RETROSPECTIVE ASSESSMENT OF ANGINA PECTORIS CASES IN GOVERNMENT HOSPITAL TIRUPUR

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THE TAMILNADU Dr. M.G.R.MEDICAL UNIVERSITY

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In partial fulfillment of the requirement for the award of the degree of

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In

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Submitted by

REG. NO: 261540402

Under the guidance of

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EVALUATION CERTIFICATE

This is to certify that dissertation work entitled "**RETROSPECTIVE ASSESSMENT OF ANGINA PECTORIS CASES IN GOVERNMENT HOSPITAL TIRUPUR"** Submitted by **REG NO: 261540402** to THE TAMILNADU Dr.M.G.R. MEDICAL UNIVERSITY, CHENNAI, in partial fulfillment for the degree of **MASTER OF PHARMACY** is a bonafide thesis work carried out by the candidate at the department of pharmacy practice, The Erode college of pharmacy and Research institute, Erode, was evaluated by us during the academic year **2016-2017.**

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This is to certify that the investigation described in the dissertation entitled "**RETROSPECTIVE ASSESMENT OF ANGINA PECTORIS CASES IN GOVERNMENT HOSPITAL TIRUPUR"** submitted by **REG NO: 261540402** to THE TAMILNADU Dr. M.G.R.MEDICAL UNIVERSITY, CHENNAI. In partial fulfillment for the award of degree of **MASTER OF PHARMACY IN PHARMACY PRACTICE** is the bonafide work carried out under the guidance and direct supervision of **Prof.Dr.R.SENTHIL SELVI M.Pharm., Ph.D.,** Department of pharmacy practice, The Erode college of Pharmacy and Research institute, Erode-638112, during the academic year **2016-2017.**

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This is to certify that Mr. SAVYA SAI KP., Post graduate student at The Erode college of pharmacy, Erode was doing a research project under in government district headquarters hospital, tirupur as a part of his M.Pharm (pharmacy practice) curriculum. The project was titled ***"RETROSPECTIVE ASSESMENT OF ANGINA PECTORIS CASES IN GOVERNMENT HOSPITAL TIRUPUR"*** and was done during the periods of November 2016 to June 2017(7 months). I wish him success in all future endeavors.

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DECLARATION

The research work embodied in this dissertation work entitled " **RETROSPETIVE ASSESSMENT OF ANGINA PECTORIS CASES IN GOVERNMENT HOSPITAL TIRUPUR"** was carried out by me in the department of pharmacy practice, The Erode college of pharmacy, erode, under the direct supervision of **Prof. Dr.R.Senthil Selvi., M.Pharm., Ph.D.,** The Erode college of pharmacy, Erode. Thos dissertation submitted to **THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY, CHENNAI,** as a partial fulfillment for the award of **degree in Master of Pharmacy** in pharmacy practice during the academic year 2016-2017. The work is original and has not been submitted in part or full for the award of any degree or diploma of this or any other university.

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INDEX

ABBREVIATIONS

ATP	:	Adenosine triphosphate
ADR	:	Adverse Drug Reaction
CAD	:	Coronary Artery Disease
BMI	:	Body Max Index
ECG	:	Electro Cardiogram
ETT	:	Exercise Tolerance Test
MPS	:	Myocardial Perfusion Scintrigraphy
MR	:	Magnetic Resonance
IGT	:	Impaired Glucose Tolerance
CHD	:	Cardiac Heart Disease
CAS	:	Carotid Artery Stenosis
BP	:	Blood Pressure
WHO	:	World Health Organisation
CFVR	:	Coronary Flow Velocity reserve
NO	:	Nitric Oxide

INTRODUCTION

RETROSPECTIVE STUDIES

Retrospective studies are conceived after some people have already developed the outcomes. The investigation finds the subjects and begin collect information about them after outcomes have already occurred. These studies are very efficient for studying rare or unusual exposure, but there are many potential problems. Sometimes exposure status is not clear when its not necessary to go back, in time and use whatever data is available, especially because the data being used was not designed to answer a health question.

A cohort is identified and classified as to exposure to the risk factor at some date in the past and followed up to the present to determine incidence rate. This is called a retrospective cohort studies/ historical prospective study prospective study of past data.

Retrospective study is an epidemiological study in which participating individuals are classified as either having some outcomes (cases) or lacking (control); The out come may be a specific disease, and the person histories are examined for specific factors that might be associated with the outcomes. Cases and controls are often matched with respect to certain demographic or other variables but need not be.[1]

ADVANTAGES

Retrospective cohort studies exhibit the benefits of cohort studies and have distinct advantages relative to prospective ones:

- They are conducted on a smaller scale.
- They typically require less time to complete.
- They are generally less expensive, because resources are mainly devoted to collecting data.
- They are better for analyzing multiple outcomes.
- In a medical context, they can potentially address rare diseases, which would necessitate extremely large cohorts in prospective studies.

Retrospective studies are especially helpful in addressing diseases of low incidence, since affected people have already been identified so . The fact that retrospective studies are generally less expensive than prospective studies may be another key benefit.[2]

DISADVANTAGES

Certain important statistics cannot be measured. Large bias may be introduced both in the selection of control and in recalls of past exposure to risk factors.

DRUG UTILIZATION STUDY

Drug utilization study can be targeted towards any of the following links in the drug use chain:

- The systems and structures are surrounding drug use

  E.g: How drugs are ordered, delivered and administrated in a hospital or health care facility.
- The processes of drug use

  E.g: What drugs are used and how they are used and doses, their use comply with the relevant criteria, guidelines or restriction.
- The outcomes of drug use.

  E.g: Efficay, Adverse drug reactions and the use of resources such as drugs, lab tests, Hospital beds, or procedures.[3]

CROSS-SECTIONAL STUDIES

Cross sectional data provide a snap shot of drug use at a particular time (e.g – over a year a month or a day). Used for making comparison with similar data collected over the same period in a different country, health facility or ward and could be drug, problem, indication, prescriber or patient based. It can be carried out before and after an educational or other interventions. studies can measure drug use, or can be criteria based to assess drug use in relation to guidelines or restrictions.

LONGITUDINAL STUDIES

Its about the trend in drug use. Drug based longitudinal data can be on total drug use as obtained through a claims data base or the data may be based on a statistically valid sample of pharmacies or medical practitionars. It can be obtained by repeated cross sectional studies. Data collection is continuous, but the practitioner surveyed therefore the patients are continually changing. It gives information about over all trends, but not about prescribing trends for individual practitioners or practices.

CONTINUOUS LONGITUDINAL STUDIES

Here, data at the individual practitioners and patient level can be obtained. Claim data base are often able to follow individuals patients unique identifier. Data provide information about concordance with treatment based on the period between prescriptions co-prescribing, duration of treatment etc.. These data bases are very powerful and can address a range of issue including reasons changes in therapy , ADR and health outcoms.

ANGINA PECTORIS

Angina pectoris is a symptom that in appropriate circumstances indicates chest pain arising from the heart. The fundamental cause is often regarded as an imbalance between the supply and demand of the limiting substrate for the heart, namely oxygen. The belief is that such an imbalance is synonymous with the presence of myocardial ischaemia. The definition of ischaemia is surprisingly controversial.[4,5]

However, and the heart never demands or even has the capability to demand oxygen. A less continuous idea is that an unsteady state exists between the provision of oxygen to the muscle of the heart and the production of adenosine triphosphate (ATP).[2] There are rarer causes of angina, such as anaemia, in which the oxygen content of blood is reduced, or aortic stenosis, in which the work of the myocardium is greatly increased. However, the cause is usually an imbalance between the work of the heart muscle, requiring the consumption of ATP, and limitations to blood flow. By far, the most common pathological defect causing reduced coronary blood flow is obstruction due to atheromatous lesions in the coronary arteries. These

lesions in the arteries develop in early life,[6][7] slowly enlarge, and manifest themselves as angina or a cardiac event in middle to old age.

Angina pectoris was probably recognized many centuries ago,[8] but the first clear and elegant description was by Heberden[9] in the 18th century. Debate followed as to the exact cause, and the work of many physicians such as Hunter, Black, Fothergil, Jenner, Parry, and Burns established the link of angina to the heart and to abnormalities of the coronary arteries.[10] By the end of the 19th century, Osler[11] understood angina and the concept of myocardial infarction. It was Obrastzow and Straschenko[12] in 1910, and then Herrick,[13] who first described myocardial infarction in a patient. More recent work has established the role of the unstable, fissured, or eroded atheromatous plaque in the coronary artery,[14] thrombosis in the coronary artery leading to myocardial infarction,[15],[16] and the effects of platelet activation and accumulation on the vessel wall.[17–19] Most of these acute abnormalities in the vessel wall lead to acute coronary syndromes or myocardial infarction and carry a poor immediate progress. Chronic angina pectoris in contrast is usually a consequence of a fixed obstruction within the coronary artery.

The atheromatous plaque may expand outwards from the lumen of the artery (the Glagov phenomenon), and only late in the progression of atheroma does the lesion reduce the size of the lumen. The extent to which the lumen is occluded by a lesion in the absence of an acute coronary syndrome is a poor guide to the stability of the plaque or the future natural history.[20] Most complete coronary occlusion events resulting in ST-elevation myocardial infarction, occur at plaques with <40% stenosis of the vessel lumen, which therefore were not flow-limiting before plaque rupture or erosion. Conversely, plaques causing significant stenosis with flow limitation are often heavily calcified and have a relatively thick fibrous cap, both of which pathological phenomena lead to plaque stability and reduced probability of rupture. In our opinion, this reflects different pathophysiological processes occurring in the coronary artery wall, resulting in the different phenotypic manifestations of coronary artery disease (CAD). As a consequence, many patients with stable angina have a much better prognosis than those with acute coronary syndromes, suggesting that these two phenotypes do not always co-exist. Superimposed statin therapy modifies these risk profiles further, making it more difficult to identify the subgroup of stable angina patients who are most likely to develop acute coronary syndromes.

In modern developed societies, the prevalence of CAD in the whole population is about 6%, and the prevalence of angina is 3%. The prevalence depends critically on age, sex, ethnicity, economic and social factors, and the demographics of the population.

DEFENITION

Angina Pectoris is a kind of chest pain that arises from reduced or insufficient blood flow to the heart. Lack of sufficient blood flow means that your heart is not getting sufficient oxygen. The pain is mostly triggered by emotional stress or physical activity. Angina Pectoris is also known as Stable angina and this is the most common kind of angina. Stable angina has a predictable pattern of chest pain based on what you are doing when the pain is felt and can be tracked. Tracking stable angina can also help you manage its symptoms with case.

Angina mostly happens when the heart muscle requires more blood than it is receiving, for example, at the time of strong emotions or physical activity. Too much-narrowed arteries may let enough blood to reach heart when the demand for oxygen is low, but the heart requires more oxygen during physical exertion like exercise.[21]

TYPES

Five different kinds of angina have been identified, with the two most common being

- stable angina

  and
- unstable angina

Stable angina

occurs when the heart has to work harder than normal, during exercise, for example. It has a regular pattern, and if you already know that you have stable angina, you will be able to predict the pattern. Once you stop exercising, or take medication (usually nitroglycerin) the pain goes away, usually within a few minutes.

Unstable angina

It is more serious, and may be a sign that a heart attack could happen soon. There is no predictable pattern to this kind of angina; it can just as easily occur during exercise as it can while you are resting. It should always be treated as an emergency. People with unstable angina

are at increased risk for heart attacks, cardiac arrest, or severe cardiac arrhythmias (irregular heartbeat or abnormal heart rhythm).

Less common kinds of angina include:

- variant angina
- microvascular angina
- atypical angina

Variant angina

It is also known as Prinzmetal's angina, It often occurs while someone is resting (usually between midnight and 8:00 in the morning), and it has no predictable pattern—that is, it is not brought on by exercise or emotion. This kind of angina may cause severe pain, and is usually the result of a spasm in a coronary artery. Most people who have variant angina have severe atherosclerosis (hardening of the arteries), and the spasm is most likely to occur near a buildup of fatty plaque in an artery.

Microvascular angina

Sometimes referred to as Syndrome X—occurs when tiny vessels in the heart become narrow and stop functioning properly, even if the bigger arteries are not blocked by plaque. Usually it is treated with common angina medications.

