Prescription Survey for Cardiovascular Drugs at Brahmonpara Upazila in Bangladesh

[A dissertation submitted to the Department of Pharmacy, Faculty of Allied Heath and Sciences, Daffodil International University, Dhaka. This report presented in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy.**]**

Submitted To

The Department of Pharmacy

Faculty of Allied Health Sciences

Daffodil International University

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APPROVAL

This Project paper, survey on "**Prescription Survey for Cardiovascular Drugs at Brahmonpara Upazila in Bangladesh.**" submitted to the Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to its style and contents.

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Declaration

I, Md. Shahariar Ridoy, hereby declare that, this project is done by me under the guidance of Ms. Farjana Islam Aovi, Assistant Professor, Department of Pharmacy, Daffodil International University, in partial fulfilment of the requirements for the degree of Bachelor of Pharmacy. The results embodied in this project have not been submitted to any other university or institute for the award of any degree.

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Certificate

This is to certify that the results of the investigation that are embodied in this thesis works are original and have not been submitted before in substance for any degree or diploma of this university. The entire present work submitted as a thesis work for the partial fulfillment of the degree of Bachelor of Pharmacy.

Ms. Farjana Islam Aovi

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Md. Shahariar Ridoy

Dedication

Dedicated to,

My Parents and Supervisor. . .

Abstract

Cardiovascular disease (CVD) refers to diseases that together damage the heart and blood arteries. The leading cause of mortality and morbidity in Bangladesh is cardiovascular disease. The purpose of this study was to determine the present prevalence of cardiovascular illnesses and the pattern of prescriptions in a specific region of Brahmonpara upazila in Bangladesh. Another goal is to compare the effectiveness of combination drugs to single prescribed treatments. To conduct a more successful clinical inquiry, this study also pays particular attention to the drug system. There was sufficient planning done prior to beginning this investigation between January and March 2023 for the selection of the specified regions in Brahmonpara upazila, Bangladesh.

This study has conducted among 116 cardiovascular patients where majority of the patients was male. Around 71% male were affected by cardiovascular diseases. The most prevalent diseases were angina and hypertension. The greatest percentage of patients, 36.20%, were affected by angina. Amon the prescribed therapeutics classes, coronary vasodilator was the highest in number (more than 18.7%). Antiplatelet and antihyperlipidemic combination medication was the highest prescribed medication (more than 15.5%). This particular study has an extensive analysis of the medication patterns of cardiovascular drugs which can help to ensure safe and effective medication.

Contents

Chapter One

Introduction

1. Introduction

The preponderance of diseases in the world are still triggered by cardiovascular problems [1]. In Bangladesh, (CVD) is a leading cause of death and morbidity [2]. The World Health Organization (WHO) estimates that 17.7 million people worldwide died from cardiovascular diseases (CVDs) in 2015, accounting for 31% of all fatalities. People from low- and middle-income nations, like Bangladesh, where 80% of these deaths take place, are those most impacted [3][4].

The most prevalent CVDs at the moment are Ischemic heart-disease, stroke (stroke), peripheral vascular disease, heart failure, rheumatic heart disease, congenital heart disease, and acute myeloid leukemia [5]. The high frequency of metabolic syndrome, genetic susceptibility, and traditional risk factors all play significant roles. Poor eating habits, an abundance of saturated and trans fats, a high salt consumption, and insufficient exercise are all lifestyle-related factors that may also be significant [6]. Pediatricians and neonatologists are increasingly more aware of the need to identify and treat newborns with congenital cardiac problems as soon as possible [7]. A significant contributor to mortality among those with T2DM, CVD accounted for over half of all fatalities during the research period. The main causes were coronary artery disease and stroke [8]. 40% of all smoking-related deaths are attributable to cardiovascular disease (CVD) [9]. Major risk factors for cardiovascular disease include smoking and other tobacco use [10]. A higher risk of cardiovascular disease is linked to high-normal blood pressure [11]. Independently of one another, plasma triglycerides and cholesterol are risk factors for I.H.D., and an elevation of both of these plasma lipids entails the greatest risk for the disease [12]. The risk of cardiovascular disease is increased by higher low-density lipoprotein (LDL) cholesterol and high blood pressure [13]. SEVERAL important developments have recently given new impetus to prevention of coronary heart disease (CHD) through control of the plasma cholesterol level [14]. In addition to CVD, obesity and physical inactivity are linked to a number of other health and social issues that have a negative impact on both quality and quantity of life [15]. A significant modifiable risk factor for cardiovascular disease is physical inactivity [16]. A very high (and consequently excessive) SFA intake is linked to an increased risk of cardiovascular disease and a rise in cholesterol levels in the Western diet and lifestyle [17]. The research that is now available suggests that those who eat more fruits and vegetables frequently have lower prevalences of critical CVD risk factors such hypertension, obesity, and type 2 diabetes mellitus [18].

