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Evaluation of Hypertension Treatment Approaches and Factors Contributing to Adverse Outcomes at Yekatit 12 Hospital Medical College in 2022.

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Abstract

Background: *Hypertension poses a significant global health challenge and is a major risk factor for cardiovascular complications, leading to morbidity and mortality due to damage to vital organs, including the heart, brain, kidneys, and eyes. Non-adherence to long-term medication and lifestyle modifications for chronic conditions such as hypertension, dyslipidemia, and diabetes is a widespread issue. This lack of adherence not only diminishes potential health benefits but also results in severe economic consequences, including wasted resources, increased healthcare costs, and unresolved health conditions.*

Objective:*The study aimed to evaluate hypertension management practices and identify factors contributing to poor treatment outcomes among hypertensive patients. Yekatit 12 Hospital Medical College. 2022:*

Methods: *A cross-sectional study was conducted within an institutional setting from October 1 to 30, 2022. A systematic convenience random sampling method was employed to select 150 participants. Data was collected using a semi-structured interview questionnaire, incorporating the 8-item Morisky medication adherence scale, along with a review of patient medication charts. The collected data were then entered and analyzed using SPSS version 21.1.*

Results: *The study revealed that the average number of prescribed drugs per patient was 2.85, while the mean number of antihypertensive medications per patient was 2.34. The most commonly prescribed drugs included hydrochlorothiazide (91.3% of patients), enalapril (83.3%), atenolol (13.3%), and amlodipine (36.7%). Only 5.3% of participants were on monotherapy, whereas 74% were prescribed two to three antihypertensive medications. Among the 150 patients studied, 16.7% demonstrated full adherence to their treatment, 37.3% showed medium adherence, and the remaining were classified as low adherent. Additionally, 58.7% of patients had controlled blood pressure. The main reasons for non-adherence included forgetfulness (43.3%), a busy schedule (30.0%), and the unaffordability of medications (27.3%).*

Conclusion: *Medication adherence, lifestyle modifications, and blood pressure control rates were generally low among the study participants. The leading causes of non-adherence were forgetfulness and a busy schedule. Additionally, most participants had insufficient knowledge about hypertension and its management. Various factors, including co-morbidities, distance from healthcare facilities, education level, income, occupation, duration of treatment, adherence level, and awareness of hypertension and its treatment, were significantly associated with hypertension treatment outcomes.*

Abbreviations and Acronyms

ACEIs Angiotensin Converting Enzyme Inhibitors
AHT Antihypertensive Treatment
AKUH Aga Khan University Hospital
AMI Acute Myocardial Infarction
ARBs Angiotensin Receptor Blockers
BLH Black Lion Hospital
BBs Beta Blockers
BP Blood Pressure
CCB Calcium Chanel Blocker
CI Confidence Interval
CMG Continuous Multiple-Interval Measure of Medication Gaps
CV Cardiovascular
G.P.H. A Ghana Ports and Harbors Authority Hospital
GUH Gondar University Hospital
HBP High Blood Pressure
HF Heart Failure
HTN Hypertension
LHU Local Health Unit
M Mean
MMAS-8 Morisky 8-item Medication Adherence Scale
mmHg Millimeter Mercury
OPD Outpatient Department
OR Odds Ratio
RF Renal Failure
SD Standard Deviation
U. S United States
UMTH University of Maiduguri Teaching Hospital
VA Veterans Affairs
WHO World Health Organization

Keywords: Hypertension, Adherence, Treatment Outcome, Associated Factors, Ethiopia

Introduction

BACKGROUND

Hypertension (HTN) or HBP (systolic blood pressure ≥140 mmHg and diastolic blood pressure ≥90 mmHg) is an overwhelming global challenge [1, 2]. It is one of the most significant risk factors for cardiovascular (CV) morbidity and mortality resulting from target-organ damage to blood vessels in the heart, brain, kidney, and eyes [4, 5]. Hypertension causes 7.1 million premature deaths each year worldwide and accounts for 13% of all deaths globally [6].

There are effective medical therapies for hypertension management. However, only 37% of hypertensive patients in a 2003-2004 survey were reported to have their blood pressure controlled. Non-adherence to medical treatment remains challenging for the medical professions and social scientists. As a result, substantial numbers of patients do not get the maximum benefit of medical treatment, resulting in poor health outcomes, lower quality of life and increased healthcare costs. Despite many advances in adherence research, non-adherence rates have remained nearly unchanged in the last decade [7].

Poor Adherence to antihypertensive therapy is one of the biggest obstacles in therapeutic control of high blood pressure. It also compromises the efforts of the health care system, policymakers, and health care professionals to improve the health of populations. Failure to adhere causes medical and psychological complications of the disease, reduces patients' quality of life, wastes healthcare resources and erodes public confidence in health systems. Poor Adherence to antihypertensive therapy is usually associated with bad outcomes of the disease and waste of limited health care resources [7].

Analysis of the global burden of Hypertension revealed that over 25% of the world's adult population had Hypertension in 2000, and the proportion is expected to increase to 29% by 2025[1, 2]. Even though the burden of Hypertension is currently centered in economically developed countries (37.3%), developing countries will feel a more significant impact due to their larger population proportion, a change in lifestyle and sedentary life. Indeed, estimates indicate that up to three-quarters of the world's hypertensive population will be in economically developing countries by the year 2025 [8].

In Africa, 15% of the population has Hypertension [1, 2]. Although extensive data are lacking, 6% of the Ethiopian population has been estimated to have HTN. Approximately 30% of adults in Addis Ababa have Hypertension above 140/90 mmHg or reported using antihypertensive medication [2].

Medications to treat Hypertension and other chronic conditions work and are widely available. However, the broad benefits of these drugs are not being realized because a large proportion of patients are not taking them as prescribed, which indirectly raises the issue of therapeutic Adherence among hypertensive persons [9].

The World Health Organization (WHO) defines Adherence to long-term therapy as "the extent to which a person's behavior of taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed recommendations from a health care provider."[10] Other similar terms have been used instead, such as Adherence, and the meanings are more or less identical [11]. Often, the terms adherence and compliance are used interchangeably. However, their connotations differ: Adherence presumes the patient's agreement with the recommendations, whereas compliance implies patient passivity [10]. Recently, the term "Concordance" is also suggested. Compared with "adherence," concordance makes the patient the decision-maker in the process and denotes patient-prescriber agreement and harmony. Although slight and subtle differences exist between these terms, in clinical practice, these terms are used interchangeably [11].

Measurement of medication adherence is challenging because Adherence is an individual patient behavior. The following are some of the approaches that have been used:

- Subjective measurements were obtained by asking patients, family members, caregivers, and physicians about the patient's medication use;
- Objective measurements were obtained by counting pills, examining pharmacy refill records, or using electronic medication event monitoring systems; and
- Biochemical measurements are obtained by adding a non-toxic marker to the medication, detecting its presence in blood or urine, or measuring serum drug levels [12, 13].

Therapeutic non-adherence occurs when an individual's health-seeking or maintenance behavior lacks congruence with the recommendations prescribed by a healthcare provider [11]. Many factors affect patients' Adherence to medication regimes. Pharmacists need to know the risk factors for non-adherence to help identify these issues and assist their patients [13].