Atypical angina

Often doesn't cause pain, but you may feel a vague discomfort in your chest, experience shortness of breath, feel tired or nauseous, have indigestion, or pain in your back or neck. Women are more likely than men to have feelings of vague chest discomfort. In order to understand what causes angina, it might be helpful to first understand a little bit about how your heart works. [22]

EPIDEMIOLOGY

As of 2010, angina due to ischemic heart disease affects approximately 112 million people (1.6% of the population) being slightly more common in men than women (1.7% to 1.5%).[23]

In the United States, 10.2 million are estimated to experience angina with approximately 500,000 new cases occurring each year. Angina is more often the presenting symptom of

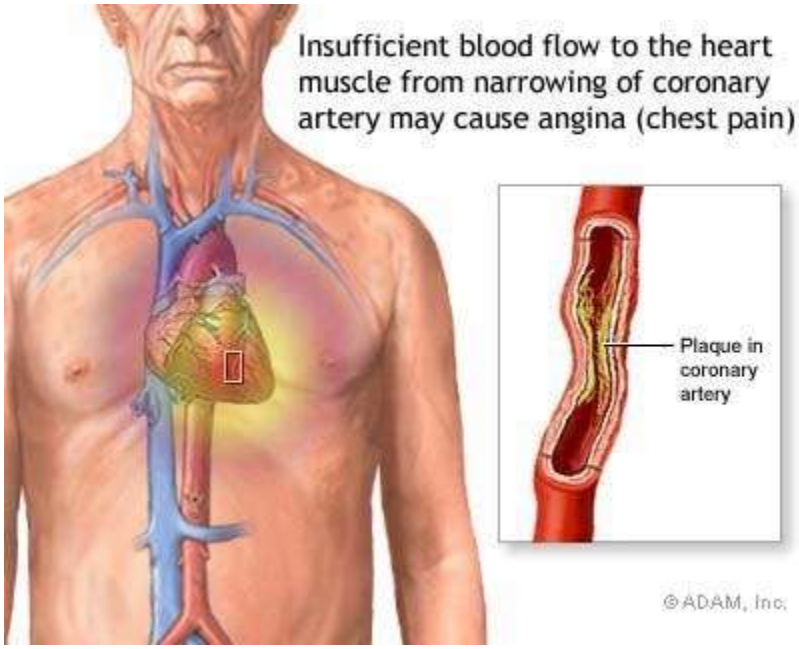
coronary artery disease in women than in men. The prevalence of angina rises with increasing age, with a mean age of onset of 62.3 years.[24] After five years post-onset, 4.8% of individuals with angina subsequently died from coronary heart disease. Men with angina were found to have an increased risk of subsequent acute myocardial infarction and coronary heart disease related death than women. Similar figures apply in the remainder of the Western world. All forms of coronary heart disease are much less-common in the Third World, as its risk factors are much more common in Western and Westernized countries; it could, therefore, be termed a disease of affluence. The adoption of a rich, Westernized diet and subsequent increase of smoking, obesity, and other risk factors has led to an increase in angina and related diseases in countries such as China.[24] Angina pectoris is more often the presenting symptom of coronary artery disease in women than in men, with a female-to-male ratio of 1.7:1. It has an estimated prevalence of 4.6 million in women and 3.3 million in men. In one analysis, this female excess was found across countries and was particularly high in the American studies and higher among nonwhite ethnic groups than among whites. [25]

ETIOLOGY

Your heart muscle needs a constant supply of oxygen. The coronary arteries carry blood containing oxygen to the heart.

When the heart muscle has to work harder, it needs more oxygen. Symptoms of angina occur when the coronary arteries are narrowed or blocked by atherosclerosis or by a blood clot.

The most common cause of angina is coronary artery disease. Angina pectoris is the medical term for this type of chest pain.[26]



Stable angina is less serious than unstable angina, but it can be very painful or uncomfortable.

There are many risk factors for coronary artery disease. Some include:

- Diabetes
- High blood pressure
- High LDL cholesterol and low HDL cholesterol
- Smoking

Anything that makes the heart muscle need more oxygen or reduces the amount of oxygen it receives can cause an angina attack in someone with heart disease, including:

- Cold weather
- Exercise
- Emotional stress
- Large meals

Other causes of angina include:

- Abnormal heart rhythms (your heart beats very quickly or your heart rhythm is not regular)
- Anemia
- Coronary artery spasm (also called Prinzmetal's angina)
- Heart failure
- Heart valve disease
- Hyperthyroidism (overactive thyroid)[27]

PATHOPHYSIOLOGY

Oxygen is delivered to the heart by larger surface vessels (epicardial vessels) and intramyocardial arteries and arterioles, which branch out into capillaries. In a healthy heart, there is little resistance to blood flow in the epicardial vessels. When atherosclerotic plaques are present, blood flow is impeded, but the process of autoregulation can compensate to a degree. Autoregulation is the dilation of the myocardial vessels in response to decreased oxygen delivery. Through autoregulation, blood flow to the heart changes rapidly as a result of higher demand. The most important mediators involved in myocardial perfusion are adenosine (a potent vasodilator), other nucleotides, nitric oxide, prostaglandins, carbon dioxide, and hydrogen ions[.28] Obstructions to the coronary blood flow can be fixed, as with atherosclerosis, or dynamic, as with coronary spasm. Some patients may have both characteristics, and this is termed *mixed angina*.

A single-cell endothelial layer separates the vascular smooth muscle from the blood. When intact, this vascular endothelium permits vasodilation and prevents thrombus and sclerotic plaque formation. The coronary artery endothelium synthesizes fibronectin, interleukin-1, tissue plasminogen activator, certain growth factors, prostacyclin, platelet-activating factor, endothelin-1, and nitric oxide (NO). NO is synthesized from L-arginine by nitric oxide synthase. NO then causes relaxation of the arterial smooth muscle. Loss of endothelial layer results in less NO and can occur because of mechanical or chemical assaults or from oxidized low-density lipoprotein (LDL). Endothelial function can be improved with angiotensin-converting enzyme inhibitors (ACEIs), statins, and exercise. The Canadian Cardiovascular Society developed a system of grading angina that is generally well accepted[29].

Table 1. Grading of Angina Pectoris by the Canadian Cardiovascular Society

Grade	Description
I	Angina occurs only with strenuous, rapid, or prolonged exertion at work or recreation
II	Slight limitation of ordinary activity, such as walking uphill; walking more than 2 blocks on level surface and climbing more than 1 flight of stairs; walking or stair climbing after meals, in the cold or wind, under emotional stress, or within a few hours after waking
III	Marked limitation of normal physical activity, such as walking 1 to 2 blocks and climbing 1 flight of stairs
IV	Inability to carry on any physical activity without discomfort, and angina *may* be present at rest

Source: Reference 3.

SIGNS AND SYMPTOMS

Angina itself is a symptom (or set of symptoms), not a disease. Any of the following may signal angina:

- An uncomfortable pressure, fullness, squeezing, or pain in the center of the chest
- It may also feel like tightness, burning, or a heavy weight.
- The pain may spread to the shoulders, neck, or arms.
- It may be located in the upper abdomen, back, or jaw.
- The pain may be of any intensity from mild to severe.

Other symptoms may occur with an angina attack, as follows:

- Shortness of breath
- Lightheadedness
- Fainting
- Anxiety or nervousness
- Sweating or cold, sweaty skin
- Nausea
- Rapid or irregular heart beat
- Pallor (pale skin)
- Feeling of impending doom

These symptoms are identical to the signs of an impending heart attack[30][31]

RISK FACTORS

Angina is most often caused by CAD, most of the **risk factors** are the same. They include:

- **High cholesterol**
- **High blood pressure**
- **Smoking**
- **Diabetes**
- **Obesity**
- **Lack of physical activity**
- Age (greater for men over 45 years and women over 55 years)
- Family history of heart disease
- **Stress** and anxiety
- **Sleep deprivation**
- For women: a history of **preeclampsia and pregnancy-related diabetes**

It is also helpful to know what triggers your angina symptoms. Use the SecondsCount Tracking Your Angina Worksheet to record what you were doing each time before you had angina symptoms.

Here are some common triggers to monitor and avoid if possible:

- Very hot or very cold temperatures
- Big meals
- Physical activity
- Emotional stress
- Drinking (alcohol)
- Smoking [32]

DIAGNOSTIC TEST

Patient's medical history

History of similar condition, high blood pressure, high cholesterol, diabetes, smoking, alcohol intake, obesity etc. in the patient is important as these are important risk factors for angina. Someone in the family may have heart disease or angina as these conditions may run in families.

Physical examination

A complete physical examination includes assessment of weight, waist size, height (to assess Body mass index – BMI with respect to weight) and features of high blood cholesterol like spots over the eye lids or a hardened feel of the arteries at the wrist etc.[33]

Blood tests

Routine blood tests are prescribed to detect anemia (that may raise the risk of angina), cholesterol and glucose in blood as well as liver and kidney functions.

Urine examination is also advised to check on the kidneys. Liver and kidney function tests may guide medication to be used as some medications may not be used in patients with disorders of these organs.

Electrocardiogram (ECG or EKG)

This is a record of the rhythms and electrical activity of the heart. The test is a painless one where small electrodes or patches are stuck on various parts of the chest of the patient and the electrical activity of the heart is recorded onto a strip of paper.

Each heart beat has typical wave patterns and abnormalities of these waves (P, Q, R, S, T and U) may detect ischemia of the heart muscles in angina patients.[34]

Echocardiography

Echocardiography may be required to assess cardiac function, detect valve disease or cardiomyopathy as cause of angina.

Exercise tolerance test (ETT)

This is a similar test to ECG or EKG and is carried out while the patient is made to exercise under supervision. This may be with a treadmill or an exercise bike. This is also called a treadmill test. This measures the amount of exercise that is required for the heart to develop symptoms of angina

Myocardial perfusion scintigraphy (MPS)

This test is performed alternatively to ETT when ETT results are not diagnostic. This test involves injection of a small amount of radioactive substance into the patient's blood.

This is then viewed using a gamma camera. This camera tracks the movement of the dye as it passes through the blood vessels of the heart and helps detects narrowing and obstructions. It is performed when the patient is at rest and also when he or she is on the exercise bike or treadmill.

Coronary angiography

This is a more invasive test and may require a day of stay at the hospital. A thin flexible tube or catheter is threaded into a vein or artery at the groin (Femoral vein or artery) or at the arm (Brachial artery or vein). X rays are used to guide the catheter into the heart and coronary arteries. A dye is injected into the catheter to highlight the coronary arteries. Repeated X rays and films show up the site of blockages.

Other tests for angina

Other tests include Stress echocardiography, Multi slice CT scan, first-pass contrast-enhanced magnetic resonance (MR) perfusion (MRI) and MR imaging for stress-induced wall

motion abnormalities. These tests show the heart function as well as detect the area of calcified or hardened arteries that is leading to symptoms of angina.

Emergency diagnosis

For patients with unstable angina, treatment is a medical emergency. An immediate EKG or ECG is prescribed upon admission.

Blood tests like Troponin T levels and Creatinine K –MB levels are tested to look for damage to the heart muscles. A coronary angiography may also be performed to assess the size and site of blockage. [35][36]

TREATMENT

Drug therapy

The aim of drug therapy is to minimise symptoms and prevent progression of coronary artery disease. Short-acting nitrates are prescribed to relieve acute symptoms or anticipated angina. Drug therapy aims to reduce myocardial oxygen demand or increase coronary blood supply. The choice of drugs is influenced by factors such as comorbidities , tolerance and adverse effects.

Nitrates

Sublingual glyceryltrinitrate tablets or nitroglycerin spray remain the treatment of choice for rapid relief of acute symptoms and anticipated angina. Sublingual glyceryltrinitrate tablets are absorbed in the sublingual mucosa and take effect within a couple of minutes. The tablet can be discarded with resolution of chest pain to minimise adverse effects such as headache. Glyceryltrinitrate spray is equally effective and, due to its longer shelf-life, is more convenient for those with infrequent symptoms of angina.

Isosorbidedinitrate undergoes hepatic conversion to mononitrate, resulting in an onset of action of 3–4 minutes. It can provide an antianginal effect for up to one hour. Less commonly it is used as a chronic antianginal drug but requires multiple dosing, and tolerance limits its

usefulness. It is often used up to three times per day with a nitrate-free period of up to 14 hours to minimise tolerance.

