them are single while twenty nine of them are widowed. The remaining twenty three of the respondents are divorced individuals.

Table 1 also depicted that 29.2% of the respondents can't read and write, 21.8% of them attended secondary school, 19.9% of them attended elementary school, 17.2% of them have diploma, 11.2% have degree and the remaining 0.8% of the respondents (3 in numbers) have got M.A. and above degree.

With regard to respondents' religions, majority of the respondents (67.3%) are Orthodox Christians and 19.1% of them are Muslims. The remaining 7.1% and 6.5% of the respondents are Protestants and Catholic Christians, respectively. Last but not least Table 1 above reveals that 104 of the respondents are unemployed, 84 of them are governmental employed, 73 of them are house wives and 30 of them are retired. The remaining 76 respondents (38 each) are either employed in non-governmental organizations or self-employed.

#### **4.1.2. Description of respondents' medical and psychological characteristics**

For the purpose of summarizing medical and psychological variables associated with respondents' hypertension descriptive statistics were computed. Specifically, frequencies and percentages were computed to describe the variables. Here bear in mind that aggregate scores for knowledge about hypertension and perceived severity of their illness were computed first and the variables are transformed in to categorical variables for the sake of ease in further

analysis. The descriptive statistical computations are summarized and presented I Table 2 below.

Table 2

*Description of Medical and Psychological Variables (N=367)*

<b>R/No</b>	<b>Variable</b>	<b>Category</b>	<b>F</b>	<b>%</b>
1	Duration since hypertension diagnosis	Less than 1year	54	14.7
		1-5 years	156	42.5
		6 -10 years	89	24.3
		greater than 10 years	68	18.5
2	BP status	Controlled	173	47.1
		Uncontrolled	194	52.9
3	Number of medication	One	154	42.0
		Two	196	53.4
		Three or more	17	4.6
4	Daily medication intake	Once daily	173	47.1
		BID	179	48.8
		TID and Above	15	4.1
5	Comorbid illness	None	252	68.7
		One	94	25.6
		More than one	21	5.7
6	Family history of Hypertension	Yes	54	14.7
		No	313	85.3
7	Knowledge about Hypertension	Poor	169	46.0
		Good	198	54.0
8	Felt side effects of medication	Yes	39	10.6
		No	328	89.4
9	Worry about cost of medication	Yes	241	65.7
		No	126	34.3
10	Perceived severity	Lower perceived severity	165	45.0
		Higher perceived severity	202	55.0

Table 2 above revealed that the duration of the hypertension since it is diagnosed for 156 of the respondents is between 1 and 5 years. The time since hypertension diagnosis is between 6 and 10 years for 89 of the respondents, less than 1 year for 56 of the respondents and it has been more than 10 years for the remaining 68 of the respondents. Table 2 also depicted that more than half of the respondents (52.9%) have uncontrolled blood pressure while the remaining 47.1% of the respondents have controlled BP status.

In terms of the number of medication respondents use the table showed that 196 and 154 of the respondents use two and one medication, respectively. The remaining 17 respondents use three or more than three medication for their hypertension. Likewise the table depict that 179 of the respondents use their medications twice daily (BID) and 173 of them use their medication once daily. The remaining respondents use their medication three times (TID) or more than three times daily.

Of all the respondents 68.7% of them do not have any other illness than their hypertension, 25.6% of them had one comorbid illness and the remaining 5.7% of them have two or more comorbid illnesses. Moreover, 85.3% of the respondents don't have family history of hypertension while the remaining 14.7% of them reported to have history of hypertension in their family.

With regard to respondents' knowledge of hypertension, Table 2 above indicated that 54% of the respondents (196 in numbers) have good knowledge of hypertension while 46% of them (169 in numbers) have poor knowledge of hypertension. In addition, 328 of the respondents did not feel the side effects of their medication while the remaining 39 of them felt the side effects of their medication.

Pertaining to respondents worry about the costs of their medication, 241 of them replied to the item “Yes” implying that they are worried about the cost of their medication. The remaining 126 of the respondents replied “No” to the item indicating that they are not worried about the costs of their medication. Regarding perceived severity of their illness, 55% of the respondents perceived higher severity of their illness and the remaining 45% of them perceived lower severity of their illness.

#### 4.1.3. Medication adherence levels of respondents

Assessing respondents’ medication adherence level is the first objective of the present study. As was reported in chapter three, Morisky Adherence Scale in the present study is used as both a scale and as an ordinal measure. Hence, mean, standard deviation minimum and maximum scores were computed based on the total sum score. Further, respondents were also categorized in to three groups based on their adherent level and frequencies and percentages were computed for each category. Respondents were also categorised in to two as recommended by the tool developer thereby frequencies and percentages are calculated. Summaries of all these computations are presented in Table 3 below:

Table 3

*Adherence scores and adherence levels of respondents (N=367)*

Variable		N	Mean	SD	Minimum	Maximum
Adherence score		367	6.37	1.575	1	8
	<b>Category</b>	<b>N</b>	<b>%</b>			
Adherence level	High adherence	106	28.9			
	Medium adherence	160	43.6			
	Low adherence	101	27.5			
	Adherent	266	72.5			
	Non-Adherent	101	27.5			

As can be seen from Table 3 above the mean adherence score of the respondents is 6.37 (SD= 1.575) where 1 and 8, respectively, are the minimum and maximum adherence scores. Table 3 also showed that 43.6% of them have medium adherence level, 28.9% of them have high adherence level and the remaining 27.5% of them have low adherence. Moreover, the table portrayed that 266 of the respondents are adherent to their medication and the remaining 27.5% of the respondents are non-adherent to their medication.