Many studies have been conducted to determine explanatory factors for "good" or "poor" Adherence to explain, predict, and monitor patients' behaviors [14]. No single factor has been found to predict patient non-adherence [13] reliably. Factors determining the level of antihypertensive drug adherence have been identified as follows:

- Factors linked to treatment: The complexity of the treatment and the drug's side effects.
- Factors linked to the doctor-patient interaction include the balance between established medical guidelines and patients' convictions, Communication between patients and doctors, and patient satisfaction with the healthcare system.
- Socio-economic factors, the cost of treatment, and a lack of medical insurance are linked to the patient [13, 15, and 16].

A healthy lifestyle remains the cornerstone of the management of Hypertension at all levels of the Disease. A healthy lifestyle decreases blood pressure, enhances antihypertensive drug efficacy and decreases total cardiovascular risk.

The South African Hypertension Guidelines 2009 recommend lifestyle changes in all hypertensive patients. Adopting a healthy lifestyle can prevent the development of Hypertension and lower blood pressure levels (17). However, healthcare providers in clinical practice know the frustrations of advocating lifestyle changes.

Lifestyle modification, previously termed non-pharmacologic therapy, plays a vital role in Hypertensive as well as non-hypertensive individuals [18].In hypertensive individuals, lifestyle Modifications can serve as an initial treatment before the start of drug therapy and as an adjunct to medication in persons already on drug therapy. In hypertensive individuals with medication-controlled BP, these therapies can facilitate drug step-down and drug withdrawal in highly motivated individuals who achieve and sustain lifestyle changes. In non-hypertensive, lifestyle modifications can potentially prevent Hypertension and, more broadly, reduce BP and thereby lower the risk of BP-related clinical complications in whole populations. Indeed, even a slight reduction in BP could enormously benefit cardiovascular events if applied to an entire population. For instance, a 3-mmHg decrease in systolic BP should lead to an 8% reduction in stroke mortality and a 5% reduction in mortality from coronary heart disease [18].

Statement of the Problem

Adherence to treatment medication, especially in chronic diseases, is a complicated issue affecting patients' health, health expenditure, and resource utilization. In contrast, Adherence to antihypertensive treatment (AHT) has been associated with improved blood pressure (BP), decreased hospitalization rates, and lower medical care costs [14, 17]. It also has long-term survival advantages after acute myocardial infarction (AMI), which appear to be class-specific and correlated positively in a dose-response–type fashion [14].

Despite the availability of effective treatments, studies have shown that in many countries less than 25% of patients treated for Hypertension achieve optimum blood pressure (BP≤140/90 mmHg [11]. A survey conducted in 2003-2004 showed only 37% of hypertensive patients have their blood pressure controlled [1]. Uncontrolled high blood pressure indirectly raises the issue of therapeutic Adherence among hypertensive persons [12]. WHO describes poor Adherence as the most important cause of uncontrolled blood pressure and estimates that 50–70% of people do not take their antihypertensive medication as prescribed [8]. Non-adherence rates for patients with Hypertension are reported to be 50% after 1 year and 85% after 5 years [13]. Within the first year of treatment, 16-50% of hypertensive patients discontinue their antihypertensive medications. Even among those who remain on therapy long-term, missed medication doses are common [16].

Non-adherence to medical treatment remains challenging for the

medical professions and social scientists [1]. Adherence to treatment medication, especially in chronic diseases, is a complicated issue affecting patients' health, health expenditure, and resource utilization. This problem can constitute many forms, including not having a prescription filled, taking an incorrect dose, taking medications at the wrong times, forgetting to take doses, or stopping therapy before the recommended time [18]. As a result, substantial numbers of patients do not get the maximum benefit of medical treatment, resulting in poor health outcomes, lower quality of life and increased healthcare costs [1, 9].

Globally, "poor adherence has been estimated to cost approximately $177 billion annually in total direct and indirect health care costs" [8]. It has been estimated that non-adherence to prescribed medications causes nearly 125,000 deaths annually [18]. 10% of hospital and 23% of nursing home admissions are due to medication non-adherence [18]. One-third of all.

Prescriptions are never filled, and over half are associated with incorrect administration. Non-adherence contributes to the U.S. healthcare system's direct annual costs of $100 billion. Indirect costs exceed $1.5 billion annually in lost patient earnings and $50 billion in lost productivity [19].

Motivating patients to implement lifestyle changes is one of the most challenging aspects of managing Hypertension. According to a review of literature in South Africa, no studies have comprehensively assessed patient hypertension knowledge and perceptions on the importance of lifestyle modification in controlling Hypertension. Good lifestyle changes in South Africa are further complicated by varying socio-economic conditions, education levels and poor healthcare delivery [20].

In general, non-adherence with long-term medication and lifestyle modifications for conditions such as Hypertension, dyslipidemia and diabetes is a common problem that leads to compromised health benefits and severe economic consequences in terms of wasted time, money and uncured disease [21].

Significance of the Study

Poor medication and lifestyle modification adherence is relatively standard. Studies have shown that 20%- 30% of medication prescriptions are never filled and that, on average, 50% of medications for chronic disease are not taken as prescribed. This lack of medication adherence has dramatic effects on individual and population-level health. Evidence suggests that benefits attributable to improved self-management of chronic diseases could result in a cost-to-savings ratio of approximately 1:10 [22].

This study helps create awareness about non-adherence's impact on health and promotes appropriate medicine and lifestyle modification usage habits to earn desirable outcomes. It also aimed to determine patients' knowledge of lifestyle modification and its importance in managing Hypertension. It also seeks to identify the common factors of poor Adherence to antihypertensive drugs and lifestyle modifications and recommends that health professionals give chronic care to the patients. It can be used as a reference for other researchers performing similar studies.

Literature Review

There are effective medical therapies for hypertension management. However, only 37% of hypertensive patients in a 2003-2004 survey were reported to have their blood pressure controlled. The problem of non-adherence to medical treatment remains a challenge for the medical professions and social scientists. As a result, substantial numbers of patients do not get the maximum benefit of medical treatment, resulting in poor health outcomes, lower quality of life and increased healthcare costs. In spite of many advances made in adherence research, non-adherence rates have remained nearly unchanged in the last decades [7].

Poor Adherence to antihypertensive therapy is one of the biggest obstacles in therapeutic control of high blood pressure. It also compromises the efforts of the health care system, policymakers, and health care professionals to improve the health of populations. Failure to adhere causes medical and psychological complications of the disease, reduces patients' quality of life, wastes healthcare resources and erodes public confidence in health systems [7].

Poor Adherence to antihypertensive therapy is usually associated with impaired outcome of the disease and wastage of limited health care resources [7].