Long-acting nitrates such as oral isosorbidemononitrate or transdermal patches are effective in relieving angina and can improve exercise tolerance. Chronic nitrate therapy is limited by the development of nitrate tolerance. A nitrate-free period of at least eight hours may reduce this problem. The mechanism of nitrate tolerance is not well established but involves attenuation of the vascular effect of the drug rather than altered pharmacokinetics.[37] A nitrate-free period restores the vascular reactivity of the vessel. Transdermal patches are generally used for 12 consecutive hours with a 12-hour nitrate-free period. There is no evidence that nitrates improve survival. Common adverse effects include headache, hypotension and light-headedness. Nitrates should not be prescribed for patients taking phosphodiesterase-5 inhibitors such as sildenafil due to the risk of profound hypotension. Other contraindications include severe aortic stenosis and hypertrophic cardiomyopathy.

Beta blockers

Beta blockers are first-line therapy to reduce angina and improve exercise tolerance by limiting the heart rate response to exercise.[38] Although they reduce the risk of cardiovascular death and myocardial infarction by 30% in post-infarct patients, their benefits in those with stable coronary artery disease are less certain.[39]

The drugs most widely used for angina in the context of normal left ventricular function are the beta1-selective drugs such as metoprolol and atenolol. Adverse effects include fatigue, altered glucose, bronchospasm, bradycardia, impotence and postural hypotension. Switching to a less lipophilic beta blocker such as atenolol may alleviate symptoms such as insomnia or nightmares. They are usually well tolerated in patients with emphysema who have predominantly fixed airways disease. Beta blockers should not be stopped abruptly due to the risk of rebound hypertension or ischaemia.

Calcium channel antagonists

Calcium channel antagonists improve symptoms of angina via coronary and peripheral vasodilation. They are indicated for those who cannot tolerate or have insufficient control of ischaemic symptoms on beta blockers alone. Non-dihydropyridine drugs such as verapamil and diltiazem also reduce heart rate and contractility. Verapamil has comparable antianginal activity to metoprolol and can be useful for treatment of supraventricular arrhythmias and hypertension. However, verapamil should be avoided in patients taking beta blockers owing to the risk of heart block, and in those with heart failure because of its negative inotropic effect. Diltiazem has a low adverse effect profile with a modest negative inotropic effect. Care should be taken when prescribing in combination with a beta blocker and in patients with left ventricular dysfunction.

The dihydropyridines such as amlodipine, felodipine and lercanidipine have greater vascular selectivity and minimal negative inotropic properties. They are therefore safer in patients with left ventricular dysfunction. Amlodipine is an effective once-daily antianginal drug that can be used in combination with a beta blocker. Long-acting nifedipine is a proven antianginal drug and is most effective when used in conjunction with a beta blocker.[40]

Contraindications to nifedipine use include severe aortic stenosis, obstructive cardiomyopathy and heart failure. Short-acting nifedipine is rarely used as monotherapy due to reflex tachycardia, which can worsen ischaemia and has been associated with a dose-related increase in mortality. It should therefore be avoided.

Nicorandil

Nicorandil is a potassium channel activator that improves coronary flow as a result of both arterial and venous dilation. It may be used in addition to beta blockers and calcium channel antagonists to control angina or in patients who are intolerant of nitrates. Nicorandil has been shown to reduce cardiovascular events by 14% in patients with chronic stable angina. Its use has been associated with headaches, hypotension, painful ulcers and genital and gastrointestinal fistulae.[41]

Ivabradine

Ivabradine can be considered for patients intolerant of, or insufficiently responsive to, other drugs. It acts on I^f channels in the sinus node to lower the heart rate of patients in sinus rhythm without affecting blood pressure, conduction or myocardial contractility. Ivabradine has been shown to reduce a composite primary end point of cardiovascular death and hospitalisation with myocardial infarction or heart failure. However, a recent placebo-controlled trial involving 19,102 patients with stable coronary artery disease found that adding ivabradine to standard therapy did not improve a composite outcome of death from cardiovascular causes, or non-fatal myocardial infarction.Ivabradine has been used in combination with beta blockers.[42]

Perhexiline

Perhexiline promotes anaerobic metabolism of glucose in active myocytes. Its use is limited by a narrow therapeutic window and high pharmacokinetic variability. Given its potential for toxic effects such as peripheral neuropathy and hepatic damage, it is usually reserved for patients whose angina is refractory to other therapies. It may be used safely with conscientious monitoring of clinical effects and regular measurement of plasma drug concentrations[. 43]

Additional beneficial effects can be obtained by using adjuncts such as

- Anti platelet drugs
- Treatment of hyperlipidemia
- Cytoprotectives[44]

Non-Medical, Non-Surgical Therapies for the Treatment of Angina Pectoris

The treatment of angina pectoris as an important symptom of coronary artery disease is usually focused on restoring the balance between myocardial oxygen demand and supply by administration of drugs interfering in heart rate, preload, after load, and coronary vascular tone. For non responders to drug therapy or for those with jeopardized myocardium, revascularization procedures such as coronary artery bypass graft surgery (CABG) and percutaneous transluminal coronary angioplasty (PTCA) are at hand. However, these therapies cannot stop the disease process and, at longer terms, angina may recur. It is not always possible to revascularize all the

patients who do not sufficiently react to medical treatment. In these group patients alternative therapies are more effective. A major difference between alternative therapies versus traditional therapies is that alternative therapy tends to look at the entire patient rather than simply treating a disorder as traditional treatments do. Some kinds of these therapies are applicable in all patients with coronary artery disease irrespective of their symptoms and the other ones would be considered in patients with refractory angina who are not suitable for revascularization.

- Consume a Healthy Diet
- Achievement or maintaining an ideal body weight
- Prevention of excess weight gain
- Treatment of obesity-Although prevention and treatment of obesity both depends on the same principles of energy balance, the application of the principles is completely different. For treatment of obesity, a large reduction in calorie intake of about 500 to 1000 kcal per day, along with increased physical activity, can result in a loss of approximately 8- 10% of body weight over the relatively short period of about 6 months
- A diet rich in vegetables and fruits.[45]

SUPPLIMENTS

It is ideal to get the body nutritional needs in foods. When that is not enough, a registered dietitian may also start a series of supplements to make up for nutrients not getting through the diet. Some of the more popular supplements for both healthy and those at risk for coronary artery disease include antioxidants such as vitamins C and E, B-complex, omega-3 fish oil and coenzyme Q10.The American Heart Association recommends 2-4 grams of Omega-3 per day for anyone with high triglycerides and at least 1 gram per day for anyone with documented coronary heart disease. According to the results of many clinical trials performed to clear the role of dietary supplements in the prevention and /or slowing the progression of cardiovascular diseases, the long-term effects of most dietary supplements other than for vitamins and minerals are not known, so these agents should be prescribed under professional supervision of physician or a registered dietitian.[46] [47]

Mind-body relaxation techniques

While living a type A lifestyle isn't typically categorized as a main risk factor for heart disease, learning how to deal with life and lower stress levels can help down road to recovery. Mind-body approach aimed at diminishing excess activation in the nervous system and thereby

improving one's own ability to modulate emotional and behavioral responses. Relaxation therapy is a broad term used to describe a number of techniques that promote stress reduction, the elimination of tension throughout the body, and a calm and peaceful state of mind. Relaxation techniques include behavioral therapeutic approaches that differ widely in philosophy, methodology, and practice. There are two basic methods, deep methods include autogenic training, progressive muscle relaxation, and meditation (although meditation is sometimes distinguished from relaxation based on the state of "thoughtless awareness" that occurs during meditation). Brief methods include self-control relaxation, paced respiration, and deep breathing. Brief methods generally are less time consuming and often represent a summarized form of a deep method. In order to be able to evoke the relaxation, several months of practice (at least three times per week) is required. Some of the more popular relaxation techniques include massage therapy, yoga, listening to music, prayer and meditation

Psychological consideration and stress management

The relationship between depression and CAD is well associated. Depression is highly prevalent in cardiac patients, and is a considerable risk factor for cardiac outcomes.[48] Patients should be screened for depression at entry to CR programs, using either a few verbal screening questions or a standardized depression questionnaire. Depressed patients enrolled in CR programs will need more attention to insure continued adherence and close monitoring to rapidly intervene provided that depressive symptoms worsen. [49]

LITERATURE REVIEW

Naja Dam Mygind et al.,(2016)[50] conducted a study between March 2012 and September 2014 to evaluate the prevalence of coronary micro vascular dysfunction and its association with symptoms, cardiovascular risk factors, psycho social factors, and results from dignostic stress testing in women with angina pectoris. The study was conducted in women with angina pectoris undergoing coronary angiogram in eastern Denmark. The study population consisted of 963 women with angina and a diagnostic coronary angiogram without significant coronary artery stenosis (<50%). Mean age was 62.1. Demographic and clinical data were taken. Data were also collected by questionnaires. Trans thorasic echo cardiography was done during rest and high dose dipyridamole with measurment of coronary flow velocity reserve (CFVR) by doppler examination of the left anterior descending coronary artery. Through the study it was found that impaired CFVR was detected in large proportion .The impaired CFVR was associated with age, hypertension, current smoking, elevated resting heart rate, and low HDL Cholesterol. It indicated that coronary microvascular dysfunction plays a role in the development of angina pectoris. The study suggested that CFVR is an indepentant parameter in the risk evaluation of women with angina pectoris.

Sangeeta Gulati et al .,(2014) [51] conducted a study to find out the risk factors responsible for coronary artery disease in district Patiala, Punjab. Study population consisted of 400 persons from both rural and urban area whose per capital income was above 20,000 per month. Study population was selected by stratified random sampling technique. The study population consisted of 100 Doctors and 100 Engineers from urban population.200 patients were selected from 4 villages of Patiala. All the participants were aged between 40-60 years, data regarding demographic variables, smoking habits, hypertension and obesity was recorded using a predesigned and semi structured proforma. BP was recorded in the sitting position as per WHO procedures. Physical activity of the study population was assessed and obesity was measured by calculating BMI. Risk factors were present in 47.0% of urban population and 17.5% of rural population. In urban population prevalence of hypertension was found to be increasing with increasing age. Diabetes mellitus and obesity were more prevalent in the age group 55-60 years.

In rural population 22.7% were in the age group 50-55 years. Smoking was more prevalent in rural population (18%)compared to urban population.

E-Billing et al., (2000) [52] conducted a study to evaluate the relationships between psycho social variables and common risk factors such as age hypertension, diabetes mellitus, myocardial infarction, heart failure and smoking habits in stable angina pectoris patients. Angina prognosis study was conducted in Stockholm. The study population comprised of 767 persons (236 females) with chronic stable angina pectoris. All participants were less than 70 years of age. The study population was divided into two groups. One group consisted of patients with angina pectoris occurring at rest and other group consisted of patients with effort angina pectoris with or without angina at rest. A structured interview was done to evaluate psychosomatic symptoms, job strains, Type-A behavior. Questions according to a standardized checklist regarding the health related problems of the patients were included in the interview. Through the study it is found that age is correlated with several psychosomatic symptoms .Smoking habits and concomitant diseases influene psychosocial variables in stable angina pectoris patients. Life satisfaction was not found to be related with severity of angina pectoris.

Ritin Fernandez et al., (2015) [53]conducted a cross sectional study to assess the coronary heart disease risk factors in the Asian Indian community living in a large city in Australia and to construct a cardiovascular health profile of the same. All people of Asian indian origin who visited the health promotion stall in Australia India friendship fair in 2010 were selected for the study.169 participants selected were aged between18-77 years with a mean age of 46 years and were able to speak English.85% of the study population were less than 65 years of age.84% of the population had Bachelors degree, 20 had a high school certificate and three had less than 10 years of study.62% of the population were in paid employment and 60% of the population had private insurance. A set of cardiovascular risk factors like Blood pressure, BMI, waist circumference, smoking status, physical activity, history of diabetes and cholesterol of the population were assessed. Blood pressure (BP), blood glucose, waist circumference, height and weight were measured with the help of a health professional. Smoking, cholesterol levels and

physical activity status were obtained through questionnaire. Through this study it was found that 17%(n=29) of the population had a medical history of hypertension out of which 19 people were taking antihypertensive medication.15% of the population had a history of high cholesterol.27 participants had a history of Diabetes out of which 14 persons were under medication. Obesity was calculated according to the definition of obesity for Asian Indians(steering committee,2000).More than half the males and sixty eight percent of the females in the study population had BMI values greater than or equal to 25kg/m2. Data regarding smoking status were obtained from 149 patients. 10 females aged between29 and 59 years were found to be smokers. Insufficiency of physical exercise was found in 65% of males and 71% of females. Family history of risk factors was found in more than a third of the participants.30% of the participants had at least 3 risk factors. Through the study it was found that females had higher number of risk factors compared to males. Prevalence of risk factors was not found to be related with age, education level, and socioeconomic status.