#### **4.1.4. Mean differences in medication adherence based on demographic, medical and psychological variables**

##### **4.1.4.1. Mean differences in medication adherence based on demographic variables**

“Are the statistically significant differences in medication adherence based on demographic variables?” is one of the research questions of the present study. In order to render answers for this question, series of statistics are computed. First of all series of One-way ANOVAs were computed to examine differences in medication adherence based on demographic variables (age, marital status, educational status, religion and occupational status). Besides, an independent sample t-test was computed in order to assess significant differences in medication adherence based on gender. Summaries of the computations are presented in Table 4 below.

Table 4

*Mean differences in Adherence based on demographic variables (N=367)*

<b>Variables</b>	<b>Category</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>F/t - value</b>	<b>p- value</b>
Age	18-40 Years	63	6.29	1.396	1.396	.249
	41-60 years	223	6.48	1.649		
	Greater than 60 years	81	6.15	1.484		
Gender	Female	195	6.35	1.507	-.216	.829
	Male	172	6.39	1.652		
Marital Status	Married	245	6.38	1.664	.131	.942
	Single	70	6.39	1.311		
	Widowed	29	6.41	1.500		
	Divorced	23	6.17	1.497		
Educational Status	Can't Read and write	107	6.25	1.649	1.853	.102
	Primary	73	6.29	1.307		
	Secondary	80	6.75	1.428		
	Diploma	63	6.29	1.835		
	Degree	41	6.34	1.591		
	MA and above	3	4.67	1.155		
Religion	Orthodox	247	6.55	1.483	3.384	.018
	Muslim	70	6.01	1.798		
	Protestant	26	5.92	1.671		
	Catholic	24	6.04	1.459		
Occupation	Governmental- employed	84	6.25	1.413	.259	.935
	Non-governmental employed	38	6.34	1.300		
	self- employed/merchant	38	6.34	1.665		
	Unemployed	104	6.42	1.688		
	Housewife	73	6.51	1.582		
	Retired	30	6.27	1.856		

Table 4 above portrayed that there is no statistically significant difference in medication adherence based on age ( $F= 1.396$ ,  $p= 0.249$ ), gender ( $t= -0.216$ ,  $p=0.829$ ), marital status ( $F= 0.131$ ,  $p= 0.942$ ), educational status ( $F= 1.853$ ,  $p= 0.102$ ), and occupational status ( $F= .259$ ,  $p= 0.935$ ).

Table 4 above revealed that there are statistically significant differences in medication adherence based on religion ( $F = 3.384$ ,  $p< 0.05$ ). However, the Levene's test of homogeneity of variance (.985) is not statistically significant ( $p=0.400$ ) which implied that there is no equal/proportional variations in the four categories considered.

#### **4.1.4.2. Mean differences in medication adherence based on medical and psychological variables**

For the purpose of examining mean differences in medication adherence based on medical and psychological variables, series of independent sample t-tests and One-way ANOVA tests were computed. The independent sample t-tests were computed to look in to mean differences in medication adherence based on BP status, family history of hypertension, knowledge about hypertension, felt side effects of medication and worry about the cost of medication.

On the other hand the One-way ANOVA tests were computed to assess mean differences in medication adherence based on duration since hypertension diagnosis, number of drugs, daily medication intake and comorbid illnesses. Summaries of the computations are presented in Table 5 below.

Table 5

*Mean differences in medication adherence based on medical and psychological variables*

(N=367)

<b>Demographic Variables</b>	<b>Category</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>t/F-value</b>	<b>p-value</b>
Duration since hypertension diagnosis	Less than 1 year	54	6.50	1.563	1.323	.267
	1-5 years	156	6.19	1.741		
	6 -10 years	89	6.56	1.414		
	greater than 10 years	68	6.44	1.354		
BP status	Controlled	173	6.55	1.582	2.128	.034
	Uncontrolled	194	6.21	1.553		
Number of medication	One	154	6.27	1.669	.583	.559
	Two	196	6.44	1.503		
	Three or more	17	6.47	1.546		
Daily medication intake	Once daily	173	6.49	1.557	1.109	.331
	BID	179	6.29	1.559		
	TID and Above	15	6.00	1.927		
Comorbid illness	None	252	6.45	1.610	1.664	.191
	One	94	6.12	1.494		
	More than one	21	6.52	1.436		
Family history of Hypertension	Yes	54	6.33	1.427	-.188	.851
	No	313	6.38	1.601		
Knowledge about Hypertension	Poor	169	6.38	1.496	.091	.927
	Good	198	6.36	1.643		

Felt side effects of medication	Yes	39	6.62	1.532	1.027	.305
	No	328	6.34	1.579		
Worry about cost of medication	Yes	241	6.48	1.552	1.870	.062
	No	126	6.16	1.602		
Perceived severity	Lower perceived severity	165	6.38	1.544	.123	.902
	Higher perceived severity	202	6.36	1.603		

As can be seen from the table above there is no statistical difference in medication adherence based on Duration of hypertension diagnosis ( $F= 1.323$ ,  $p= 0.267$ ), number of medication ( $F= .583$ ,  $p= 0.559$ ), daily medication intake ( $F= 1.109$ ,  $p= 0.331$ ), comorbid illness ( $F= 1.664$ ,  $p= 0.191$ ) and Family history of Hypertension ( $t= -0.188$ ,  $p=.851$ ).