1.1 Hypertension

Virtually every element of the diagnosis, evaluation, monitoring, secondary causes, pharmacological and non-drug therapy of hypertension is covered by the ACC/AHA hypertension guidelines [19]. According to ACC/AHA recommendations, everyone with a blood pressure reading over 130/80 mm Hg has hypertension, and their blood pressure should be brought down to less than 130/80 mm Hg overall. Contrarily, according to the ESC/ESH guidelines, hypertension is defined as a reading of >140/90 mm Hg. The target level is a reading of 140/90 mm Hg for everyone, aiming for a reading of 130/80 mm Hg only in people at high cardiovascular risk, while always taking into account each person's ability to tolerate the proposed goal [20]. Two blood pressure thresholds (130/80 and 140/90 mm Hg) have been advocated for the start of pharmacological treatment; it is also advised to continue nonpharmacological treatment after the start of drug therapy. ACE inhibitors, ARBs, thiazide diuretics, and calcium antagonists are the first-line antihypertensive medication classes that are advised; among Black patients, thiazides and calcium antagonists are advised as monotherapy due to their higher relative BP-lowering efficacy. The AHA/ACC hypertension guidelines appear to have been created with the intention of being directly used in clinical practice utilizing standardized, non-standardized single clinic blood pressure data [21]. A common co-morbidity in people with type 2 diabetes is hypertension. In diabetes patients, Angiotensin-converting enzyme inhibitors (ACEI) or angiotensin receptor blockers (ARBs), thiazide-like diuretics, or dihydropyridine calcium channel blockers are examples of a pharmacological class with proven cardiovascular benefits that should be used as first-line therapy, according to the ADA (CCB) [22]

1.2 Heart Failure

In the United States, heart failure (HF) is a significant public health issue. In this nation, there are up to 5 million patients with HF, and each year, close to 500,000 people are given their first HF diagnosis. Each year, 6.5 million hospital days and 12 to 15 million clinic visits are directly related to the condition [23]. Most patients with HF brought on by left ventricular systolic dysfunction react well to pharmacological and nonpharmacological therapies, leading to improved survival and good quality of life. Nonetheless, even receiving the best possible medical care, some individuals may not get well or their symptoms return quickly [24]. An ACE inhibitor, a diuretic, a beta-adrenergic blocker, and (often) digitalis should consistently be used in conjunction to treat the majority of patients with symptomatic left ventricular dysfunction [25].

1.3 Myocardial infraction

The whole set of guidelines, together with the ACC/AHA Class I, II, and III recommendations, are available in the Journal of the American College of Cardiology's November 1996 issue.

The patient with suspected acute MI should receive the following treatments as soon as they arrive in the emergency department: (1) oxygen via nasal prongs; (2) sublingual nitroglycerin (unless systolic arterial pressure is less than 90 mm Hg or heart rate is less than 50 or greater than 100 bpm); (3) adequate analgesia (with morphine sulfate or meperidine); and (4) aspirin, 160–325 mg orally. Moreover, a 12-lead electrocardiogram (ECG) needs to be done.