Arvind kumar et al., (2005),[54] conducted a study to evaluate the prevalence of coronary artery disease risk factors in asymptomatic middle aged and elderly subjects. The study population consisted of 160 patients, 80 each from rural and urban population. All the patients were above 55 years of age. The study patients were not aware of their disease status and were not on any treatment. Past medical history of all the patients including diet and lifestyle was taken. Body mass index and waist hip ratio were obtained through physical examination of patients. Patients also undegone cardiovascular examination and biochemical investigations like fasting blood sugar, serum LDL, and serum triglyceride levels. Through the study it was found that the prevalence of smoking was 63.75% among the population, and smoking was more prevalent in males. Smoking was found more among rural population. Diabetes mellitus was prevalent in 4.37% subjects and the increased LDL was found in 38.75%. 23.75% subjects were detected with hyper triglyceridemia. Generalized obesity was found in 4.40 % subjects and central obesity was found in 23.12% individuals. 80% of the population followed a sedentary lifestyle and was more in urban population.

E.A.Amsterdam et al., (1978)[55] conducted a study to evaluate the relationship between myocardial infarction and angina pectoris. The study was done in 146 consecutive patients attended the cardiology clinic of the Sacramento medical center. All patients were with documented myocardial infarction. Out of 146 patients 126 were males and 20 were females. They were aged between 32 to 70 years with a mean age of 55 years. Mean period from infarction to the time of data collection was 30 months. Patients were fully evaluated. Complete history of the population was taken. Physical examination, electrocardiogram, chest x-ray film, and laboratory studies were done. Angina was defined as a retrosternal pressure associated with exertion or emotion relieved within 5 minutes of cessation of stress or administration of nitroglycerine. By comparing pre and post infarction occupational and recreational activity patient activity levels before and after myocardial infarction were determined. History of orthopnea, nocturnal dyspnea, exertional dyspnea and edema indicated the presence of heart failure. Through the study it was found that 51% of the study population with documented myocardial infarction had chronic stable angina pectoris at some time during their clinical course. In the majority of this group (52%) angina occurred after infarction as a new symptom following angina. Angina appeared both before and after infarction in 41% and appeared before infarction only in 5% patients as a symptom lost after infarction. In a majority of all three groups post infarction activity was the same as or less than pre infarction activity.49% of the total population had no angina before or after infarction, myocardial infarction was neither preceded by nor followed by angina.

Catherine kreatsoulas et al., 2016 [56] conducted a study between July and December 2010 with an objective of redefining angina construct by the qualitative comparison of anginal symptoms in men and women referred for coronary angiography. To propose a new conceptional framework for angina in terms of gender centered experiences avoiding the typical and atypical distinction of angina was another objective of the study. The study was conducted on 31 patients including 17 women and 14 men selected from Hamilton health sciences, a tertiary cardiac care centre. 14 women and 13 men in the patient population had obstructive CAD. The mean age of women was 66 years and of men was 60 years. In depth semi structural interviews were used to collect the patient symptoms and perception of their symptoms. Patient characteristics and cardiac risk

factors were also recorded. Interviews were taken immediately prior to their first angiogram. Patients were subjected to angiogram and patients with obstructive CAD as per angiogram (at least one vessel>2mm with lesion stenosis greater than or equal to 70%) were selected. Collected data's were analyzed using a modified grounded theory approach. They arranged the symptoms experienced by the patients along a gender continuum with gender specific symptoms placed at each end of the continuum. The common symptoms experienced were placed at the center of the continuum which showed the overlap of symptoms experienced by both men and women. The study revealed that contrary to the popular belief there is a large number of common anginal symptoms among men and woman.

Joaquin J Alonso et al.,2015 [57] conducted a study to estimate the prevalence of stable angina in Spain. It was a cross sectional study and it was conducted on a representative sample of the Spanish population. Sampling was done by two stage random sampling. 8378 people aged 40 years or older with a mean age of 59.2years were selected. People selected for the study were classified in to two groups, those having definite angina (if they met the criteria for definite angina given in rose questionnaire, and those having confirmed angina (if angina was confirmed by a cardiologist). The prevalence was assessed by age, sex and geographic area. The prevalence of definite angina was found to be 2.6% and was higher in women compared to men. The prevalence of confirmed angina was found to be 1.4% and was with no difference between men and women. The prevalence of both definite and confirmed angina found to be increasing with age, cardiovascular risk factors and history of cardiovascular diseases.

Leonardo Alves et al.,2010 [58] conducted a study to estimate the prevalence of angina and possible angina and its distribution in the urban area of Pelotas, a city located in the south of Brazil. It was a population based cross sectional study and it was conducted from October-December 2007..A two stage probability cluster sampling was opted for the study, primary units were census tract sectors and secondary units were households.1836 persons aged 40 years or older were selected. Data was collected by interviewing the individuals at their households using standard questionnaire. Interviews were done by using Rose questionnaire and prevalence was

assessed by demographic and socioeconomic characteristics like age sex, skin color, economic status and schooling. The presence of angina was expressed in terms of cumulative prevalence at any time in the past. Prevalence of angina was found to be more among lower economic classes, and among individuals with low schooling. Prevalence of possible angina was more in women than men and in black/brown skinned persons than white skinned ones. Possible angina was more prevalent among lower economic classes and among individuals with low schooling.

Bent Martin Eliassen et al., 2014 [59] conducted a cross sectional population based study to find out the ethnic difference in the prevalence of angina pectoris in Sami and non Sami population and to find out the role played by established cardiovascular risk factors in mediating it if any ethnic difference was found. A health survey was conducted on 15,206 persons including men and women from both Sami and non-Sami populations from 2003 to 2004.Life style informations were collected from the participants through questionnaires. Informations about BP, lipid levels were obtained through clinical examination of the participants. The study revealed that angina pectoris symptoms and self reported angina was higher in Sami population compared to non Sami population. The established cardiovascular risk factors couldn't explain the ethnic difference in the prevalence of angina pectoris.

Kimbach T Carpiuc etal.,2010 [60] conducted a study to determine the association of Angina pectoris with heart disease mortality among older men and women with or without diabetes mellitus. The study was conducted in 822men and 1184 postmenopausal women aged between 50-89 years. Who visited Rancho Bernardo study clinic from the year 1984-1987.Average age for both sexes was 71.Selected persons were subjected to glucose tolerance test and were interviewed with Rose questionnaire.61 men and 142 women had angina,129 men and130 women had Type 2 Diabetes mellitus, and 228men and 357 women were identified with impaired glucose tolerance (IGT).Average follow up period was 13.2 years.485 men and 557 women were died and 103 men and 104 women had fatal CHD(cardiac heart disease).The study revealed that women with both IGT and angina have double the risk of mortality due to CHD compared with women with IGT and without angina.

Josefina Claudia Zirpolil et al., 2012 [61] conducted an epidemiological cross sectional study analyzed as case control study on 584 HIV/Aids patients aged over 20 years. Patients were selected from HIV outpatient clinics of two hospitals, Hospital universitario (HUOC) and Hospital estadual correia picanco (HCP) in Recife, Pernambuco, Brazil. Patients were aged between 20-67 years. The study was conducted from June2007 to February2008.Out of 584 patients 369 were men and 215 were women. Mean age of men was 39.8 and of women was36.8 years. Angina pectoris was identified by Rose questionnaire. Informations were collected through questionnaire and biochemical laboratory tests. The frequency of angina pectoris was noted and association of anti retroviral regimen, smoking, obesity and other traditional risk factors with angina pectoris was studied The study revealed that out of 584 patients 119 had angina pectoris, The prevalence of definite and possible angina were 11% and 9.4% respectively.72.3% of them had been diagnosed with HIV more than 24 months earlier.77% of them were under anti retroviral therapy of which 52.2% were under protease inhibitor therapy and 47.7% were under other therapy. An independent association of angina pectoris was found with smoking, obesity, family history of heart diseases and low schooling.

T.Sekhri et al., 2014 [62] conducted a study to estimate the prevalence of risk factors of coronary artery diseases among Government employees from 20 cities across 14 states in one union territory in India. They recruited 10642 men and 1966 women aged between 20-60 years. The persons selected were from different ethnic groups and were living in different environmental conditions Recruited persons were subjected to interviews, medical examinations and anthropometric measurements were recorded, blood glucose and serum lipid profile were estimated. Prevalence of diabetes mellitus, hypertension, and dyslipidemia among study population were 16%, 21% and 45.6% respectively. 4.6% had a family history of premature CAD.

Sarathi Kalra et al[63] conducted a study to evaluate the prevalence of risk factors for CAD in eastern Nepal. 119 persons aged between 35 to 86 were selected from Dharan, a small city in eastern Nepal. Study population consisted of 63 males and 56 females. Data about risk factors

like diabetes mellitus, hypertension, family history of CAD, BP were collected. Anthropometric parameters like BMI, waste hip ratio and biochemical parameters like random blood sugar and serum cholesterol were checked. Prevalence of hypertension, diabetes mellitus, smoking, hypercholesterolemia and sedentary lifestyle was found to be 35.3%, 15.9% 38.7%, 2.6% and 47.1% respectively. One third of the study population had more than one risk factors for CAD.

Tea Lallukka et al., 2009 [64] conducted a study to find out whether job strain is associated with angina pectoris symptoms among British and Finnish White collar job employees and to find out the effects of factors like age, occupational class and behavioral risk factors on the studied association and to compare the studied association between two nations as well as between women and men. Cross sectional survey data collected from British Whitehall 2 study (London) and Finnish Helsinki health study. Whitehall 2 study involved a cohort of 10308 people including men and women from 20 civil service departments in London, UK. Questionnaire data collected from7830 persons in phase 5 from the year 1997-1999 were examined by the team. 4551participants who were still employed there aged 40-60 years were included in the study. Helsinki health study was conducted among 8960 middle aged employees of the city of Helsinki, Finland. The questionnaire data was collected from the year 2000-2002.7605 white collar employees aged 40-60 years were included in the study. The study revealed that High job strain was associated with angina pectoris in females from Finland and males from London, but not in men from Finland and women from London. The found association could not be explained by socio economic position, adverse behavior, or obesity.

Murthy P D et al.,2012 [65] conducted a cross sectional community based study to find out the prevalence and risk factors for coronary artery disease(CAD).The study was conducted in two localities of Tenali town, Andhra Pradesh namely Gandhinagar and Nazarpet. The study was conducted from July to October 2009. The study population consisted of 534 patients aged 20years or above. Patients were subjected to oral glucose tolerance test, lipid profile estimation and 12 electro cardiogram. Prevalence of CAD among study population was found to be 5.4%.Prevalence of CAD was found to be higher in persons with Diabetes mellitus compared to

persons with normal glucose tolerance. Prevalence of CAD was found to be increasing with increase in total cholesterol, serum triglycerides, low density lipoprotein

Harry Hemingway et al., 2006 [66] conducted a prospective cohort study to examine the sex differences in the incidence and prognosis of stable angina in a large ambulatory population. The study was done linking data held in National registers in Finland to create a register of angina patients. social insurance institution had records of all prescriptions which were repaid by national health insurance irrespective of ambulatory care provider. The ambulatory setting included all municipal primary health care centers, hospital outpatient clinics, occupational health care services, and the private sector in the Finland. The study was carried out among ambulatory patients aged between 45 to 89 years with no history of coronary heart disease. Two case definitions of incident, uncomplicated angina were used, Nitrate angina (based on nitrate prescriptions) and Test positive angina (based on abnormal invasive or noninvasive test results) Study was conducted from January 1, 1996 to December 31, 1998. Follow up ended in December 2001.There were 7906 deaths in 4 year (coronary mortality) and 3129 events of fatal and nonfatal myocardial infarction in one year. The study revealed that incidence of stable angina is higher in women compared to men and also stable angina in women leads to increased coronary mortality relative to women in the general populations.

Jianbin Zhang et al 2015 [67] conducted a study to find out the prevalence of carotid artery stenosis among Chinese patients with angina pectoris. The study population consisted of 989 patients suspected for coronary artery disease and they were referred for non emerging coronary angiogram between January 2013 to December 2014.The selected persons undergone carotid ultrasonography one month before or after coronary angiogram.853 out of 989 patients had CAD, out of which 19.3% had one vessel disease,24.9% had two vessel disease and 42.1% had three vessel disease. The prevalence of significant CAS (>50%stenosis and total occlusion) was 10.3, 13.9, 19.9 and 22.8% with zero vessel, one vessel, two vessel and three vessel CAD respectively. Incresed carotid artery stenosis was seen with three vessel CAD.