Table 5 above also indicate that there is no statistical difference in medication adherence based on knowledge about hypertension ( $t= 0.091$ ,  $p=0.927$ ), felt side effects of medication ( $t= 1.027$ ,  $p=0.305$ ), worry about cost of medication ( $t= 1.870$ ,  $p=0.062$ ) and perceived severity ( $t= 0.123$ ,  $p=0.902$ ).

On the other hand Table 5 depicted that there are statistically significant difference in medication adherence based on BP status ( $t= 2.128$ ,  $p< 0.05$ ). Specifically it is revealed that respondents which controlled BP status were found to have higher adherence ( $M= 6.55$ ,  $SD= 1.582$ ) than respondents with uncontrolled BP status ( $M= 6.21$ ,  $SD= 1.553$ ).

#### 4.1.5. Predicting respondents' medication adherence

The last objective of the present study is related with examining the independent and cumulative predictive abilities of the demographic, medical and psychological variables over patients' adherence level. In order to achieve this objective series of 4 regression tests were computed. The first three models examine the independent predictive abilities of the demographic, medical and psychological variables over patients' adherence level. Summaries of the computations are presented in Table 6 below. The fourth model examined the cumulative effects of the demographic, medical and psychological variables over patients' adherence level. Summaries of the computations are presented in Table 7 below.

Table 6

*The independent prediction ability of demographic, medical and psychological variables over medication adherence (N=367)*

	<b>b</b>	<b>SEb</b>	<b><math>\beta</math></b>	<b>t</b>	<b>p</b>	<b>R<sup>2</sup></b>	<b>R<sup>2</sup><math>\Delta</math></b>	<b>F value</b>	<b>p</b>
<b>Model 1</b>						<b>.034</b>	<b>.017</b>	<b>2.082</b>	<b>.055</b>
Age	-.006	.008	-.041	-.772	.441				
Gender	-.035	.173	-.011	-.201	.840				
Marital status	-.068	.178	-.021	-.386	.700				
Religion	.558	.177	.166	3.153	.002				
Education	-.160	.190	-.046	-.841	.401				
Occupation	-.157	.213	-.042	-.738	.461				
<b>Model 2</b>						<b>.014</b>	<b>.003</b>	<b>1.276</b>	<b>.279</b>
Knowledge	.009	.165	.003	.057	.955				
Felt medication side effect	.337	.269	.066	1.252	.211				
Perceived severity	.054	.166	.017	.323	.747				
Worry about medication cost	.348	.174	.105	2.000	.046				
<b>Model 3</b>						<b>.026</b>	<b>.009</b>	<b>1.579</b>	<b>.152</b>

Treatment duration	.196	.233	.044	.842	.400				
Number of drug	-.206	.170	-.065	-1.212	.226				
Drug dosage	.184	.168	.059	1.096	.274				
BP status	.350	.167	.111	2.094	.037				
Comorbid	.189	.183	.056	1.030	.304				
Family history	.063	.243	.014	.260	.795				

In the first model of the regression analysis, the independent predictive power of demographic variables on medication adherence was tested. Then, it was found that the predictive abilities of the variables are small and statistically insignificant ( $F(6, 360) = 2.082$ ,  $p = 0.055$ ,  $R^2 = .034$ ).

In the second model the predictive abilities of the medical variables on respondents' medication adherence was tested. It was, then, found that the predictive abilities of the variables are small and statistically insignificant ( $F(6, 360) = 1.276$ ,  $p = 0.279$ ,  $R^2 = .014$ ).

The third model tested the independent predictive abilities of psychological variables on respondents' medication adherence. Similar to the two models, it was found that the predictive abilities of the variables are small and statistically insignificant ( $F(4, 362) = 1.579$ ,  $p = 0.152$ ,  $R^2 = .026$ ).