Despite the availability of effective treatment, over half of the patients being treated for Hypertension drop out of care entirely within a year of diagnosis and of those who remain under medical supervision, only about 50% take at least 80% of their prescribed medications. Consequently, because of poor Adherence to antihypertensive treatment, approximately 75% of patients with a diagnosis of Hypertension do not achieve optimum blood pressure control. Estimates of the extent to which patients adhere to pharmacotherapy for Hypertension vary between 50 and 70%. This variation relates to differences in study groups, follow-up duration, Adherence assessment methods, and drug regimens used in different studies. For example, studies that defined Adherence as an 80% ratio of days on which medication was dispensed to days in the study period reported adherence rates ranging from 52% to 74%. Other studies investigating discontinuation of antihypertensive have reported adherence rates of 43 to 88%. Furthermore, it has been estimated that within the first year of treatment, 16 to 50% of patients with Hypertension discontinue their antihypertensive medications, and among those who continue their therapy in the long term, missed doses of medication are common. These figures differ for newly diagnosed patients and those with chronic, long-standing Hypertension.

Another source of variation that could explain the differences in rates of Adherence is the method used to measure Adherence. Examples of methods used include calculating the percentage of pills taken in a specific time period, the percentage of patients taking 80% of their pills, the improvement in number of pills taken, the dropouts from treatment and follow-up, and the missed appointments. There are also indirect proxy measures, such as changes in blood pressure and achieving target blood pressure [23].

Many patients have uncontrolled blood pressure (BP) because they are not taking medications as prescribed. Providers may have difficulty accurately assessing medication Adherence. They need to evaluate medication adherence to decide whether to address uncontrolled BP by improving Adherence to the current prescribed regimen or intensifying the BP treatment regimen by increasing doses or adding more medications [21].

A cross-sectional cohort study of 1169 veterans with diabetes presenting with BP ≥140/90 mm Hg at 9 Veterans Affairs (VA) facilities, U.S. AUSA, from February 2005 to March 2006 indicated 1064 patients were receiving antihypertensive medication regularly from the VA. Adherence assessments by providers correlated poorly with refill history. 211 (20%) patients did not have BP medication available for ≥ 20% of days, and among them, 79 (37%) of the patients had non-adherence and intensified medications for 97 (46%). Providers' intensified BP medications for 451 (42%) patients, assessed also have non-adherence (44%). The continuous multiple-interval measure of medication gaps (CMG) determines the proportion of time in the prior year that a patient did not possess the prescribed medications; CMG ≥20% is considered clinically significant non-adherence. The BP regimen was intensified if a medication was added or increased without stopping or decreasing another medication. Providers recognized non-adherence for less than half of patients whose pharmacy records indicated significant refill gaps and often intensified BP medications even when suspected of serious non-adherence [21].

A survey was conducted on 18806 newly diagnosed hypertensive patients≥35 years of age in 2000 - 2001 using data obtained from 400 Italian primary care physicians in Italy. Patient adherence was subdivided a priori into three categories: high (proportion of days covered, ≥80%), intermediate (proportion of days covered, 40% to 79%), and low (proportion of days covered, ≤40%). At baseline (i.e., 6 months after index diagnosis), 8.1%, 40.5%, and 51.4% of patients were classified as having high, intermediate, and low adherence levels, respectively [14].

Another population-based retrospective study was conducted at the Local Health Unit of Florence (Italy) on 31,306 patients, (men (48.0%), and women (52.0%)), with a mean age of 60.2 ± 14.5 years, including patients newly treated with antihypertensive, 18 years of age, with a first prescription between January 1, 2004, and December 31, 2006, assessed shows, Adherence to AHT was poor in 8038 patients (25.7%), moderate in 4640 (14.8%), good in 5651 (18.1%), and excellent in 12,977 (41.5%) [24].

A semi-structured interview using an anthropological approach based on an ethnographic survey conducted from October 2002 to April 2004 in a rural area of south Eastern France with 68 hypertensive patients (39 women and 29 men, between the ages of 40 and 95, of whom 52 were over 60) who had been receiving treatment for over a year indicates prescription compliance does not solely depend on the patient's perception of cardiovascular risk, but also on how the patient fully accepts the treatment and integrates it into their daily life. Following the prescription requires a relationship based on trust between the doctor and patient, in three forms: reasoned, emotional, and conceded trust [14].

A semi-standard survey interview was conducted on 518 patients with AHT at the Penang General Hospital, Malaysia clinic to assess Adherence to AHT using the Risky Medication Adherence Scale (MMAS). An independent sample T-test with a response rate of 73.36% was used to determine whether there was a significant difference between hospitalized patients (n = 12) and those not (n = 368) with poor Adherence. The results show that 195 (51.3%) patients had poor Adherence to antihypertensive medication. Much higher level of hospitalization for patients with poor Adherence (M = 4.50, SD = 0.384) than those who are adherent (M = 2.82, SD = 1.486) [25].

Thematic content analysis of a qualitative study conducted on 16 patients at Sandmen Provisional Hospital of Quetta City, Pakistan, indicated five significant themes that can change the beliefs and experiences of hypertensive patients.

- Perceived benefits and risks of medications
- physician's interaction with patients
- perception toward traditional remedies
- layman's concept toward medications and
- Beliefs toward Hypertension and its control.

Physician's attitude, patient's past experiences, and knowledge related to Hypertension were noted as major contributing factors thus resulting in non-adherence to therapy prescribed [25].

Another cross-sectional study was conducted on 460 patients at the Aga Khan University Hospital (AKUH) and National Institute of Cardiovascular Diseases, Karachi, Pakistan, from September 2005–May 2006, using MMAS, with scores ranging from 0 (non-adherent) to 4 (adherent) and patient self-reports about the number of pills taken over a prescribed period, showed that at a cut-off value of 80%, 77% of the cases were adherent. Upon univariate analyses, increasing age, better awareness and increasing number of pills prescribed significantly improved Adherence, while depression showed no association. Younger age, poor understanding, and symptomatic treatment adversely affected Adherence to antihypertensive medication in our population [8].

A cross-sectional study was conducted with 223 hypertensive patients older than 18, treated at six Family Health Strategy Units in Maceio (AL), Brazil, through interviews and home blood pressure measurements between January and April 2011 using MMAS-8. The study shows Adherence among the patients studied was 19.7%, while 34% had controlled BP (> 140/90 mmHg). The average adherence value according to the MMAS-8 was 5.8 (± 1.8). Adherent patients showed (OR = 6.1, CI [95%] = 3.0 to 12.0) to have blood pressure control than those who reached mean (6 to <8) or low values (<6) at the adherence score [26].

Randomly sampled 152 non-comorbid hypertensive outpatients visiting the consultant outpatient clinic of the cardiology unit of

the Department of Medicine, University of Interviewed Maiduguri Teaching Hospital (UMTH), Maiduguri, Borno state, Nigeria to assess Adherence to AHT.Adherence was measured on a 12-point scale with a mean score of 9.37 + 1.22. The study participants had a mean age of 49.29±1.04 years, and the adherence level was 85.5%. The study shows a significant association between Adherence and age, marital status, tribe, state of origin, cost of antihypertensive medications, number of antihypertensive drugs, and age/gender with $P < 0.01$. Significant reasons for non-adherence were feeling worse (side effects of the antihypertensive medications), and feeling better with $P < 0.01$ [4].