Muhammed Naeem Iqbal et al., 2016 [68] conducted a study to find out the prevalence of angina pectoris in Narowel, Pakistan in relation to various risk factors. The study population consisted of 100 patients from different hospitals of Narowel. Datas were obtained from the cardiac wards of the hospitals. The prevalence of silent angina and painful angina were found to be 79% and 21% respectively. Silent angina was found more prevalent in comparison with painful angina. Females had a higher incidence of both silent and painful angina. The prevalence found to be increasing with cholesterol (25%), family history (22%), smoking (13%), hypertension (8%), diabetes mellitus (4%) alcohol (16%), obesity(12%).

Paulo Andrade Lotufo et al., [69] conducted a study to estimate the prevalence of angina pectoris in the Brazilian population over 18 years with the help of Rose questionnaire for angina in the National health survey 2013.(A home based epidemiological survey representative of Brazil) Sampling was done in three stages, census tracts, households and adult residents were the primary secondary and tertiary units respectively. After sampling 60,202 persons above 18 years were interviewed with short version of Rose questionnaire to identify angina grade 1 and angina grade 2.Prevalence of angina was calculated with sex, age, education, race and color. The study revealed that the prevalence of mild angina(angina 1)in the population was 7.6 %and was more in women compared to men and prevalence of moderate/severe angina (angina 2)was 4.2% and was more in women compared to men. Prevalence increased progressively with age but no significant difference was seen with race/color.

M.N Krishnan et al., (2016)[70]conducted a community based cross sectional study to find out the prevalence of coronary artery disease and its risk factors in Kerala, South india. The study population consisted of 5167 adults with mean age of 51 years.40.1% of the population were male. Study population was selected using multistage cluster sampling method. Interviews were done for collecting information on socio demographics, smoking, alcohol use, physical activity, dietary habits, and personal history of hypertension, diabetes and CAD. Anthropometry Blood pressure, Electrocardiogram and biochemical investigation were done according to standard protocols. According to standard criteria CAD and its risk factors were defined. Age adjusted prevalences were compared using two tailed proportion tests. The age adjusted prevalence of

definite CAD in male was found to be 4.8% and in female was found to be 2.6%.The overall age -adjusted prevalence of definite CAD was 3.5%.Prevalence of any CAD was 12.5%(12.5% in men and 9.8% in women).No difference was found in definite CAD between rural and urban population.17.5% reported physical inactivity .Family history of CAD was found in 18%.59% reported obesity and 28% reported hypertension.52% reported high total cholesterol and 39% reported low level of high density lipoprotein cholesterol. Smoking was reported only by men. Through the study it was found that prevalence of definite CAD in kerala increased without any difference in rural and urban area from 1993. CAD risk factors were found to be highly prevalent among the population.

NEED OF THE STUDY

Angina pectoris is a common medical condition with a high mortality and morbidity rate and normally requires medical therapy to control symptoms. Drug Utilization Evaluation (DUE) is an ongoing, authorized and systemic quality improvement process, which is designed to: Review drug use and/or prescribing patterns, provide feedback of results to clinicians and other relevant groups, develop criteria and standards which describes optimal drug use, promote appropriate drug use through education and other interventions. Hence it is used in our project to facilitate the rational use of drugs in the hospital.

For the individual patient, the rational use of drugs implies the prescription of well documented drug at an optimal dose, together with correct informations on frequency and duration of therapy. Hence the inappropriate use of drugs represents a potential hazard to patients and may leads extended hospital stay and as well as the expense of the therapy.

This necessitates the periodic review of patterns of drug use in a health care facility to ensure safe and effective use of drugs.

Risk factor assessment, a scientific process of evaluating the adverse effects caused by a substance, activity, lifestyle, or natural phenomenon. In this work I need risk factor assessment to find out the major reason for angina pectoris among our taken group of patients in our hospital, by which the further case of same complaints could be prevented respectively.

AIM AND OBJECTIVES

Aim

To study the Retrospective assessment of Angina Pectoris cases in government hospital Tirupur.

Objective

Drug utilization studies provide data on prescribing patterns and may help to improve the prescribing habits of general medical practitioners. Some basic objectives of drug utilization studies are as follows:

1. To find-out the drug utilization pattern for angina pectoris patients in a tertiary care hospital.
2. To assess the risk factors related with angina pectoris.
3. To assess the therapeutic, toxic and economic aspects of drugs and their combinations.
4. To encourage the rational prescribing.

PLAN OF WORK

- Initial study to identify the scope of work
- Literature survey
- Preparation of study of protocol
- Obtaining consent from the hospital authority
- Collection of data format from case sheets
- Data analysis
- Evaluations of data
- Results and Discussion
- Summary & Conclusion

METHODOLOGY

Study site: The study is conducted in Government district headquarters hospital, Thirupur district, Tamil Nadu.

Study period: November 2016 - June 2017

Study type: Retrospective study

Sample size: 100 patients

Study population: Inpatients attended in general medicine ward and intensive care unit, case sheets from medical record department.

Inclusion criteria:

- Patients above the age of 18 years old diagnosed with angina pectoris.
- Patients those willing to give their consent.

Exclusion criteria

- Patient below age 18 years old.

Pregnant and Lactating women.

Study Procedure

The present study was conducted at Government district headquarters hospital, Thirupur for the retrospective assessment of Angina pectoris cases The study involves mainly 3 steps.

1-Collection of the prescriptions

The prescription were collected from the General medicine department and intensive care unit, medical record department of Government district headquarters hospital, Thirupur. For a period of 6 months that is from Nov 2016 to June 2017

The study was conducted in retrospective manner, The data was collected from the respective departments of the hospital on proforma.

2-Analysing the prescription

The Collected data from the prescription were entered in to proforma were analysed. The pattern of drug use and duration of therapy, mostly prescribed drugs are noted and other important parameters are noted.

3-Statistical analysis

The datas were collected according to the proforma and was entered in separate excel sheets in respective of their proformas or the parameters and they were analysed for the outcomes of the individual parameters like gender, age groups, others by making a table first and then followed by a graphical representation of the data.

The study was designed in a Retrospective manner. It was conducted in patients admitted in the General medicine department and Intensive care unit of Government district headquarters hospital, Thirupur district (Tamilnadu) from November 2016-June 2017.

A study population of 100 patients (all above 18 years and diagnosed with Angina pectoris) was selected. The study population consisted of both sex (73 male and 27 female).Patients below 18 years and pregnant and lactating women were excluded from the study population.

Prescriptions were collected from the respective departments of the hospital. Collected Data were recorded using a predesigned proforma and entered in to Microsoft Excel worksheets. Appropriate tests were applied for analysis.

Prevalence of angina risk factors and different types of angina among the population, drug use pattern and mostly prescribed drugs were noted.

History of smoking or non smoking and alcohol consumption was given by patient or relatives. Hypertension was defined using WHO criteria-pressure exceeding a systolic value of 140mm Hg and/or a diastolic value of 90mm Hg. Patients on antihypertensives were included in the study. Patients on anti diabetic drugs or having a fasting blood glucose level greater than or equal to 7.0 mmol/L were considered to be diabetic.

Dyslipidaemia was defined when total blood cholesterol greater than or equal to 200mg/dl, decreased HDL cholesterol less than or equal to 40mg/dl, adverse total cholesterol/HDL ratio greater than or equal to 4.5.

Obesity was defined as having a Body mass index (BMI) of more than 30Kg/m2.Family history of coronary heart diseases (CAD) increases the risk of angina in all first degree relatives.

RESULTS AND OBSERVATIONS

Sex wise distribution of Angina cases.

Table - 1

SEX	FREQUENCY n=100	PERCENTAGE %
Male	73	73
Female	27	27

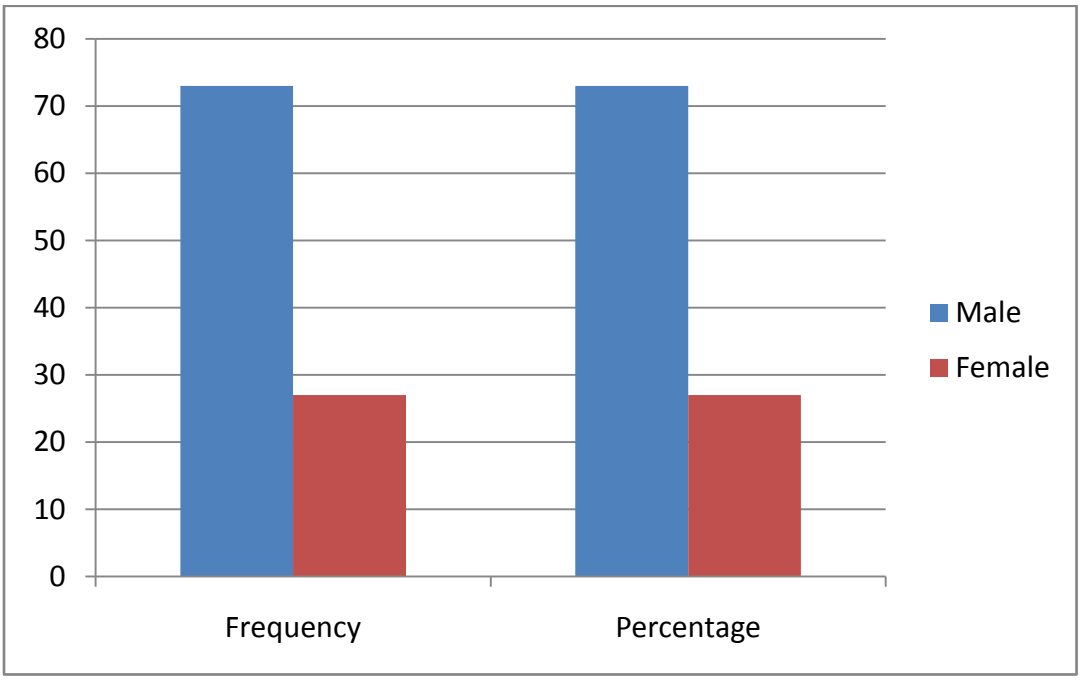


Figure - 1

Employment status of Patients.

Table - 2

EMPLOYMENT STATUS	NUMBER OF PATIENTS
Coolies	35
Drivers	16
Farmers	13
Business	10
Govt. Employees	2
Other white collar jobs	5
House wives	10
Others	9

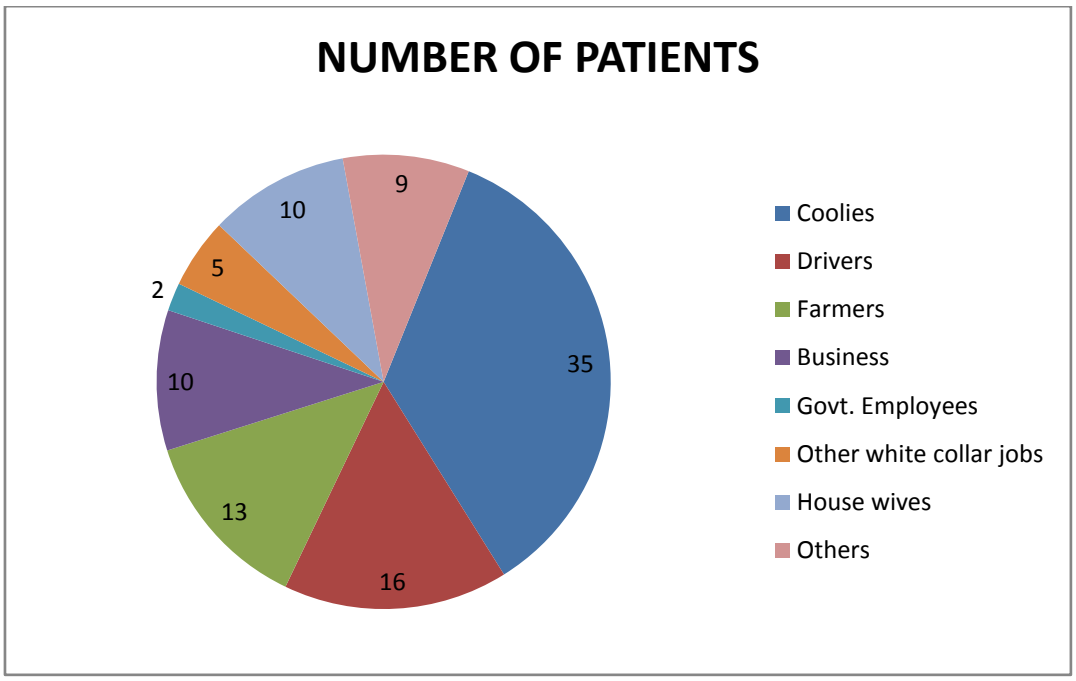


Figure - 2

INCIDENCE OF AGE

Frequency and Percentage of cases according to age group.