Table 7

*The cumulative prediction ability of demographic, medical and psychological variables over medication adherence (N=367)*

	<b>b</b>	<b>SEb</b>	<b><math>\beta</math></b>	<b>t</b>	<b>p</b>	<b>R<sup>2</sup></b>	<b>R<sup>2</sup><math>\Delta</math></b>	<b>F value</b>	<b>p</b>
<b>Model 4</b>						.077	.035	1.825	.027
Age	-.004	.008	-.030	-.560	.576				
Gender	-.004	.174	-.001	-.025	.980				
Marital status	-.113	.177	-.034	-.639	.523				
Religion	.636	.182	.190	3.498	.001				
Education	-.121	.191	-.035	-.634	.526				
Occupation	-.151	.217	-.040	-.696	.487				
Knowledge	.016	.164	.005	.095	.924				
Felt medication side effect	.342	.270	.067	1.268	.206				
Perceived severity	-.018	.167	-.006	-.110	.913				
Worry about medication cost	.408	.177	.123	2.305	.022				
Treatment duration	.176	.231	.040	.762	.446				
Number of drug	-.216	.170	-.068	-1.270	.205				
Drug dosage	.242	.170	.077	1.423	.156				
BP status	.361	.169	.115	2.142	.033				
Comorbid	.106	.185	.031	.575	.566				
Family history	.042	.251	.009	.166	.868				

Table 7 above presents the cumulative predictive abilities of the demographic, medical and psychological variables over respondents' medication adherence. Then, it was found that small but significant variations in medication adherence are explained by the demographic, medical and psychological variables ( $F(16, 350) = 1.825, p < 0.05, R^2 = .077$ ). However the t-test results depict that religion ( $t = 3.498, P < 0.01$ ), worry about medication costs ( $t = 2.305,$

$P < 0.05$ ) and BP status ( $t = 2.142$ ,  $P < 0.05$ ) have statistically significant contribution over medication adherence. These implied that patients with (a) Orthodox religion; (b) who worry about their medication cost; and (c) controlled BP status have higher medication adherence than their counterparts.

## **4.2. Discussion**

In the present study it was found that 72.5% of the respondents are adherent to their prescribed medication leaving 27.5% of the respondents as having poor adherence. The medication adherence rate in the present study is higher than the reports from other studies. Specifically, the adherence level in the present study is higher than the reports from the studies at University of Gondar (Ambaw et al., 2012), at Jimma university hospital (Asgedom et al., 2018) and in northwest Ethiopia (Mekonnen et al., 2017) which reported 64.6%, 61.8% and 67.2% adherence rate, respectively.

Similarly a recent study at University of Gondar reported an adherence rate of 62.7% (Gebreyohannes et al., 2019) which is lesser than the findings of the present study. Another study conducted in four hospitals in Addis Ababa (Tibebu et al., 2017) reported slightly lower rate (66.8%) of medication adherence than the present study. Still a lower medication adherence rate is reported from the study at Adama hospital (Hareri et al., 2014) that reported 59.5% adherence rate. Besides these national study reports, a study among 12 countries in sub-Saharan Africa reported a medication adherence rate of 69.2% (Terline et al., 2019).

On the other hand there are other studies that reported higher medication adherence rate than the rate found in the present study. For example, in a study at Ayder Comprehensive Hospital in Mekelle 74.1% of the respondents were found to be adherent (Gebremicheal, et al., 2019).

Another study at Debretabor Hospital reported a medication adherence rate of 77.3% among its respondents (Teshome et al., 2018).

The variability over the rate of medication adherence in the present study and other studies could be attributed to the nature of the hospital used to recruit respondents. Respondents of the present study are from a referral hospital with patients from different corners of the country. Hence it is expected that the respondents are referred patients who may have experienced the side effects of medication non-adherence.

Measurement issues could also be considered as reasons for the variations. In the present study MMSA-8 is used to measure medication adherence. MMSA-4 is used in the study by Ambaw (2012), the study at Adama (Hareri et al., 2014) used researcher developed 9 items and mean of the distribution was used as cut-off point to level patients as adherent or non-adherent. The study by Gebreyohanes and colleagues (2019) deducted the numbers of missed doses from the intended doses and calculate adherence out of 100% to categorize patients as adherent or non-adherent.

One factor that has been studied in conjunction to the process of adherence/non-adherence to the medication adherence is BP status. In the present investigation, controlled BP is observed in 47.1% of the participants. And respondents with controlled BP status have higher medication adherence level than respondents with uncontrolled BP status. Similar finding is reported from the study at University of Gondar (Ambaw et al., 2012) where it was found that patients with controlled BP have higher chance of adherence to their medication. The study in North West Ethiopia (Mekonnen et al., 2017) found that BP status is not a significant predictor of medication adherence. The differences in findings might partially be explained by differences in statistical method employed.

In the present study patients' demographic variables were found to have no significant contribution in their medication adherence level. However, studies conducted in other places in Ethiopia have reported the effects of some demographic variables over medication adherence. For instance in the study at University of Gondar Hospital gender, knowledge about HTN and its treatment, distance from the hospital and comorbidity were found to be associated with medication adherence (Ambaw et al., 2012). Likewise, in the study at Jimma University Hospital it was revealed that comorbidity, daily alcohol intake, purchasing medications with own expense and patients with two and more than two antihypertensive medications were associated with medication adherence (Asgedom et al., 2018). Gender, comorbidity, knowledge about HTN and income were also found to influence patients' medication adherence level in a study among patients in four hospitals at Addis Ababa (Tibebu et al., 2017). Use of traditional medicine and individual wealth index were found to be independent predictors of medication adherence in the study among 12 countries in sub-Saharan Africa (Terline et al., 2019).