In long-term the patient should continue taking aspirin, a/3-adrenoceptor blockers, and a certain dose of an ACE inhibitor for an undetermined amount of time following acute MI. The patient should receive instructions on how to reach their ideal weight as well as information on a diet low in cholesterol and saturated fat. Drug therapy should be administered to the patient whose low-density lipoprotein (LDL) cholesterol reading is greater than 130 mg/dL despite diet in order to lower LDL to less than 100 rag/alL. Quitting smoking is crucial [26].

1.4 Ischemic heart disease

These recommendations are meant to be used by adult patients with stable ischemic heart disease (IHD), including those who have recently developed chest pain (also known as low-risk unstable angina) or stable pain syndromes. The latter group of patients includes those who have "ischemic equivalents," such as dyspnea or arm pain when active [28]. When comparing men and women, there are gender-related differences in the ischemic heart disease epidemiology, presentation, diagnostic testing, and management [27]. Chelation therapy has been promoted as a potential noninvasive method of enhancing blood flow in atherosclerotic channels, treating angina, and preventing cardiac events. It entails a series of intravenous infusions of disodium ethylene diamine tetraacetic acid (EDTA) combined with other drugs [28]. Repeat procedures are frequently required after revascularization procedures. After receiving the most aggressive medical treatment, patients still have symptoms. In addition to being a promising alternative to conventional pharmaceutical treatments, gene therapy may also be helpful in refractory disease. Growth factor gene therapy with isoforms of VEGF, FGF, and HGF promotes angiogenesis, lowers apoptosis, and provides protection for the ischemic heart [29]. Biopharmaceutical-based therapy, such as protein, gene, and cell therapy, has enhanced traditional surgery-based treatment in the management of ischemic heart disorders. The use of drug-eluting stents, coronary artery bypass graft surgery, and anti-thrombosis are the mainstays of conventional medical therapy [30].

1.5 Angina

Ischemic heart disease frequently manifests as chronic angina [31]. The proportion of patients who are successfully managed with medical therapy alone is likely to rise when standard and innovative treatments are used in combination.

Calcium-channel blockers and beta-blockers of the -adrenergic receptor are the first-line anti-anginal medications, and several studies have demonstrated their ability to stop angina and myocardial ischemia. Calcium channel blockers act on L-type Ca2+ receptors and lead to systemic and coronary vasodilatation, reducing afterload and improving myocardial blood flow.

In addition to acting as a nitric oxide donor, nicorandil also opens sarcolemma K+-adenosine triphosphate (K-ATP)-dependent channels, inducing K+ efflux, L-type Ca2+ channel hyperpolarization, and coronary and systemic vasodilation. Nicorandil monotherapy has similar positive effects to metoprolol, amlodipine, diltiazem, and nitrates [32].