Table - 3

AGE GROUP	FREQUENCY n=100	PERCENTAGE %	MALE	FEMALE
20-30	1	1	1	-
31-40	3	3	2	1
41-50	21	21	14	7
51-60	33	33	24	9
61-70	40	40	30	10
71-80	2	2	2	-
Total	100	100%	73	27

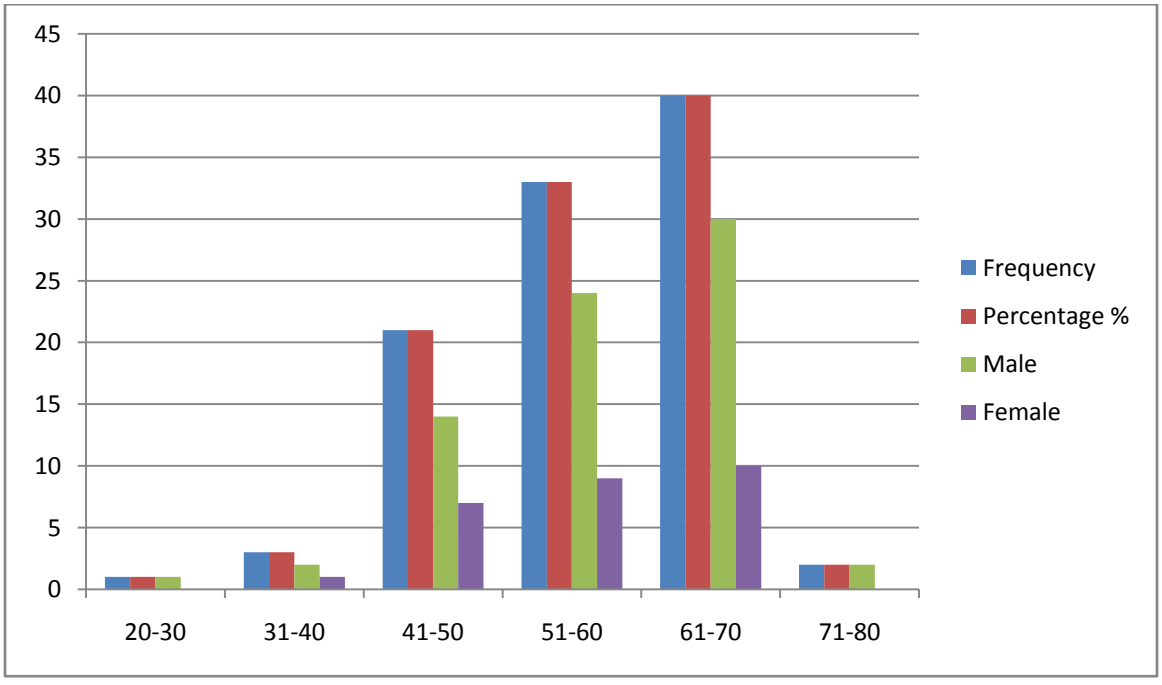


Figure - 3

TYPE OF ANGINA

Table – 4

TYPE OF ANGINA n=100	NUMBER OF PATIENTS	PERCENTAGE %
Stable Angina	76	76
Unstable Angina	23	23
Variant Angina	1	1

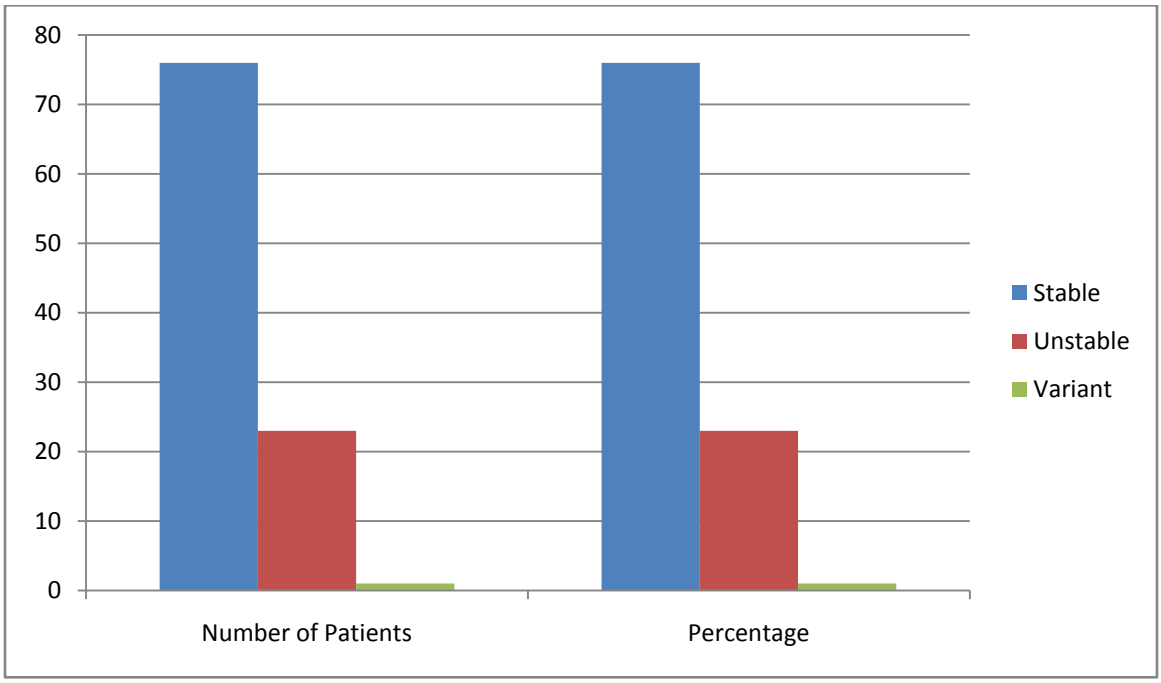


Figure - 4

Gender wise frequency of different types of Angina.

Table – 5

SEX		STABLE ANGINA n=76	UNSTABLE ANGINA n=23	VARIANT ANGINA n=1
Female	Count	22	5	-
	Percentage	28.95	21.74	-
Male	Count	54	18	1
	Percentage	71.05	78.26	100

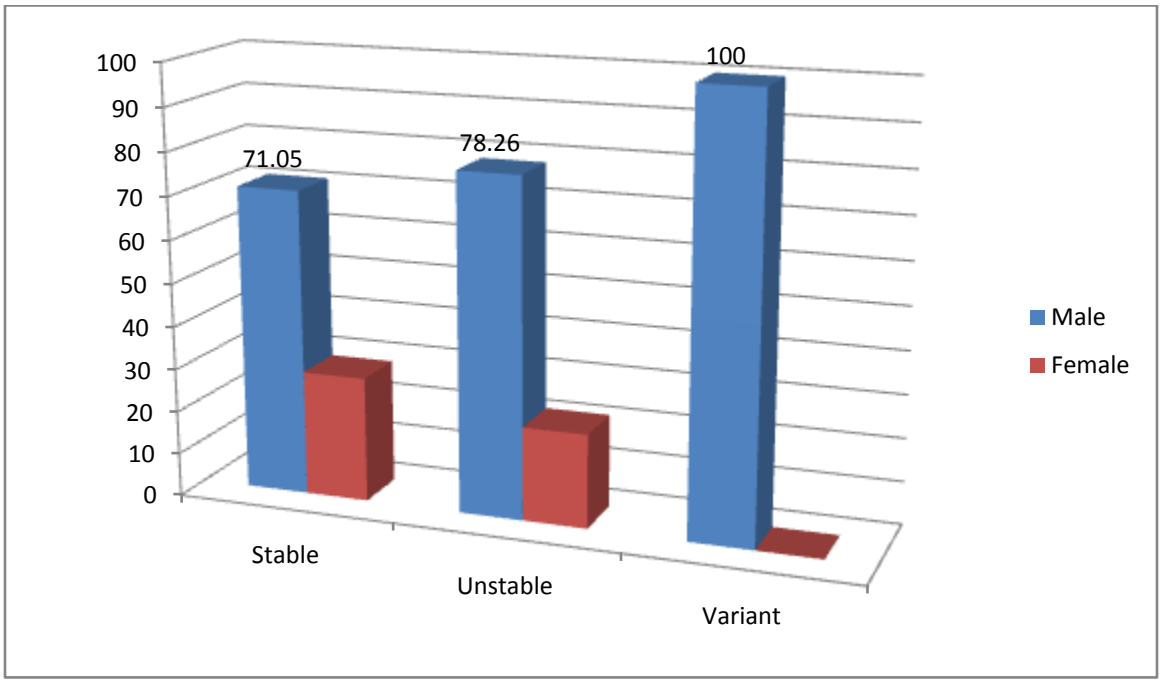


Figure - 5

Prevalence of Risk factors in Angina Pectoris patients.

Table - 6

RISK FACTOR	NUMBER OF PATIENTS	PERCENTAGE %
Diabetes Mellitus	45	45
Higher Cholesterol level	50	50
Smoking	22	22
Alcohol	25	25
Obesity	38	38
Family history of CAD	15	15
Hypertension	61	61
Post Menopausal woman	24	24

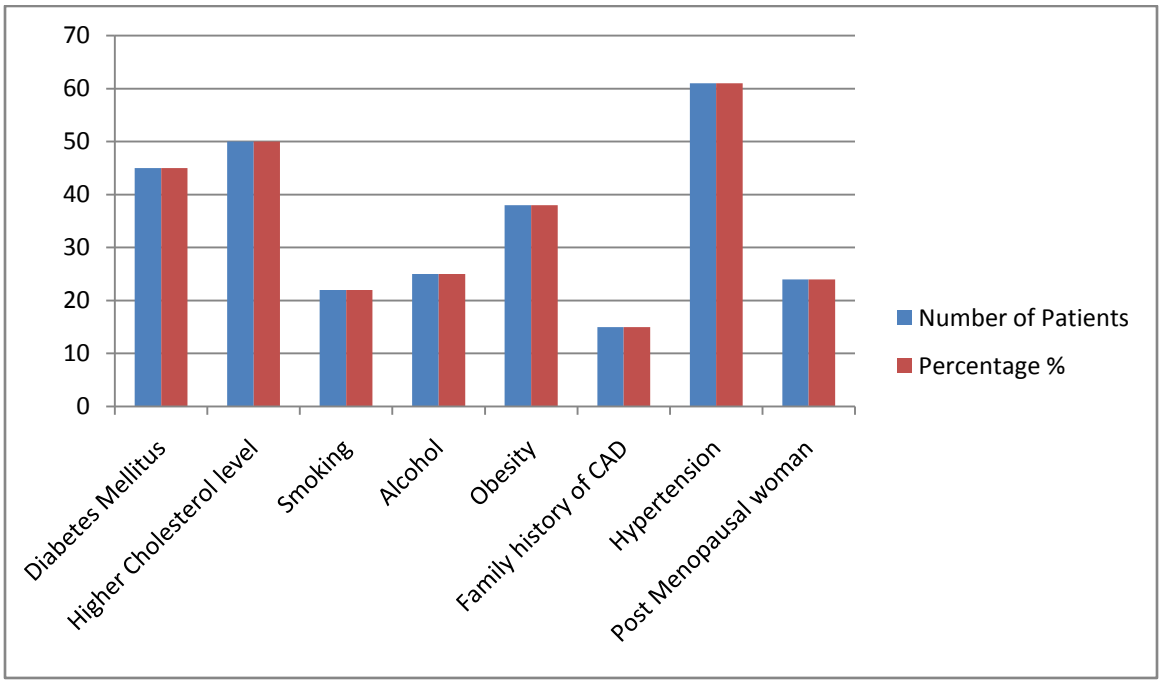


Figure - 6

Gender wise frequency of risk factors in angina Patients.