In the present study the independent and cumulative effects of demographic, medical and psychological variables were examined. Each domain of variables independently don't predict medication adherence. On the other hand the three domains of variables cumulatively were found to be significant predictor of medication adherence. Specifically, patients with Orthodox religion, who worry about their medication cost and controlled BP status were more likely to have higher medication adherence than their counterparts. These implied that the three domains of variables are important in patients' medication adherence.

Relatively similar results were reported from a study in Ghana (Kretchy et al., 2020). The study in Ghana includes 358 male out-patients with hypertension from a tertiary hospital. Medical, clinical and demographic variables were measured in the study. Moreover, Psycho-

behavioural measures of sexual dysfunction, psychological distress, and sleep problems were included as independent variables of the study. The study examined the cumulative effects of the variables which then found that age, marital status, educational level, income, duration of diagnosis, number of medications taken and sexual dysfunction were important predictors of medication adherence (Kretchy et al., 2020).

Differences over the independent and cumulative effects of demographic, medical and psychological variables over medication adherence among the studies could be attributed to methodological rigor. As depicted above there are differences in the tools used to measure medication adherence and the cut points employed to categorize patients as adherent or non-adherent among the studies. Differences in the variables included in each study are also observable. For example, the study at Adama Hospital (Hareri et al., 2014) and the study in the 12 sub-Saharan African countries (Terline et al., 2019) included demographic, medical and clinical variables. The present study and the study in Ghana (Kretchy et al., 2020) added psychological variables as predictors of patients' medication adherence. Moreover, the regression analysis employed in some studies is logistic while it is linear in the present study. For instance, the study at University of Gondar Hospital (Ambaw et al., 2012) and the study at Adama hospital (Hareri et al., 2014) employed logistic regression.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1. Summary

The present study aimed at investigating the effects of demographic, medical and psychological factors over hypertension patients' medication adherence. A hospital-based, cross-sectional study was conducted among 367 hypertensive patients who were receiving treatment and on follow-up at Menelik II Referral Hospital. Data was collected using questionnaire assessing patients' demographic, medical, psychological characteristics as well as their adherence. Adherence to medication was assessed by the Morisky's Medication Adherence Scale (MMAS-8). Descriptive and inferential statistics were used to analyse the data collected and the following major findings were found:

- Around two third of the respondents in the present study are adherent to their medication.
- Respondents with controlled BP status have higher medication adherence level than respondents with uncontrolled BP status.
- Respondents' demographic, medical and psychological variables are not independent predictors of respondents' medication adherence.
- Respondents' demographic, medical and psychological variables cumulatively have small but statistically significant predictive ability over their medication adherence.
- Religion, worry about medication cost and BP status are significant predictors of respondents medication adherence.

## 5.2. Conclusions

The number of hypertensive patients who adhere to their medication in the present study is slightly higher than the proportion of adherent patients in other studies. In the present study it is, however, concluded that significant number of hypertension patients at Menelik II referral hospital have poor/low medication adherence although the percentage of non-adherent patients is lower than those reported in other studies. This so because it is non-adherence, even small in number, that would lead to complications.

There was statistically significant difference in medication adherence based on BP status. And BP status is found to be significant predictor of patients' medication adherence in the regression analysis. Therefore, it is concluded that controlled BP status is an important factors in hypertension patients' medication adherence.

Patients' demographic, medical and psychological characteristics cumulatively plays small but significant role in their medication adherence. The fact that: (a) religion is from the demographic variables; (b) BP status is from the medical variables; and (c) worry about medication cost is from the psychological variables implied that all domains of variables are equally important in the patients medication adherence.

### 5.3. Recommendations

Based on the conclusions made from the findings and the literatures reviewed, the following short and long term recommendations are given:

- Patients need advice, support and information from health professionals in order to be able to understand the importance of using drugs as prescribed. It is recommended that hypertensive patients should be counselled every time whenever they visit physicians to improve their adherence to anti-hypertensive drugs.
- Health care providers and/or everyone who is concerned about hypertensive patients need to consider demographic, medical and psychological variables in their care giving services. In other words there is a need to provide bio-psychosocial interventions to help hypertensive patients adhere to their treatment regimens.
- Ministry of Health should plan strategies to improve antihypertensive medication adherence such as improving education campaign on the importance of adherence to antihypertensive medications, by the media, posters, and health education on the management of hypertension.
- The Ministry of Health should provide training to health providers on how to counsel patients in a constructive and non-judgmental manner with the primary goal of helping the patients to better adhere with the treatment regimen.
- The present study is delimited to a single hospital. Researchers need to conduct similar researches at a broader scope than is in the present study. Furthermore, researchers need to focus on the development or adaptation of tools that could be used

in Ethiopian context. This in turn could call up on conducting qualitative studies to precisely figure out important factors among hypertensive patients in Ethiopia.