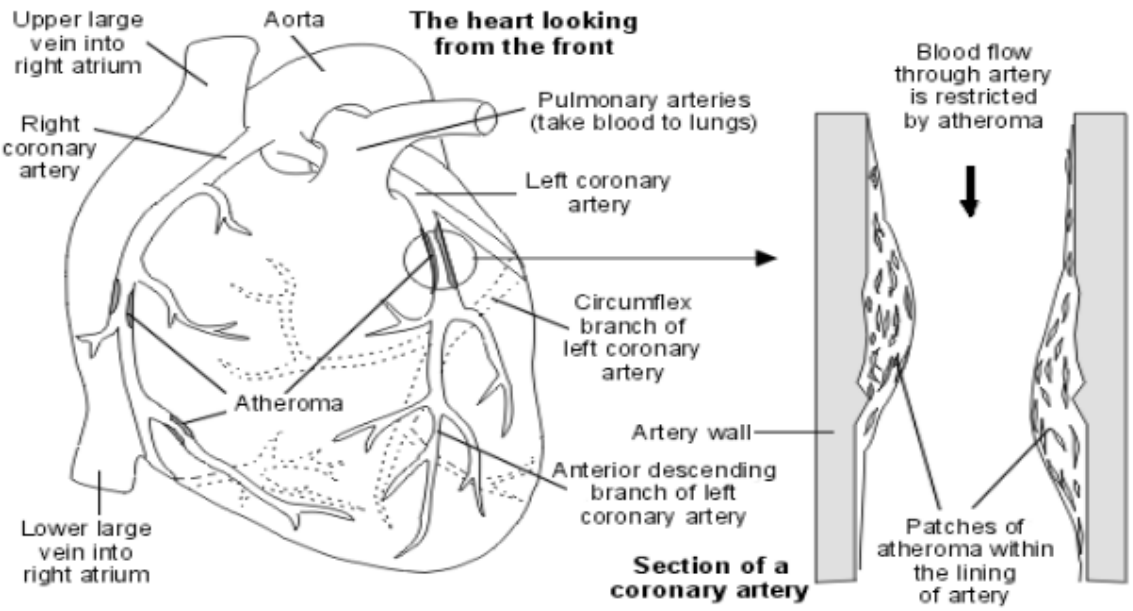

Figure 1.5: Angina

1.6 Congenital heart disease.

The most prevalent congenital condition affecting babies is congenital heart disease. Modern cardiovascular surgery and treatment have made it possible for the majority of patients to live to maturity [33]. Congenital heart disease comprises cardiac structure defects that develop prior to birth. Several treatments are prescribed based on the severity of the condition, and in more severe cases, surgery or a heart transplant, as is the case with endocarditis, may be necessary to heal damaged heart valves [34].

1.7 Management systems

The main cause of death worldwide is cardiovascular disease, which affects a variety of people at various stages along the cardiovascular continuum. Due to their complimentary effects on the sympathetic nervous system and renin-angiotensin-aldosterone system, two interconnected pathways that affect cardiovascular risk and disease outcomes, beta-blockers in conjunction with ACE inhibitors are of particular interest [35]. Combinations of statins, aspirin, and beta-blockers increase survival in high-risk patients with cardiovascular disease; however, despite the study being corrected for congestive heart failure, the addition of an ACE inhibitor did not result in any extra benefit [36]. Although monotherapy has been demonstrated to be successful in treating hyperlipidemia, a combined therapy regimen may be necessary for a thorough strategy. Presently, there are five main groups of antihyperlipidemic medications (Table 2): statins, fibric acid derivatives, bile acid binding resins, nicotinic acid derivatives, and medications that prevent the absorption of cholesterol [37]. The combination of a calcium antagonist and a β-blocker is statistically more effective than either monotherapy [38]. The administration of antianginal medicines, especially beta-blockers, appears to have a positive impact on the detrimental prognostic effect of exercise ischemia in patients with coronary heart disease [39]. By boosting coronary blood flow, lowering myocardial oxygen demands, or both, nitrates, beta blockers, and calcium channel blockers work to balance out the myocardial supply and demand [40]. It is known that a number of general strategies and pharmaceutical treatments can effectively manage hypertension. Diuretics are frequently used to treat hypertension, particularly low dose thiazides and thiazide-like diuretics [41]. Diuretics of the thiazide class are less expensive and more effective at preventing one or more primary causes of CVD. They ought to be chosen as the initial antihypertensive therapy [42]. The numerous hemodynamic effects of calcium channel blockers make them potentially useful in treating a variety of cardiovascular ailments [43].

Chapter Two

Literature review

2. Literature review

2.1 Title

Adherence to drugs that prevent cardiovascular disease: meta-analysis on 376,162 patients.

Authors: Naderi SH, Bestwick JP, Wald DS. Adherence to drugs that prevent cardiovascular disease: meta-analysis on 376,162 patients. The American journal of medicine. 2012 Sep 1;125(9):882-7.