Table - 7

RISK FACTORS	MALE n=73		FEMALE n=27	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Diabetes mellitus	31	42.46	14	51.85
Higher cholesterol level	39	53.42	11	40.74
Smoking	22	30.13	-	-
Alcohol	25	34.24	-	-
Obesity	32	43.83	6	22.22
Family history of CAD	11	15.06	4	14.81
Hypertension	46	63.01	15	55.55
Post menopausal woman	-	-	24	88.88

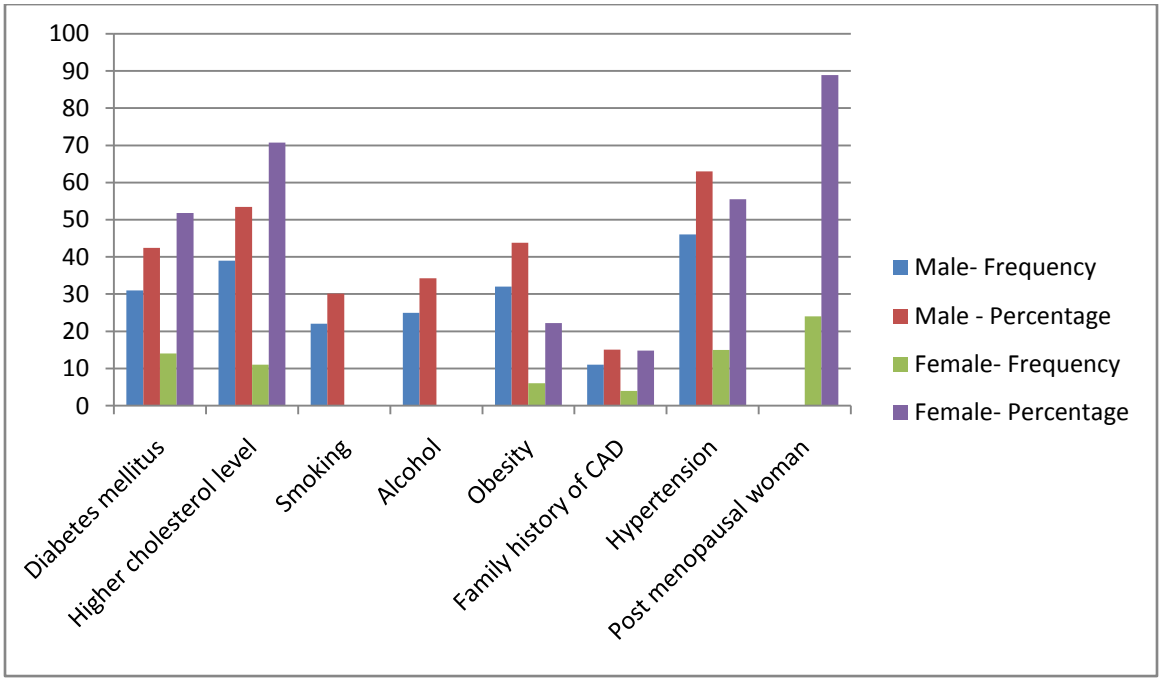


Figure - 7

No. of Risk factors in Patients.

Table - 8

NUMBER OF RISK FACTORS	NUMBER OF PATIENTS n=100	PERCENTAGE %
One Risk factor	2	2
Two Risk factor	25	25
Three Risk factor	64	64
More than three	9	9

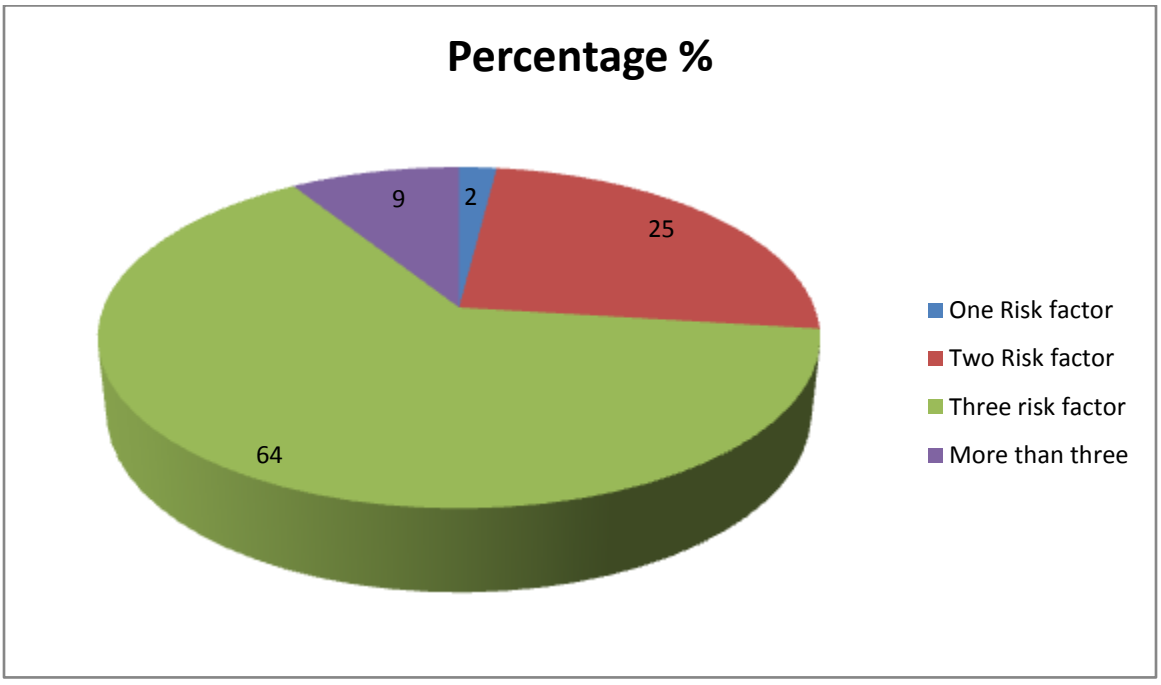


Figure - 8

Drug Pattern

Table - 9

MEDICATION	NO. OF PATIENTS	PERCENTAGE
Clopidogrel	91	91
Aspirin	87	87
Atenolol	79	79
Metoprolol	17	17
Amlodipine	83	83
Atorvastatin	39	39
Isosorbiddinitrate	82	82
Isosorbidmononitrate	18	18
Herarin	35	35

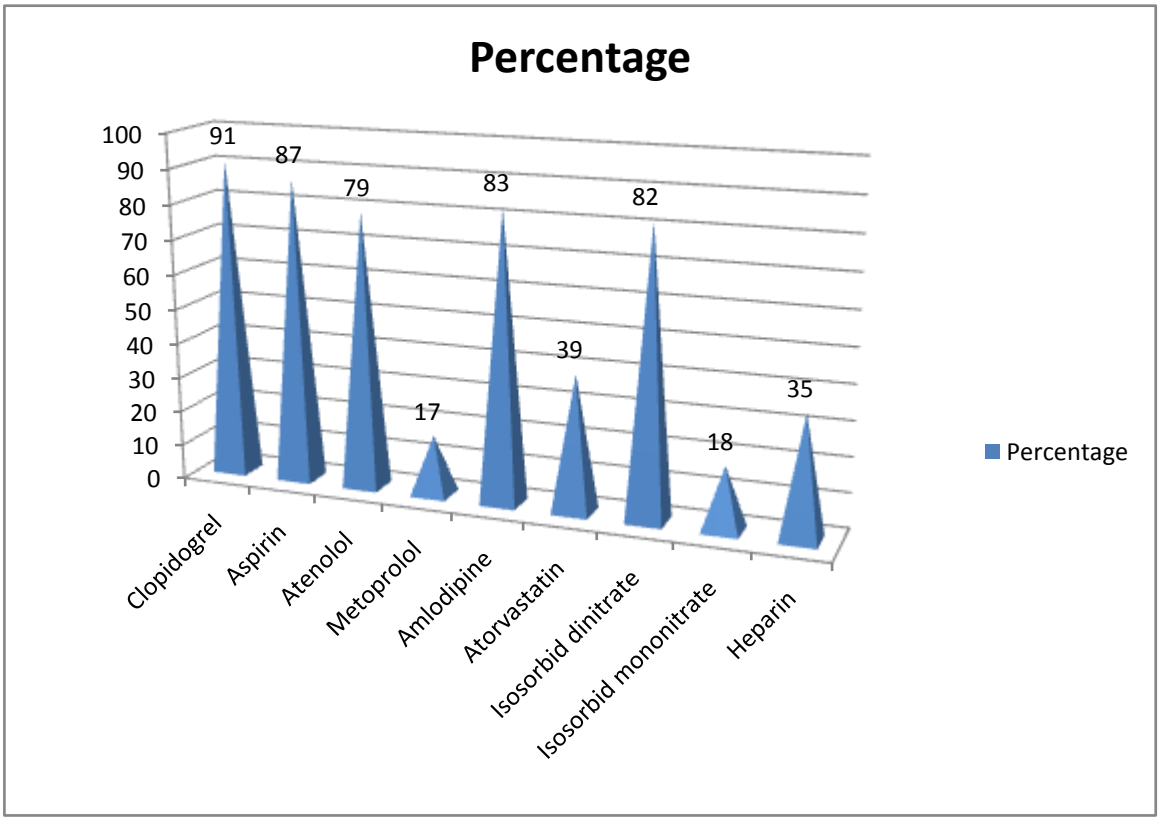


Figure - 9

ANTIPLATELET THERAPY

Table – 10

DRUGS	NO. OF PATIENTS n=100	PERCENTAGE
Clopidogrel	13	13
Aspirin	9	9
Clopidogrel + Aspirin Combination	78	78

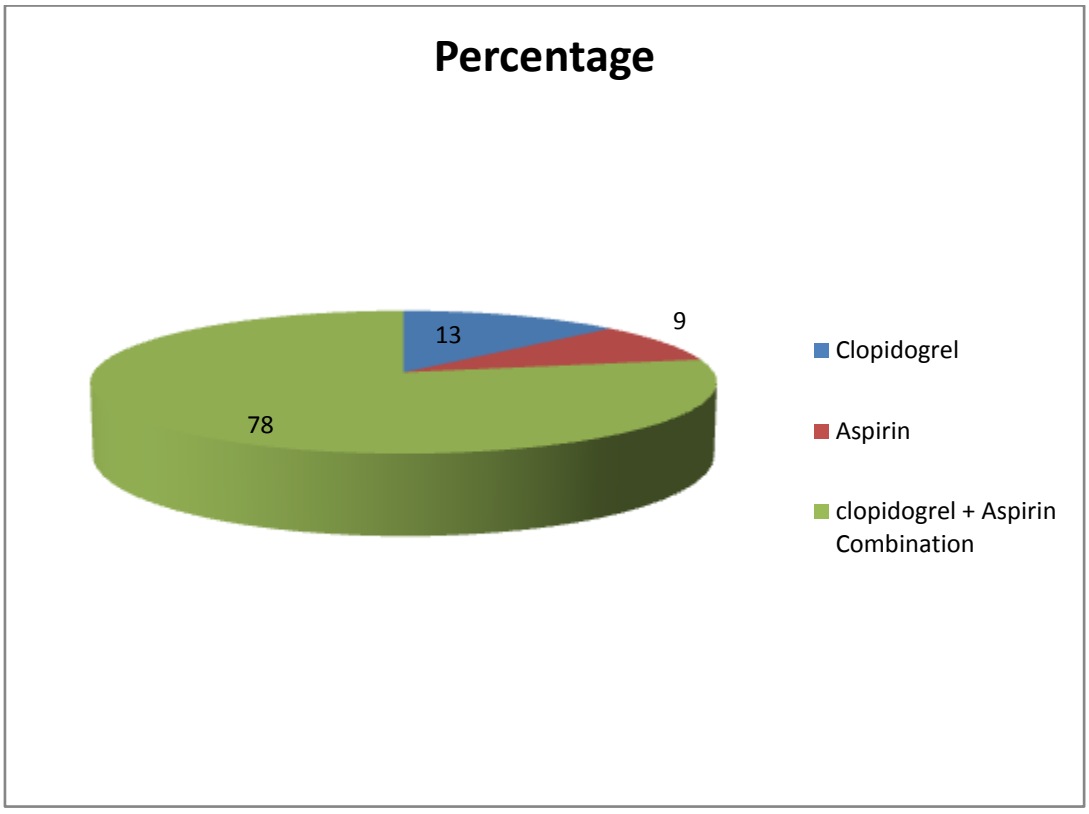


Figure - 10

Percentage of given dose of Clopidogrel

Table - 11

CLOPIDOGREL	NO.OF PATIENTS n=91	PERCENTAGE
Clopidogrel 75mg/day	88	96.7
Clopidogrel 150mg/day	3	3.3