A prospective study of 150 hypertensive patients on medication for 6 months, at the OPD of Ghana Ports and Harbor Authority (G.P.H.A.) Hospital Takoradi was carried out using MMAS-4. The study revealed that total Adherence to antihypertensive medication regimens was 19.3%, and partial or medium Adherence was 49.3%. Hence, the adherence rate (i.e., those who took their medications ≥ 75%) to antihypertensive medicines in the institution was 68.6%, and the non-adherence rate was 31.4%. The primary reasons for non-adherence were forgetfulness (45.4%) by the patient to take medications on time or missed doses and side effects of the medicines (20.8%). Finance (10.4%) was also a problem for paying patients who had to make up-front payments to refill their medicines [13].

A questionnaire-based cross-sectional study was conducted at the University Teaching Hospital (UTH) in Lusaka, Zambia, on 237 adult patients aged 18 and above with previous diagnosis of essential Hypertension receiving outpatient care from the first week of November to the second week of December 2010. Information was collected using self-report and a modified Hill-Bone compliance scale. The mean age was 57.8 &12.0 SD. The result showed that the prevalence of Adherence was 83%, according to self-report. The factors associated with Adherence included pill burden, drugs prescribed unavailability at the hospital pharmacy (83%), poor patient counseling, a primary level of education, side effects of dizziness, missed appointments due to lack of transport, and living at a distant from the hospital [27].

A cross-sectional study was conducted at general medical outpatient clinics at a tertiary referral hospital, Kenyatta National Hospital, Nairobi, Kenya. Adequacy of BP control and level of Adherence by the Hill-Bone score. Of 783 patients screened between June 1 and November 30, 2007, 575 (73%) met the inclusion criteria, and 264 were randomly recruited; 67% were female; the mean age was 57.3 years. The number of antihypertensive drugs prescribed was 35.2% for two drugs, 36.6% for three drugs and 14.9% for four or more drugs. 26% had adequate BP control and58.5% of those with inadequate BP control had BP of > 160/l00mmHg? 31.8% of the patients were fully adherent to antihypertensive therapy. Poor BP control in 75% of hypertensive patients is largely due to non-adherence, with other associated factors being obesity, increasing number of medications, and suboptimal drug combinations and doses [28].

Randomly sampled eighty (80) outpatients suffering from co-morbid hypertension and diabetes mellitus who visited the consultant outpatient clinics of the cardiology and endocrinology units of the Department of Medicine, the University of Maiduguri Teaching Hospital (UMTH), Maiduguri, Borno state, Nigeria were interviewed using a self-administered pre-tested structured, mostly closed-ended questionnaires. Adherence was measured on a 12-point scale; a Mean SD score of 9.4 ± 1.0 was recorded. The study participants had a mean SD of 51.9 ± 7.8 years. The adherence level was 81.2%. The study showed a significant association between age and adherence levels with $P = 0.005$. A primary reason for non-adherence to clinic appointments was traveling a lot (27.2%). Adherence to filling/refilling prescriptions was mainly attributed to feeling worse due to the side effects of medications (60.0%) and the high cost of drugs (20.0%). Busy work schedule (22.2%), feeling better (22.2%) and feeling worse while taking medications (22.2%) were the primary reasons responsible for not taking medications as prescribed [29].

A cross-sectional study conducted at Black Lion Hospital (BLH) chronic follow-up unit, Addis Ababa, Ethiopia, with 286 study subjects was analyzed for adherence level using SPSS 16. P-value <0.05 was considered a significant association. Of the subjects included in the study, 165(57.7%) were female, and the mean age was 52±13 years. The study revealed the adherence level of respondents to medication, diet and exercise were 69.2%, 64.7%, and 43.7% respectively. The medication and diet-related Adherence were better in patients who had been informed about their medicine. There was a significant association between marital status, work status, Health care facilities, duration of Hypertension and its treatment and medication adherence [2].

An institution-based cross-sectional study conducted at the University of Gondar Hospital (GUH), Northwest Ethiopia, on 384 participants using MMAS shows that more than half (64.6 %) of the study participants were found to be adherent to their treatment. Factors such as sex, distance from the hospital, number of co-morbidities, and Knowledge about HTN and its treatment were associated with the adherence behavior of patients. Early diagnosis and management of co-morbidities, adherence counseling and patient education about the disease and its treatment are essential to improve the adherence status of patients [1].

An increased prevalence of Hypertension in groups with high alcohol consumption has been recognized for a number of years. More recently, several studies have suggested an independent association between alcohol consumption and blood pressure levels in samples from general populations. In multivariate analyses, the association was shown to be independent of various potential confounding factors, including age, relative body weight, exercise, and smoking status, that are known to be or are likely to be related to blood pressure and alcohol consumption. Of 30 cross-sectional population studies reviewed, the majority reported small but significant elevations in blood pressure in those consuming three drinks or more per day compared to non-drinkers. In two studies, one from the United States and one from Australia, the maximum contribution to the prevalence of Hypertension of alcohol consumption more significant than two drinks per day was estimated to be 5% to 7%; the contribution in

men (11%) was more important than that in women because of their greater alcohol consumption (21).

Objectives

General Objective

The study aimed to evaluate hypertension management practices and identify factors contributing to poor treatment outcomes among hypertensive patients. Yekatit 12 Hospital Medical College. 2022

Specific Objectives

- To assess BP control among hypertensive patients at Yekatit 12 Hospital Medical College. 2022
- To investigate the antihypertensive medication prescribing pattern among hypertensive patients at Yekatit 12 Hospital Medical College. 2022
- To determine the adherence status to antihypertensive medication and lifestyle modification of hypertensive patients at Yekatit 12 Hospital Medical College. 2022To identify reasons for non-adherence in hypertensive patients in Yekatit 12 Hospital Medical College. 2022
- To assess the knowledge of hypertensive patients toward controlling blood pressure in Yekatit 12 Hospital Medical College. 2022.
- To identify factors contributing to poor treatment outcomes in hypertensive patients in Yekatit 12 Hospital Medical College. 2022.

Materials and Methods

Study Area and Period

The study was conducted at Yekatit 12 Hospital and Medical College's Internal Medicine Department. Yekatit 12 Hospital was established in 11923G. Until the Ethiopian revolution of the 11970s, it was known as Haile Selassie I Hospital, named after Emperor Haile Selassie I. In addition, Yekatit 12 Hospital Medical College maintains electronic medical record systems, which streamline the process of collecting data for this study. These records contain detailed information on patient demographics, medical history, investigation results, diagnoses and disease progress over time. The hospital serves over 5 million people in its central 5 Departments in the catchment area. Addis Ababa was chosen as the study setting due to its diverse population, representing various socioeconomic backgrounds and cultural contexts. The city is known for its well-established healthcare infrastructure, making it a suitable location to access a significant number of emergency patients. An institutional-based cross-sectional study will be carried out in Yekatit 12 hospital medical colleges from October 1 to 30, 2022.

Study Design

A hospital-based descriptive cross-sectional design with a quantitative approach.

Population

Source Population

The source populations were all patients visiting Yekatit 12 hospital medical colleges from October 1 to 30, 2022 and diagnosed with Hypertension.