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# **Appendix 1: Questionnaire English Version**

**Addis Ababa University**

**College of Education and Behavioral Studies**

**School of Psychology**

**Dear Sir/Madam**

My name is Elias G/Egziabher. I am a student in school of psychology, health psychology track at Addis Ababa University. I am undertaking a research entitled “Medical and Psychological Factors Contributing to Poor Medication Adherence among Hypertensive Patients at Menelik II Referral Hospital” for the partial fulfilment of the requirements for Masters of Arts Degree in health psychology. The primary aim of this study is to assess the medical and psychological factors contributing to poor medication adherence and associated factors to antihypertensive therapy among patients on follow up at Menelik II Referral Hospital, This study is only used for educational purpose and all respondents are expected to give genuine answer to the best of their knowledge. You are not supposed to tell your name anytime in the conversation. This means that your name will not be known to the researcher or revealed in the publication of the results. Your participation in this study is purely voluntary and you are free to grant or refuse your consent to participate. I promise to treat all information you provide as strictly confidential and will not disclose individualized information to anyone. Your cooperation and assistance is highly valued.

Thanks for your participation....!!!!

## Part I. Socio-demographic Characteristics

1. Age in years \_\_\_\_\_

2. Gender  Male  Female

3. Marital status

Married  Single  Widowed  Divorced

4. Religion

Orthodox  Muslim  Protestant  Catholic  Other (specify) \_\_\_\_\_

5. Educational status

Cannot read and write  Primary school completed  Secondary school completed  Diploma  First degree  Masters and above

6. Occupation

Governmental-employed  Non-Governmental-employed  
 Self-employed/merchant  Unemployed  Student  Housewife  Retired  
 Others please specify it \_\_\_\_\_

7. Monthly Income (ETB)

Very low (<600ETB)  Low(601-1650ETB)  Average(1651-3200ETB)  
 Above average (3201-5250ETB)  High (5251-7800 ETB)  
 Higher (7801-10,900ETB)  Much higher >10,900ETB

## Part II: Morisky Medication Adherence Scale

No	Items	Yes	No
1	Do you sometimes forget to take your medication?		
2	People sometimes miss taking their medications for reasons other than for getting. Over the past 2 weeks, were there any days when you did not take your medication?		
3	Have you ever cut back or stopped taking your medication without telling your doctor because you felt worse when you took it?		
4	When you travel or leave home, do you sometimes forget to bring your medication?		
5	Did you take all your medication yesterday?		
6	When you feel like your symptoms are under control, do you sometimes stop taking your medication?		
7	Taking medication every day is a convenience for people some. Do you feel about ever hassled sticking to your treatment plan?		
8	How often do you have difficulty remembering all your medication to take? Never/Rarely..... Once in a while..... Sometimes..... Usually..... <b>always</b> .....		

## Part III: Medical and Psychological Variables

- For how long time have you taken your anti-hypertensive medications?  
 < 1 year     1-5 years     6-10 years     ≥ 11 years
- What is your blood pressure status?  Controlled     Uncontrolled
- How many medications do you use for your hypertension?  
 one     two  
 three or more
- What is the daily frequency of administration of your anti-hypertensive medications?  
 1-times     2-times     3 or more times
- Do you have any major co morbidities other than hypertension [cancer, diabetes mellitus, cardiovascular disease (angina, heart failure & renal failures), central nervous problems (epilepsy, Parkinson's disease etc.), alcohol abuse, rheumatoid arthritis etc?]

Yes     No

6. Are/were there someone in your family with hypertension?  Yes  No

7. How do you get the medications?

Free of charge     Self-buy     Employer organization

8. Did you worry about your medication costs?  Yes     No

9. Have you ever felt the side effects of your medications?  Yes     No

10. To what extend do you agree or disagree with the following statements

No	items	Strongly agree	Agree	undecided	Disagree	Strongly disagree
1	My blood pressure condition is serious					
2	I am worried about my blood pressure condition					
3	Getting hypertension would be so serious					
4	Getting hypertension complication would be so dangerous					
5	Being permanently disabled due to hypertension would be so dangerous					
6	Dying due to hypertension complications would be so dangerous					

**11. Here under are questions related with hypertension. Reply Yes if you know it and reply No if you don't**

No	Items	Yes	No
1	Is high blood pressure a lifelong disease?		
2	Most times, do people with high blood pressure feel anything different?		
3	Is the pressure high when it is $\geq 14/9$ ?		
4	Can high blood pressure cause heart, brain and kidney problems?		
5	Is the treatment for high blood pressure a lifelong one?		

6	Can high blood pressure be treated without the use of medication?		
7	Do regular physical exercises help control high blood pressure?		
8	Does losing weight help control high blood pressure in obese people?		
9	Does reducing salt intake help control high blood pressure?		
10	Does reducing stress help control high blood pressure?		