In a recent study, the following 7 pharmacological classes were examined in a meta-analysis: aspirin, Ace inhibitors, angiotensin receptor blockers, beta-blockers, calcium-channel blockers, thiazides, and statins, which included data on 376,162 individuals from 20 studies. The risk of coronary heart disease is significantly decreased by combination therapy, specifically with aspirin, cholesterol- and blood pressure-lowering medications, but the entire preventative benefit is only experienced if treatment is continued forever [44].

2.2 Title

Use of cardiovascular medications in the elderly

Authors: Raza JA, Movahed A. Use of cardiovascular medications in the elderly. International journal of cardiology. 2002 Oct 1;85(2-3):203-15.

For people 65 and older, cardiovascular disease is the main cause of death. Even though they only make up 12.4% of the US population, seniors are responsible for one-third of all prescription spending. Nonetheless, it has been demonstrated that the rate of cardiovascular morbidity and mortality can be decreased in these patients by using cardiovascular drugs as directed. Significant structural and molecular changes occur in the elderly as a result of aging normally and the disease process. Elderly patients' autonomic nervous system, kidney, and liver alterations affect how most drugs are metabolized and have clinical effects. Those who are elderly are more vulnerable to side effects and negative drug reactions. To provide the elderly patient with the best treatment possible, doctors must have a thorough awareness of the normal aging processes, the abnormal changes brought on by disease processes, and the changes in the pharmacology of medications in the aged [45]

Chapter Three

Purpose of the Study

3. Purpose of the study

- The prevalence of any cardiovascular diseases among the people in Brahmonpara upazila, Bangladesh;
- Identification of various age group who are “at risk” for cardiovascular disease.
- Identification of various therapeutic classes of medications which are used to treat cardiac diseases.
- Identify the guidelines for the prevention, detection and management of chronic heart Cardiovascular disease.
- Identify clinical guidelines CVD management.
- Use of medications to treat cardiovascular disease.
- To make comparison between single prescribed medication and combination therapy.

Chapter Four

Methodology

4. Methodology

Prior to completing this inquiry between January and March 2023, enough planning for the identification of the specific regions in Brahmonpara upazila, Bangladesh, was completed. A few of the retail pharmacies were visited for the interview. In total of 116 patient's prescription had been evaluated in this study. The study was conducted when the patients has come to take suggestions regarding the medication in the retail pharmacy shop. Relevant data were collected from Google scholar, Science direct, Biomedical and pharmacology journals and Scopus, Journal of the American college of cardiology, Journal of hypertension, Circulation etc.

Chapter Five

Result and Discussion

5. Result and Discussion

The following study on prescription trends for cardiovascular drugs was conducted in a few retail pharmacies in the Brahmonpara upazila, Bangladesh. In total, 116 patient prescriptions were examined during this investigation.

5.1 Gender

	Number of Patients (n=116)	Percentage (%)
Male	82	71
Female	34	29

Table 5.1: Gender

- In this study majority 71% of patients were male and 29% were female. Cardiovascular diseases were more predominant in males than males in this particular area.