Study Population

The study included adult hypertensive patients who had been receiving treatment on an outpatient basis at the facility for at least six months and willingly agreed to participate during the study period.

Selection Criteria

Inclusion Criteria

- Hypertensive patients who are on medications for at least six months.
- Age greater than 18 years old.
- Diabetic hypertensive patients were a part of the study, proving that they are on antihypertensive medication.
- Patients who were clinically and mentally stable.

Exclusion Criteria

- Pregnancy-induced hypertension patients.
- Hypertensive urgency or emergency
- Patients with mental illnesses leading to confusion were excluded from participating in the study, e.g. delirium, dementia, psychosis, schizophrenia etc.
- Non-volunteers to respond to the questionnaire

Sample Size& Sampling Technique

Patients found during the study period in the study area who fulfilled the criteria were included in the study, which was conducted using a convenience sampling technique.

Study Variables

4.5.1 Independent Variables

- Age
- Sex
- Religion
- Ethnicity
- Occupation
- Duration of illness
- Educational status

Dependent Variables

- Treatment outcome
- BP
- Knowledge
- Adherence rate
- Medication utilization pattern
- Reason for non-adherence

Data Collection Instrument and Technique

Instrument

Data collection involved a questionnaire incorporating the 8-item Morisky medication adherence scale and self-reported questions on medication use, key reasons for non-adherence, and a review of patient records. Materials such as pens, pencils, calculators, binders, erasers, and sharpeners were utilized during the process.

Data Collection Technique

Data were gathered through interviews, incorporating the 8-item Morisky medication adherence scale, additional questionnaires, and a review of patients' medication charts.

Quality Assurance

To ensure data quality, several measures were implemented. A well-designed and pre-tested data collection checklist/format was utilized. Additionally, the collected data were reviewed daily to verify completeness and consistency of responses.

Data Processing and Analysis

All collected data were analyzed using SPSS version 21.1 and presented in the form of frequency tables, graphs, and charts. Respondents were categorized into three adherence levels—high, medium, and low—based on their total score on the 8-item Morisky Medication Adherence Scale (MMAS-8). A score of 0 indicated high adherence, scores between 1 and 2 represented medium adherence, and scores ranging from 3 to 8 indicated low adherence. In the MMAS-8, responses were scored as 0 for "No" and 1 for "Yes," except for question 5, where the scoring was reversed. The total score was then calculated, with values above 2 signifying low adherence, scores of 1 or 2 indicating medium adherence, and a score of 0 reflecting high adherence.

Ethical Consideration

An official approval letter was secured from the Ethical Review Committee of the Yekatit 12 Hospital Public Health Department. Informed consent was obtained from all study participants. Confidentiality of the collected data was strictly maintained and used solely for research purposes. Participants had the right to withdraw from the study at any point during data collection if they chose not to continue. Personal identifiers, such as patient names, were excluded from the questionnaire to ensure privacy.

Results

Socio-Demographic Characteristics of the Study Subjects

A total of 150 hypertensive patients were interviewed and their patient charts were reviewed. The response rate was 100%. All respondents were above 30 years old, and most were females (55.3%). The mean age of the study participants was 56.4 ± 12.25 years. About 122 (81.3%) of the study subjects were Oromo by ethnicity. More than half of the respondents, 90(60%), were Muslim by religion, and 110(73.3%) were married. Most (60%) of the study participants were rural residents, and (68.0%) traveled more than 30 minutes to the health institution. About 43.3% of the study participants were illiterate. Most (52%) of the study subjects earned a monthly income of <500 Ethiopian birr (ETB), (and 27.3%) earned 500-1000 ETB. Out of the respondents (45.3%) were farmers, and (10%) had responded to being retired from governmental employment, unemployed and dependent on others due to aging.

Among study participants, only 16.7% were fully adherent to their treatment, and 37.3 % and 46% were medium and low Adherent to their treatment, respectively. More than half of the study participants (58.7%) controlled their BP, and 74% were users of 2-3 antihypertensive medications. Among the study participants, about 137(91.3%) were users of at least one diuretic, 125(83.3%) have using one of ACEI drugs, and about (48%) of study participants were on their antihypertensive treatment for the past 2 to 4 years. More than three-fourths (78%) of the respondents had no co-morbidities like heart disease, diabetes mellitus, renal diseases, etc.

Table 5.1: Socio-Demographic Characteristic of The Study Participants at Yekatit 12 Hospital Medical Colleges from October 1 to 30, 2022

Variables	Frequency	Percent
Sex		
Males	67	44.7
Females	83	55.3
Total	150	100
Age		
18-40	14	9.3
41-60	82	54.7
>60	54	36
Total	150	100
Ethnicity		
Oromo	122	81.3
Amhara	5	3.3
Kaffa	12	8
Dawuro	6	4
Others	5	3.3
Total	150	100

Residence		
Urban	60	40
Rural	90	60
Total	150	100
Marital status		
Married	110	73.3
Widowed	17	11.3
Single	14	9.3
Divorced	9	6
Total	150	100
Religion		
Muslim	90	60
orthodox	43	28.7
protestant	14	9.3
others	3	2
Occupational status		
Government Employee	29	19.3
Retired	15	10
Student	3	2
Farmer	68	45.3
Daily Labor	13	8.7
Business Man/Woman	10	6.7
Housewife	8	5.3
Others	4	2.7
Total	150	100
Educational status		
Illiterate	65	43.3
grade 1-6	22	14.7
grade 7-12	41	27.3
Diploma and above	22	14.7
Total	150	100
Monthly Income		
<500 ETB	78	52
500-1000 ETB	41	27.3
>1000 ETB	31	20.7
Total	150	100
Distance from health institution		
<0.5 hrs.	48	32
>0.5 hrs.	102	68
Total	150	100
Regular physical exercise		
yes	20	13.3
No	130	86.7
A smoking habit of patients		
Yes	9	6
No	141	94

Alcohol consumption of patients		
Yes	21	14
No	129	86
No. of drugs the patient takes		
1	8	5.3
2-3	111	74
4-5	23	15.3
greater than 5	8	5.3
Total	150	100
Duration on treatment		
less than 1 year	29	19.3
2-4	72	48
5-7	32	21.3
8-10	8	5.3
greater than 11 years	9	6
Total	150	100
Co-morbidity status of patients		
Yes	31	20.7
No	119	79.3

Medication Adherence Status of Respondents

As shown in the figure below, 25(16.7%) of the study subjects scored the value expected to score in the study (scored a total MMAS-8 of 0), and hence, they were fully adherent, while 56(37.3%) and 69(46%) of the respondents scored medium and low Adhesion, respectively.