## Appendix 2: Questionnaire Amharic Version

### አዲስ አበባ ዩኒቨርሲቲ

#### የትምህርት እና የስነ-ባህሪ ጥናት ኮሌጅ

#### የስነ-ልቦና ትምህርት ቤት (የተመራ-ቂጥናት)

##### የመረጃ ደብዳቤ

##### ውድ ክቡር/ክብርት

ስሜ ኤልያስ ገ/አግዜር ይባላል። በአዲስ አበባ ዩኒቨርሲቲ በስነ-ልቦና፣ ጤና እና የስነ-ልቦና ትራክት ትምህርት ቤት “በዳግማዊ ሚኒልክ ሪፈራል ሆስፒታል የደም ግፊት ታካሚዎች መድሐኒት በአግባቡ እንዳይወስዱ ምክንያት የሚሆኑት የሕክምና እና የስነ-ልቦና አለባውያን” በሚል ርዕስ ስር ጥናት እያከናወንኩ ሲሆን ይህም በስነ-ልቦና ጤና ትምህርት የማስተርስ ኦፍ አርት ላለኝ ከፊል የመመረቂያ መስፈርት ማሟላት እንድችል ዘንድ ነው። የዚህ ጥናት ቀዳሚ ዓላማ በዳግማዊ ሚኒልክ ሆስፒታል በደም ግፊት የሕክምና ክትትል ውስጥ ካሉት ታካሚዎች የፀረ-ደም ግፊት መድሐኒት በአግባቡ እንዳይወስዱ የሚያደርጋቸው የሕክምና እና የስነ-ልቦና አለባውያን/ምክንያቶች ለመለየት ነው። ይህንን ጥናት ለትምህርት ዓላማ ብቻ የሚውል ሲሆን በቃለ መጠይቁ ወቅት በማናቸውም ጊዜ ስምዎን መናገር አያስፈልግዎትም። ይህ ማለት ስምዎ ለአጥኚው ሆነ ውጤቱ ይፋ ለሚደረግ ማህበረሰብ አይገለጽም ማለት ነው። በዚህ ጥናት የሚደረግ የእርስዎ ተሳትፎ በራስ መላኩ ፈቃደኝነት ብቻ የሚደረግ ሲሆን በጥናቱ ለመሳተፍ አለመፍቀድ ወይም ውድቅ ማድረግ ይችላሉ። በጥናቱ ምክንያት የሚሰጡን መረጃ እጅግ ሚስጥራዊ በሆነ መልኩ የሚጠበቅ ሲሆን የግል መረጃዎች ለማንኛውም ሰው አይገለጹም። በዚህ ጉዳይ በእርስዎ በኩል የሚደረግ ትብብር እና ድጋፍ ከፍተኛ ዋጋ ይኖረዋል።

ስለተሳተፉ እና መሰግናለን.....!!!!!!!

**ክፍል 1: የግል መለያ እና ታሪክ**

1. እድሜዎ ስንት ነው? \_\_\_\_\_
2. ጾታ  ወንድ  ሴት
3. የጋብቻ ሁኔታ  
 ያላገባ  ያገባ  ፈት  የሞተበት
4. ሐይማኖት  
 ኦርቶዶክስ  ፕሮቴስታንት  ካቶሊክ  
 ሙስሊም  ሌላ (ይለዩ) \_\_\_\_\_
5. የትምህርት ደረጃ  
 መጻፍ እና ማንበብ የማይችል  1ኛ ደረጃ ት/ቤት ያጠናቀቀ  
 2ኛ ደረጃ ት/ቤት ያጠናቀቀ  የመሰናዶ ት/ቤት ያጠናቀቀ  
 ዲፕሎማ  የመጀመሪያ ዲግሪ  2ኛ ዲግሪ እና ከዛ በላይ
6. ስራ  
 የመንግስት ሰራተኛ  መንግስታዊ ያልሆነ ድረጅት ሰራተኛ  
 የግል ሰራተኛ/ነጋዴ  ስራ እጥ  ተማሪ  የቤት እመቤት  
 ጡረተኛ  ሌላ (ይለዩ) \_\_\_\_\_
7. የወር ገቢ (ኢትብ)  
 በጣም ዝቅተኛ (600 ብር ያነሰ)  ዝቅተኛ (601-1650 ብር)  
 አማካይ (1651-3200 ብር)  ከ3201-5250 ብር በላይ  
 ከፍተኛ (5271-7800 ብር)  በጣም ከፍተኛ (7801-10,900 ብር)  በጣም ከፍተኛ 10,900 ብር በላይ

**ክፍል 2: የጥርስከም መድሐኒት አጠቃቀም ስኬል - 8 (ኤምጌምጌኤስ-8)**

ተ.ቁ	ጥያቄዎች	አዎ	አይደለም
1	አንዳንድ መድሐኒትዎን መውሰድ ይረሳሉን		
2	ሰዎች አንዳንድ መድሐኒት ከመርሰት ባለፈ የማይወስዱበት ምክንያት አለ። ስለሆነም እርስዎ ባለፉት ሁለት ሳምንታት መድሐኒትዎን ያልወሰዱበት ጊዜያት ነበርን		
3	መድሐኒቱን ከወሰደ በኋላ ከመሻል ይልቅ እንደተባባሰብዎት ስለተሰማዎት ብቻ ለዶክተር ሳይናገሩ መድሐኒት መውሰድ ያቋረጡበት ጊዜ ነበርን		
4	ከቤት ሲወጡ ወይም ለገዢ ሲሄዱ አንዳንድ መድሐኒትዎን የሚረሱበት ጊዜ አለን		
5	ትናንት ሁሉንም መድሐኒት ወስደዋልን		
6	ሕመምዎ እንደተሸልዎት ወይም እንደተቆጣጠሩት ሲገባዎት አንዳንድ መድሐኒትዎን መውሰድ ያቆማሉን		
7	በየአለቱ መድሐኒት መውሰድ ለአንዳንድ ሰው አይመችም ስለዚህ መድሐኒት ሁሌ መውሰድ ስልችት ብልዎት ያውቃልን		
8	<p>መድሐኒት የመርሳት ሁኔታዎ የተደጋገመ ነውን</p> <p>በፍጹም/አልፎ አልፎ -----</p> <p>በአጋጣሚ አንዴ -----</p> <p>አንዳንድ -----</p> <p>በብዛት -----</p> <p>በሁሉም ወቅት -----</p>		