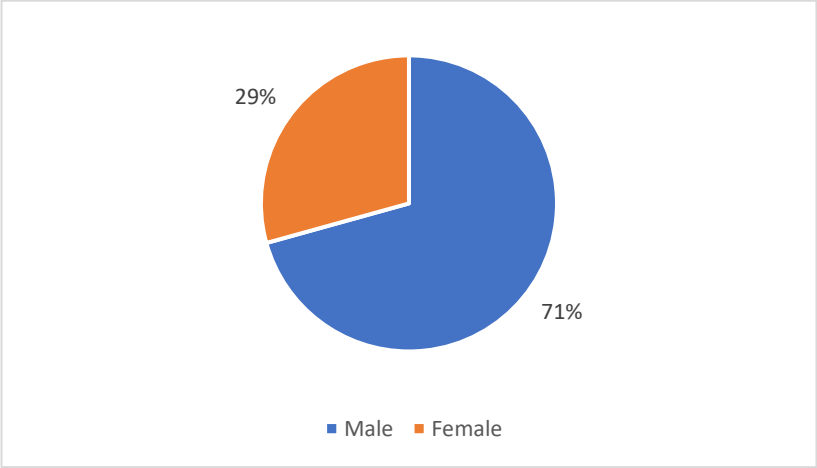

Figure 5.1: Gender

5.2 Various medical conditions

Medical condition	Number of patients (n=116)	Percentage (%)
Hypertension	38	32.75
Stroke	8	6.89
Ischemic heart disease	16	13.79
Heart failure	8	6.89
Heart attack	4	3.44
Angina	42	36.20

Table 5.2: Various medical conditions

- The prevalence of several medical disorders was discovered by this investigation. Angina and hypertension were the most prevalent conditions in these patients. Angina, which was the most common type, impacted about 36.20 % of the patients. Around 32.75 % of these patients had hypertension, which was the second highest percentage. Only 3.44% of the patients experienced a heart attack, whereas nearly 13.79% of patients had ischemic heart disease, 6.89% had strokes, and 6.89% had heart failure.

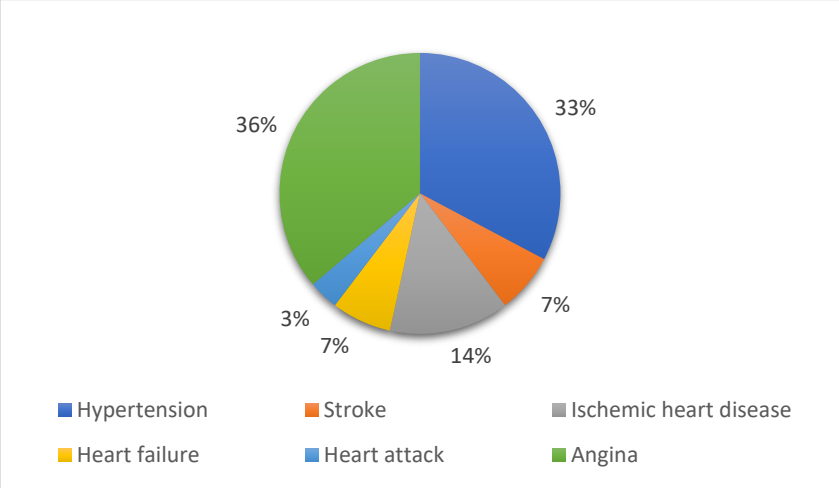

Figure 5.2: Various medical conditions

5.3 Number of therapeutic classes prescribed

	Number of patients (n=116)	Percentage (%)
Anxiolytics	6	5.1
Ace-2 receptor blocker	4	4
Antihyperlipidemic	14	12
Antianginal	6	5.1
Coronary vasodilators	22	18.7
Calcium channel blocker	8	6.7
Anti-platelet	18	15.5
Ace inhibitor	8	6.7
Beta-blocker	18	15.5
Diuertics	6	5.1
Anticoagulants	2	1.6
Positive inotropic drug	4	4

Table 5.3: Number of therapeutic classes prescribed

- In this study, physicians prescribed different therapeutic classes of drugs to the patients. Coronary vasodilator was the highest prescribed therapeutics class (18.7%). The second highest prescribed class was anti-platelet and beta-blocker 15.5% for both.