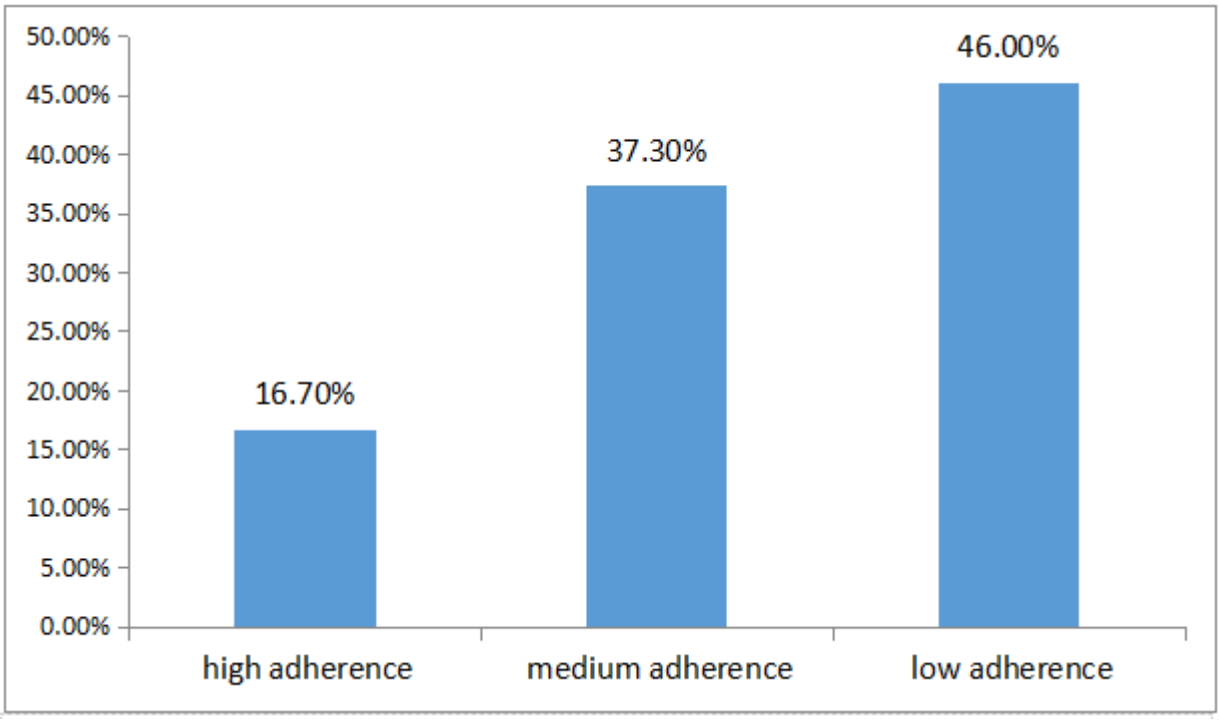
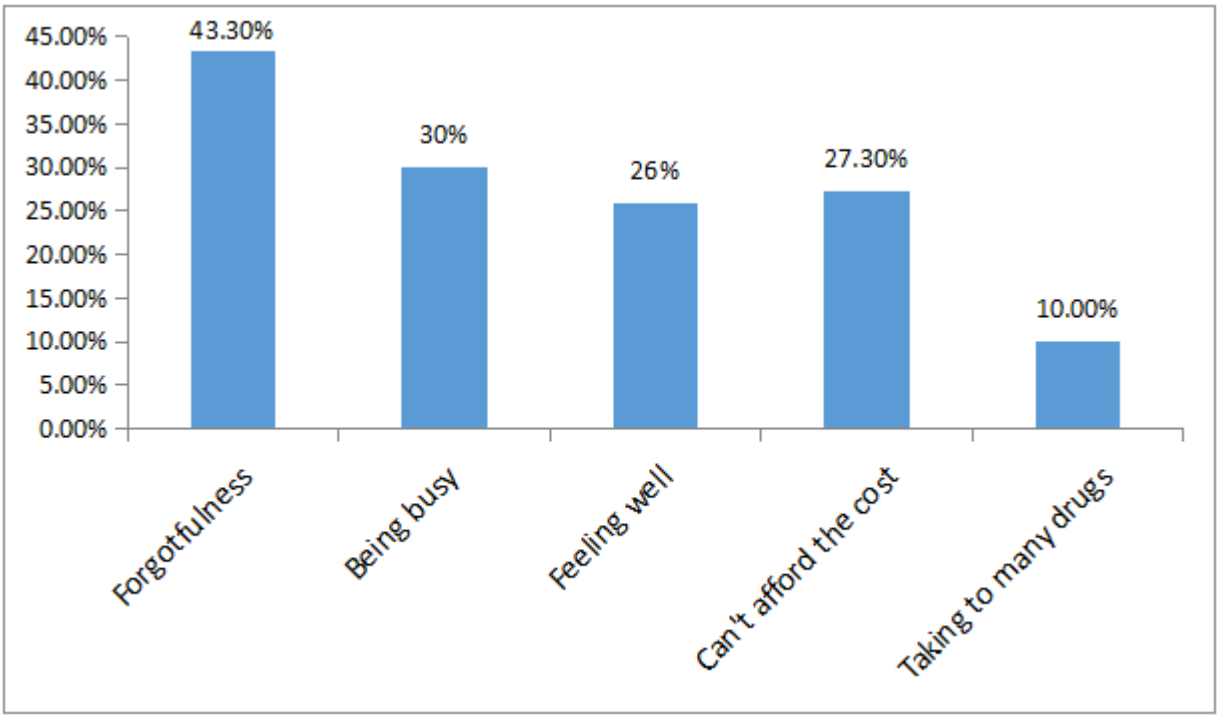


Figure 5.1: Adherence Level Among the Study Participants at Yekatit 12 Hospital Medical Colleges from October 1 to 30, 2022

5.3 Reasons for Non-adherence

As shown in the figure below, the primary reasons for non-adherence among the study participants were forgetfulness (43.3%), being busy (30.0%) and unaffordability (27.3%) of the medications.



NB: Some Patients Had More Than One Reason for Non-Adherence

Figure 5.2: Reasons for Non-Adherence Among the Study Participants at Yekatit 12 Hospital Medical Colleges from October 1 To 30, 2022

Table 5.2: Effect of selected socio-demographic, clinical and other characteristics on Adherence to antihypertensive Treatment at Yekatit 12 Hospital medical colleges from October 1 to 30, 2022

Variables		Adherence rate			
	High Adherence	Medium Adherence	Low Adherence	Total	Association
Age					
18-40	4	2	8	14	X^2=6.016 Df=4 P value=0.198
41-60	13	29	40	82	
>60	8	25	21	54	
Total	25	56	69	150	
Gender					
Female	16	34	33	83	X2=2.989 Df=2 P value=0.224
Male	9	22	36	67	
Total	25	56	69	150	
Number of AHDs					
1	2	5	1	8	
2-3	22	33	56	111	
4-5	0	13	10	23	X2=0.496 Df=1 P value=0.481
>5	1	5	2	8	
Total	25	56	69	150	