### ክፍል 3: ሕክምና እና የስነ-ልቦና አለባውያን

1. የፀረ-ደም ግፊት መድሐኒት ለምን ያህል ጊዜ ወስደዋል  
 ከአንድ አመት በታች                                     1-5 አመት  
 6-10 አመት     11 አመት እና ከዛ በላይ
2. የአርስዎ የደም ግፊት ሁኔታ ምን ደረጃ ላይ ነው?  
 የተቆጣጠሩት                                     ያልተቆጣጠሩት
3. ለደም ግፊትዎ ምን ያህል መድሐኒት ይጠቀማሉ?  
 አንድ     ሁለት     ሶስት ወይም ከዛ በላይ
4. የፀረ ደም ግፊት መድሐኒቶች በቀን ምን ያህል ይወስዳሉ?  
 1 ጊዜ                                     2 ጊዜ                                     3 ጊዜ                                     4 ጊዜ
5. ከደም ግፊት ሕመም ውጪ ሌሎች ከባድ ሕመሞች አልዎትን (ካንሰር፣ ስኳር ሕመም፣ የልብ ሕመም፣ የኩላሊት ሕመም፣ የመካከለኛ ነርቭ ስርዓት ችግር/የአንጎል ሕመም) የሚጥል ሕመም፣ የአልኮል ሰብኝነት ወዘተ...  
 አዎ                                     አይደለም
6. ከቤተሰብዎ መካከል ደም ግፊት ሕመም ያላቸው/የነበረባቸው አሉ?  አዎ                                     የሉም
7. መድሐኒቱን እንዴት ነው የሚያገኙት?  
 ያለክፍያ                                     ራሴ ገዘቼ                                     መስሪያ ቤቱ ይከፍላል
8. የመድሐኒቱ የጎንዮሽ ተፅዕኖ ተሰምቶዎት ያውቃል?  አዎ                                     አይ
9. ስለመድሐኒቱ ክፍያ ይጨነቃሉ?  አዎ                                     አይ

10. ለሚከተሉት ሃሳቦች በምን ያህል ሁኔታ ይስማማሉ ወይስ አይስማሙም

ተ. ቁ	ሃሳቦች	በጥብቅ እስማማለሁ	እስማማለሁ	ለመወሰን ያስቸግረኛል	አልስማማም	በጥብቅ አልስማማም
1	የእኔ የደም ግፊት ሁኔታ አሳሳቢ ነው					
2	ስለ ደም ግፊት ሁኔታዬ አስጨንቆኛል					
3	ደም ግፊት ሕመም መኖር አሳሳቢ ነው					
4	ከደም ግፊት ሕመም ሊከሰቱ የሚችሉ ውስብስብ የጤና ችግሮች አደገኞች ናቸው					
5	በደም ግፊት ሕመም ምክንያት በቋሚነት ሙሉ ለሙሉ አካል ጎደሎ መሆን አደገኛ ነው					
6	በደም ግፊት ውስብስብ ችግሮች ምክንያት መሞት አደገኛ ነው					

11. ቀጥሎ ከደም ግፊት ጋር ተያያዥነት ያላቸው ጥያቄዎች ቀርበዋል። የሚያውቁትን አዎ የሚያቁትን አይ በማለት ምላሽ ይስጡ።

ተ. ቁ	ጥያቄዎች	አዎ	አይ
1	ደም ግፊት የእድሜ ልክ በሽታ ነው?		
2	በአብዛኛው ጊዜ ደም ግፊት ያለባቸው ሰዎች የተለየ ስሜት ይሰማቸዋል?		
3	የግፊት መጠናችን 14/9 ወይም ከዚያ በላይ ሲሆን ከፍተኛ ነው የሚባለው?		
4	የደም ግፊት የልብ፣ የአንጎልና የኩላሊት ችግሮችን ሊፈጥር ይችላል?		
5	የደም ግፊትን ለማከም የሚደረገው ህክምና እድሜ ልክ የመሰጠት ነው?		
6	ደም ግፊት ያለመድሃኒት ሊታከም ይችላል?		
7	ዘወትር አካላዊ እንቅስቃሴ ማድረግ የደም ግፊትን ለመቆጣጠር ይጠቅማል?		
8	ከፍተኛ የሰውነት ውፍረት ባላቸው ሰዎች ላይ ውፍረት መቀነስ ደም ግፊትን ለመቀነስ ያግዛል?		
9	የምንወስደውን የጨው መጠን መቀነስ ደም ግፊትን ለመቆጣጠር ያግዛል?		
10	ውጥረትን መቀነስ የደም ግፊትን ለመቆጣጠር ያግዛል?		