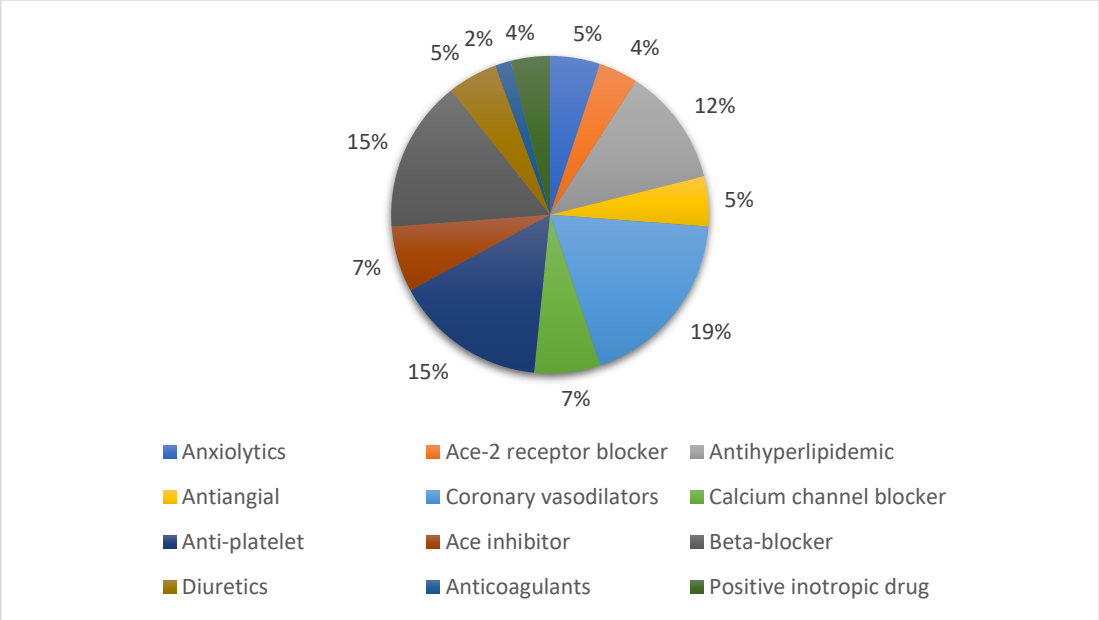

Figure 5.3: Number of therapeutic classes prescribed

5.4 Combination drug prescribed.

;	Number of patients	Percentage (%)
ACE inhibitor + Beta blocker	8	6.8
Beta blocker + Angiotensin receptor antagonist	6	5.1
Antianginal + Antihyperlipidemic	14	12
Beta blocker + Antihyperlipidemic	10	4.3
ACE inhibitor + Antihyperlipidemic	6	8.6
ACE inhibitor + Antianginal	6	5.1
Beta blocker + Diuretics	12	10.3
β blocker + Antianginal	10	13.7
β blocker + calcium channel blocker+ Antihyperlipidemic	4	3.4
β blocker + calcium channel	2	1.7
Antihyperlipidemic + Angiotensin II receptor antagonist	2	1.7
Antihyperlipidemic + Coronary vasodilator	6	5.1
ACE inhibitor + Diuretics	2	1.7
Antianginal + Coronary vasodilator	6	5.1
β blocker + Antihyperlipidemic + ACE inhibitor	2	1.7
ACE inhibitor + calcium channel blocker	8	6.8
Antiplatelet+ Antihyperlipidemic	16	15.5
Antiplatelet+ coronary vasodilators	18	8.6
Antiplatelet+ Ace inhibitor	2	1.7

Table 04: Combination drug prescribed

- Among all the prescriptions, the study found most of the patients has prescribed combination drugs than single-prescribed medication. Antiplatelet and antihyperlipidemic combination medication was the highest prescribed medication (more than 15.5%). Around 13.7% of the patients have been prescribed Beta-blocker and antianginal combination medications.