Time of antihypertensive treatment					
< 1 year	9	6	14	29	X2=6.350 Df=1 P value=0.012
2-4 years	13	33	26	72	
5-7 years	1	12	19	32	
8-10 years	2	4	2	8	
>11years	0	1	8	9	
Total	25	56	69	150	
Educational status					
Illiterate	7	20	38	65	X2=9.149 Df=1 P value=0.002
grade 1-6	4	11	7	22	
grade 7-12	5	17	19	41	
Diploma and above	9	8	5	22	
Total	25	56	69	150	
Monthly Income(ETB)					
<500	9	29	40	78	X2=6.835 Df=4 P value=0.145
500-1000	8	19	14	41	
>1000	8	8	15	31	
Total	25	56	69	150	
Residence					
Urban	11	23	26	60	X^2=0.348 Df=2 P value=0.840
Rural	14	33	43	90	
Total	25	56	69	150	
Distance from the HI					
<0.5 hrs.	12	20	16	48	X^2=5.758 Df=2 P value=0.056
>0.5 hrs.	13	36	53	102	
Total	25	56	69	150	
Marital status					
Married	21	45	44	110	X^2=4.070 Df=1 P value=0.044
Widowed	1	6	10	17	
Single	2	2	10	14	
Divorced	1	3	5	9	
Total	25	56	69	77	
Regular Physical exercise					
YES	7	2	11	20	X^2=9.678 Df=2 P value=0.008
NO	18	54	58	130	
Smoker					
YES	3	5	1	9	X^2=4.981 Df=2 P value=0.083
NO	22	51	68	141	
Regular Alcohol consumption					
YES	5	6	10	21	X^2=1.264 Df=2 P value=0.532
NO	20	50	59	129	
co-morbidity					

YES	1	14	16	31	X2=5.145 Df=2 P value=0.076
NO	24	42	53	119	
BP of patients					
controlled	23	35	30	88	X^2=18.359 Df=2 P value=0.000
uncontrolled	2	21	39	62	
Occupational status					
Government Employee	9	9	11	29	X^2=10.275 Df=1 P value=0.001
Retired	3	11	1	15	
Student	0	3	0	3	
Farmer	10	20	38	68	
Daily Labor	0	10	3	13	
Business Man/ Woman	2	2	6	10	
Housewife	1	0	7	8	
Others	0	1	3	4	
Total	25	56	69	150	
Knowledge of patients about HTN & its treatment					
Knowledgeable	15	27	13	55	X^2=18.519 Df=2 P value=0.000
unknowledgeable	10	29	56	95	
Total	25	56	69	150	

BP Control and Knowledge Status Of Patients

This study revealed that Among 150 study subjects, more than half, 88(58.7%) and 95(63.3%) of the study subjects had controlled blood pressure and had inadequate knowledge about Hypertension and its treatment, respectively.

Medication Prescribing Pattern

The average number of prescribed medications per patient was 2.85, with a mean of 2.34 antihypertensive drugs per patient. The most commonly prescribed medications included hydrochlorothiazide (91.3% of patients), enalapril (83.3%), atenolol (13.3%), and amlodipine (36.7%). Monotherapy was used by 5.3% of patients, while 74% were on two to three antihypertensive medications, and 20.7% were taking four or more drugs, including a diuretic. Blood pressure was controlled in 100% of patients on monotherapy and 57.6% of those on two to three medications. Among patients with uncontrolled blood pressure, 8% (1.3% of total patients) were adherent but on triple therapy containing a diuretic, indicating resistant hypertension. The remaining patients with elevated BP were categorized as follows: 8.2% were non-adherent to triple therapy with a diuretic, 8.8% were adherent but on one or two antihypertensive medications, and 80.3% were non-adherent while taking one or two antihypertensive drugs.

Table 5.3: Effect of Selected Socio-Demographic, Clinical and Other Characteristics on Blood Pressure Control at Yekatit 12 Hospital Medical Colleges from October 1 to 30, 2022

Variables	Blood pressure control rate			
	Controlled BP	Uncontrolled BP	Total	Association
Age				
18-40	7	7	14	x^2=1.506 Df=2 p value=0.471
41-60	46	36	82	
>60	35	19	54	
Total	88	62	150	
Gender				
Female	51	32	83	x^2=0.592 Df=1 p value=0.442
Male	37	30	67	
Total	88	62	150	
Number of AHDs				
1	8	0	8	x^2=1.947 Df=1 p value=0.163
2-3	64	47	111	
4-5	11	12	23	
>5	5	3	8	
Total	88	62	150	
Time of antihypertensive treatment				
< 1 year	23	6	29	x^2=11.284 Df=1 p value=0.001
2-4 years	45	27	72	
5-7 years	13	19	32	
8-10 years	5	3	8	
>11years	2	7	9	
Total	88	62	64	
Educational status				
Illiterate	29	36	65	x^2=11.590 Df=1 p value=0.001
grade 1-6	15	7	22	
grade 7-12	24	17	41	
Diploma and above	20	2	22	
Total	88	62	64	
Monthly Income(ETB)				
<500	35	43	78	x^2=13.416 Df=2 p value=0.001
500-1000	29	12	41	
>1000	24	7	31	
Total	88	62	150	
Residence				
Urban	38	22	60	x^2=0.898 Df=1 p value=0.343
Rural	50	40	90	
Total	88	62	150	
Distance from the HI				
<0.5 hrs.	36	12	48	x^2=7.766 Df=1 p value=0.005
>0.5 hrs.	52	50	102	
Total	88	62	150	

Marital status				
Married	68	42	110	Df=0.845 Df=1 p value=0.358
Widowed	10	7	17	
Single	7	7	14	
Divorced	3	6	9	
Total	88	57.3	62	
Regular Physical exercise				
YES	16	4	20	x^2=4.331 Df=1 p value=0.037
NO	72	58	130	
Smoker				
YES	6	3	9	x^2=0.253 Df=1 p value=0.615
NO	82	59	141	
Regular Alcohol consumption				
YES	14	7	21	x^2=0.644 Df=1 p value=0.422
NO	74	55	129	
co-morbidity				
YES	5	26	31	x^2=29.158 Df=1 p value=0.000
NO	83	36	119	
Occupational status				
Government Employee	16	13	29	x^2=0.048 Df=1 p value=0.826
Retired	12	3	15	
Student	2	1	3	
Farmer	37	31	68	
Daily Labor	7	6	13	
Business Man/Woman	7	3	10	
Housewife	5	3	8	
Others	2	2	4	
Total	88	62	150	
knowledge of patients about HTN& its treatment				
knowledgeable	44	11	55	x^2=16.299 Df=1 p value=0.000
unknowledgeable	44	51	95	
Total	88	62	150	
adherence rate				
Highly adherent	23	2	25	x^2=20.904 Df=2 p value=0.000
Medium Adherent	35	21	56	
Low Adherent	30	39	69	
Total	88	62	150	

There was a significant association between educational status and treatment outcome (p = 0.001). Poor treatment outcomes were common in respondents of lower education (the illiterate and those who had completed primary school). This could be due to a lack of awareness about Hypertension, its management and medications for this condition in this study area.

Income level was another variable found to be significantly and independently associated with the treatment outcome of the respondents (p = 0.001). Most study participants with poor treatment outcomes had low and medium incomes. This might result from the respondents' occupations where most were farmers, daily laborers and others (retired from governmental employment or dependent on younger family relatives). This could cause poor Adherence and lead to inadequate treatment outcomes for the respondents. As reported in a descriptive study conducted

in Pakistan, mean Adherence showed an overall increase with increasing monthly income (8), similar to the current study.

Regular physical exercise was another variable found to be associated with the respondents' treatment outcomes (p=0.037). Most of the study participants with poor treatment outcomes were not engaged in regular physical exercise.