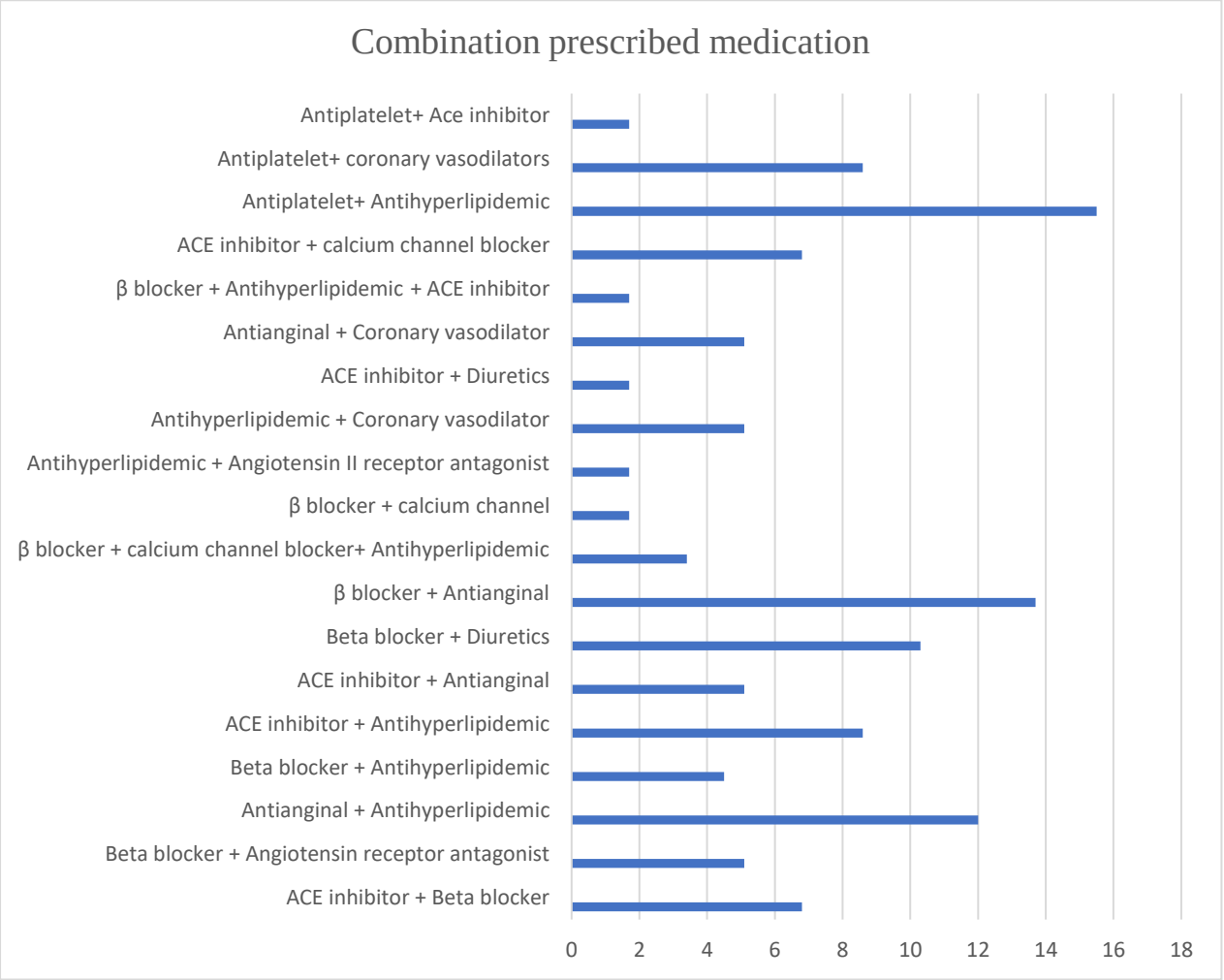

Figure 03: Combination drug prescribed

Chapter Six

Conclusion

6. Conclusion

This study is mainly clinical based study on cardiovascular diseases which can play a vital role in the safe and efficient medication system for Bangladesh. This study has comprised an extensive analysis of the prevalence of cardiovascular diseases and medication systems in this area. This Study reveals majority of the people in this area are suffering from angina and hypertension. Most of the patients has been prescribed combination drug than single prescribed medication. Highest prescribed combination medications are antiplatelet and antihyperlipidemic combination. This study will contribute some fruitful outcome in the health sector of Bangladesh and must endure sage and effective medication.

Chapter Seven

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