The knowledge status of the respondents was also significantly associated with treatment outcomes (p=0.000). Patients with inadequate knowledge about HTN and its treatment were found to score poor treatment outcomes. This may be due to a lack of awareness about appropriate medication use and lifestyle modifications to manage Hypertension, which leads to poor treatment outcomes.

Only 58.7 %(88) of the study participants had controlled BP, which is better than the study done in GUH (43%)(2), Maceio, Brazil (34%) (26), and general medical outpatient clinics at a tertiary referral hospital, Kenyatta National Hospital, Nairobi, Kenya (26%) [27].

In this study, 88% of the hypertension patients were on 2 to 3 antihypertensive drugs and 8% on four or more drugs. This is in line with the study done in Kenya, which found that 71.8% were on 2-3 drugs, and 14% were on four or more drugs [28].

Among the study participants, 71 (47.3%) were on their antihypertensive treatment for the past 2 to 4 years. The study agreed with the previous reports from UMTH, Maiduguri, Nigeria (4), where most participants, 36(45.0%), had been on treatment for 2 – 5 years. This study revealed that respondents who were on antihypertensive treatment for the past 1 to 5 years had significant associations with poor treatment outcomes (p = 0.001). This might be due to the prolonged use of drugs, which would burden the patient and lead to discontinuing medication, too. Besides, once the patient's BP had stabilized, they might have felt better. Along with this, long-term use of medicines might result in a layperson's concept, and the patient might seek other herbal medicines than their AHT drugs.

Out of the respondents, 119 (79.3%) had no co-morbid condition, and 31(20.7%) had one or more co-morbid conditions, such as diabetes mellitus, chronic kidney disease, or rheumatic arthritis. Co-morbidities can worsen patients' conditions and make them unable to adhere to their antihypertensive medications and lifestyle changes.

Co-morbidity was also significantly associated with treatment outcomes (p=0.000). Patients with no co-morbidity were likelier to have good treatment outcomes than those with co-morbidities. Patients with more co-morbidities could suffer from severe complications and complex treatment regimens, which were favorable conditions for not adhering to their medications, diet and exercise recommendations, which could lead to poor treatment outcomes.

Only 16.7% of the study subjects were fully adherent to their treatment. Among patients considered non-adherent, 37.3% had medium Adherence, and 46% had low Adherence, which is better than the findings from 400 Italian primary care physicians. In Italy, 8.1%, 40.5%, and 51.4% of patients were classified as having high, intermediate, and low adherence levels, respectively [14].

This study demonstrated lower Adherence than what has been reported from Brazil (19.7%) and Kenya (31.8%) [26, 28].

The finding of medication adherence in the current study was significantly lower than previous reports from Nigeria 85.5%, Zambia 83%, Pakistan 80%, BLH, Addis Ababa University (69.2%), GUH, Gondar University (64.6%), Malaysia (48.7%), U.S.A. U.S.A. (63%) and Ghana (68.8%) (4, 27, 8, 2, 1, 21, 25, 13). This might be due to better access and skilled healthcare professionals for the patients in these regions and countries. This could also be due to a better knowledge of Hypertension and its management than in the current study area.

The association between adherence level and treatment outcome is considered to be statistically significant (p = 0.000). Patients with high Adherence and medium Adherence to their treatment had better BP control than patients with low Adherence to their treatment.

The primary reasons for non-adherence among the study participants were found to be forgetfulness (43.3%), being busy (30.0%), and affordability (27.3%) of the costs of the medications. It has some similarities with what was reported by the U.S.A. U.S.A., the reasons for poor Adherence are forgetfulness, adverse effects, and not liking to take medication (21).

This was in contrast to what has been reported from UMTH, Maiduguri, Nigeria, where non-adherence was mainly attributed to feeling worse due to side effects of medications (60.0%), a busy work schedule (22.2%), feeling better when feeling better (22.2%) and feeling worse while taking medications (22.2%) [29].

This study has shown that around half (63.3%) of the study participants have inadequate knowledge about Hypertension and its treatment. Proper knowledge about HTN and its treatment creates a clear understanding and avoids confusion about the treatment and the disease condition. Knowledge about HTN and its treatment was positively associated with treatment outcomes (p = 0.000). Patients with better awareness were more likely to have good treatment outcomes. In contrast, patients with inadequate knowledge about HTN and its treatment were found to be negatively associated with treatment outcomes. Patients with poor awareness were more likely to be non-adherent to their treatment and had poor treatment outcomes. This result is dissimilar from what was reported by GUH, Gondar University (1). This may be because 76.6% of patients who participated in the study done in GUH were from urban residences. Therefore, they may have access to health professionals who advise the patient on pharmacologic and lifestyle modifications for hypertension management, while in this study, 60% of participants were rural residents.

Limitations of the Study

The study excluded hypertensive patients who did not visit the health facility during the study period. Treatment outcomes were assessed solely through self-reporting and chart reviews, which have limitations such as recall bias and the tendency to provide socially desirable responses. This reliance on self-reported data may have led to an overestimation of certain results, potentially affecting the accuracy of the findings.

Conclusions

This study found that blood pressure control and adherence to medication and lifestyle changes were generally low. The main reasons for non-adherence among participants included forgetfulness, a busy schedule, missing doses, and the high cost of medications. Additionally, most participants had limited knowledge about hypertension and its management. Several factors, including place of residence, distance from healthcare facilities, education level, income, occupation, duration of treatment, adherence level, and awareness of hypertension and its treatment, were significantly associated with treatment outcomes.

Recommendation

- Since this topic had not been investigated earlier, the following recommendation would be appropriate for individuals, departments, organizations and institutions.
- For their well-being, clients must stick to their antihypertensive treatment and lifestyle changes. Clients should buy any medicines unavailable at the hospital pharmacy from private pharmacies as they are essential. (FOR ALL HYPERTENSIVE CLIENTS)
- Practitioners should always look for poor Adherence and poor treatment outcomes. They can enhance Adherence by emphasizing the value of a patient's regimen, making it simple and customizing it to the patient's lifestyle. Healthcare professionals should assist hypertensive patients in developing systems that will remind them to take their medications. There should be a total collaboration between all the health professionals in the institution to promote patient education and medication counselling. (FOR HEALTH CARE PROFESSIONALS)
- Pharmacists have the responsibility of counselling all hypertensive patients about their treatment and possible side effects of the drugs. Pharmacists should also advise on the risk of not taking medications, and they should counsel at each visit without being tired. They also should advise about non-pharmacologic treatments of Hypertension. (FOR ALL PHARMACY PROFESSIONALS)
- The hospital should make all medicines available for the patients as soon as possible. The institution should assign competent and skilled health professionals for all chronic care cases. Besides, the hospital should prepare a place for pharmacists to counsel patients about their medication and non-pharmacological regimens and their importance in daily life. (YEKATIT 12 HOSPITAL MEDICAL COLLEGE. 2022)
- To direct their staff and the next graduate students of this school to investigate this topic extensively in collaboration with the hospital staff. (FOR SCHOOL OF MEDICINE)

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