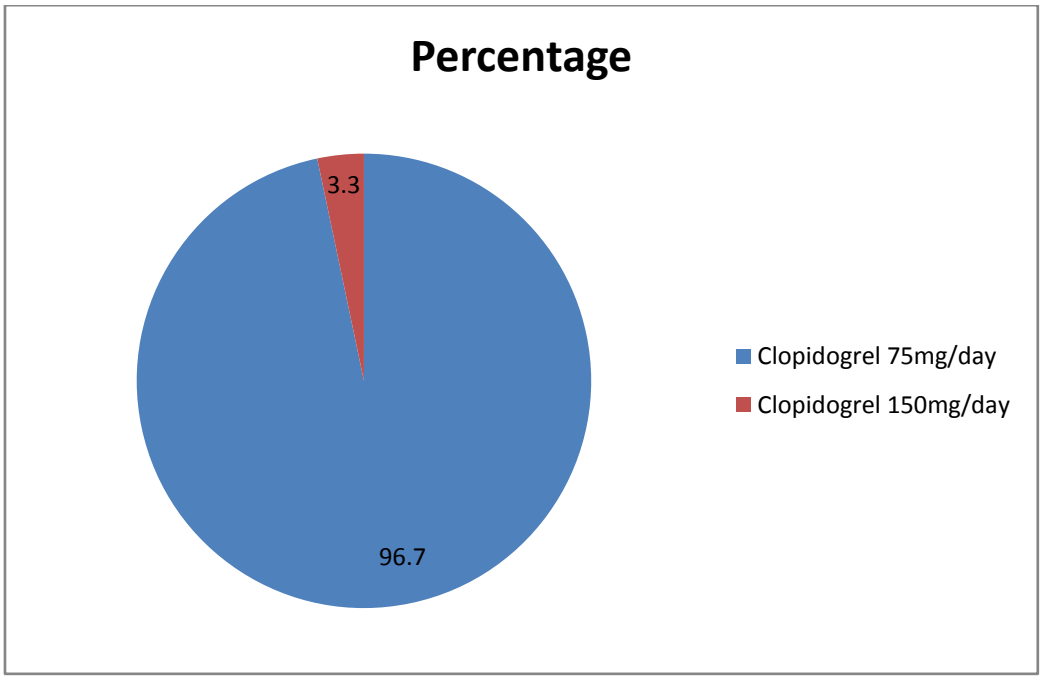


Figure - 11

Percentage of given dose of Aspirin

Table - 12

ASPIRIN	No. OF PATIENTS n=87	PERCENTAGE
Aspirin 75 mg/day	49	56.32
Aspirin 150 mg/day	38	43.68

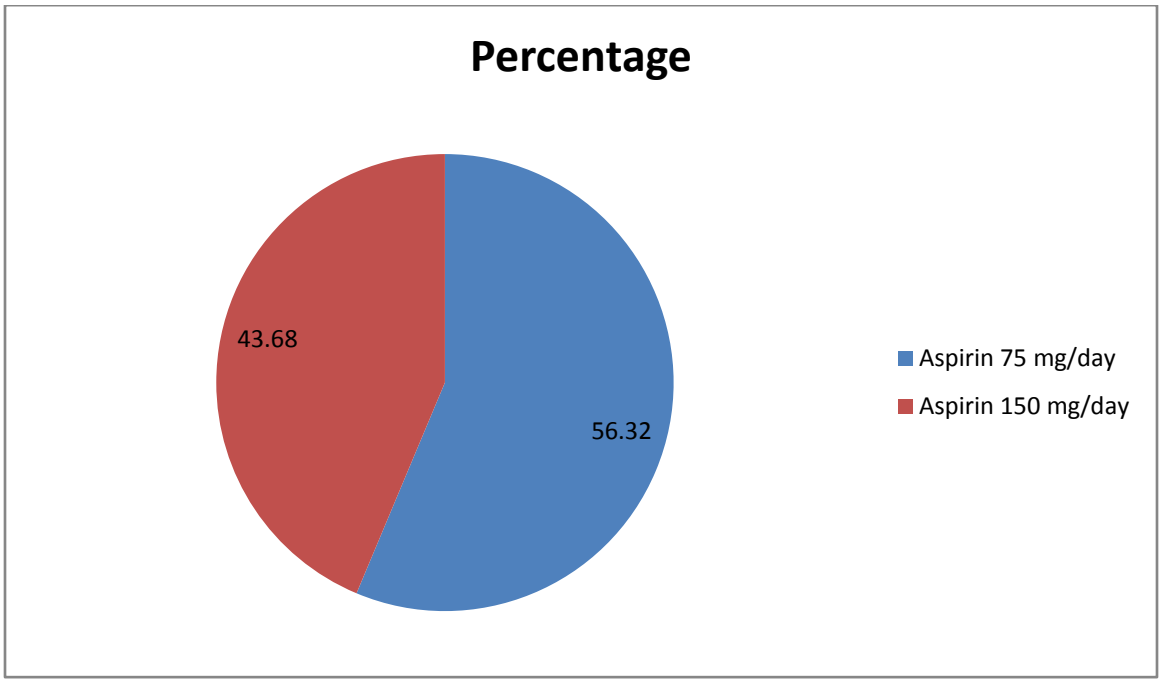


Table - 12

Beta Blockers and Calcium Channel blockers in Angina Cases.

Table - 13

DRUG	NO.OF PATIENTS n=100	PERCENTAGE %
Amlodipine	4	4
Atenolol + Amlodipine	79	79
Metoprolol + Amlodipine	17	17

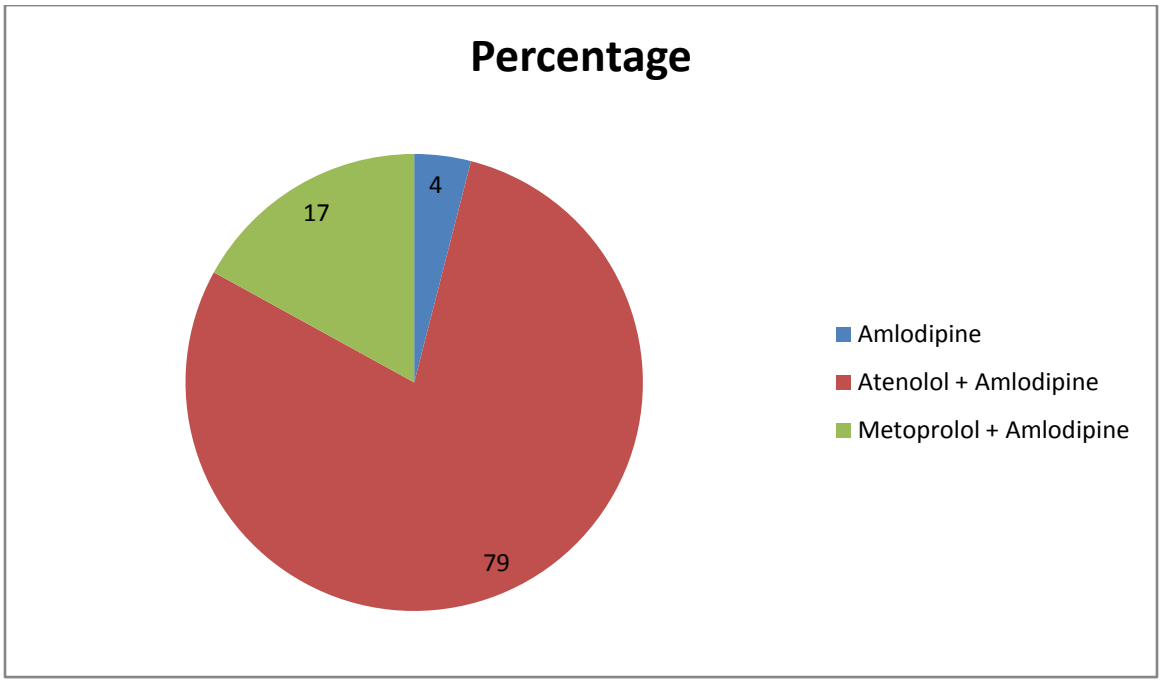


Figure - 13

DISCUSSION

100 patients were selected for the retrospective study. The study population consisted of 73 males(73%), and 27 females(27%) FIGURE.1

Patients selected for the study had different employment status. Study population include coolie workers (35%), Drivers (16%), Farmers(13%), Business persons (10%), Govt.Employees (2%), other white collar employees (5%), Housewives (10%) and others(9%). Persons with low employment staus found to be more susceptible to angina FIGURE.2

Maximum number of patients fall on the age group of '61-70' years(40%)". In both males and females Maximum number of patients were from this age group. Minimum number of patients were from the age group of '21-30' years (1%). The incidence of Angina were more rapid in 3 age groups '41-50', '51-60', '61-70', indicating that incidence of angina increases as the age of the patient increases.FIGURE.3

The more prevalent type of angina among the study population was Stable angina (76%). 23% had Unstable angina. Less prevalent type of angina among the population was Variant angina (1%).FIGURE 4.

Stable, Unstable and Variant anginas were more prevalent among males compared to females. Out of 76 stable angina patients, 54 patients were males (71.05%) and 22 patients were females (28.95%) Among 23 unstable angina patients 18 patients were males (78.26%) and 5 patients were females (21.74%). The most prevalent type of angina among both males and females was stable angina. Variant angina was present in one male among the study population and was found absent in female population. This shows male gender is an important risk factor for developing Angina FIGURE 5.

Among the study population, the most prevalent risk factor was found to be Hypertension (61%) followed by Higher cholesterol level (50%) and Diabetes mellitus(45%). 22% of the study population were smokers and 25% were alcoholics. These two risk factors were limited only in male.38% were obese and 24% were Post menopausal women (risk factor limited only in female). 15% of the population had family history of CAD FIGURE 6.

The most common Risk factors among males were found to be Hypertension (63.01%), Higher cholesterol level (53.42%), Obesity (43.84%) and Diabetes mellitus (42.46%). Alcohol consumption and smoking were also found to be responsible for heart diseases in males. Smokers were 30.13% and alcoholics were 34.24% among males.15.06% of males had family

history of CAD.24 out of 27 female patients were post menopausal women (88.88%). Hypertension (55.55%), Diabetes mellitus (51.85%) and Higher cholesterol level (40.74%) were found to be other more prevalent risk factors among females. Obesity (22.22%) and family history of CAD (14.81%) were also found to be the reason for heart diseases in females FIGURE 7.

98% of the study population had two or more cardiac risk factors which showed the increased prevalence of risk factors among the people FIGURE.8

Anti platelet medication was the most preferred medication for the patients. Anti anginal drugs like Nitrates (Isosorbid mononitrate, isosorbid dinitrate), Betablockers (Atenolol, Metoprolol) and calcium channel blockers (Amlodipine) were also used. Statins and anti coagulants were also used in patients FIGURE.9.

Clopidogrel and Aspirin were the most commonly used anti platelet medication. Clopidogrel alone was used in 13% of the population and Aspirin alone was used in 9% of the population. Clopidogrel -Aspirin combination was used in 78% of the population FIGURE.10.

Among 91 patients using clopidogrel 96.70% were given clopidogrel 75mg/day and 3.3% were given clopidogrel 150mg/day. Among 87 patients using Aspirin 56.32% were given Aspirin 75mg/day and 43.68% were given Aspirin 150mg/day FIGURE 11, FIGURE 12.

CONCLUSION

- Prevalence of angina was found to be increasing with age and was found more in persons with low employment status (coolie workers, drivers, farmers).
- Stable angina was found to be more prevalent among the population compared to unstable angina and variant angina.
- Angina was found to be more prevalent in males compared to females. All three types of angina was found to be more prevalent in males. This reflects male gender is an important risk factor for angina pectoris.
- Approximately half of the patients had hypertension, Diabetes mellitus, High cholesterol level and obesity. This is associated with stress, Life style changes and unhealthy food habits.
- Hypertension was found to be the most common risk factor for angina followed by Higher cholesterol level and Diabetes mellitus.
- Two risk factors, smoking and alcohol consumption were limited only in male.
- One risk factor, post menopause stage was limited only in female.
- Family history of CAD increases the chances of Angina in first degree relatives.
- 98% of the population had multiple risk factors.
- The drug pattern included anti platelet medication, anti anginal drugs, statins and anti coagulants.
- Most prefered medication was Anti platelet medication. Aspirin and clopidogrel were the most commonly used anti platelet drugs. Combination therapy was preferred more than treatment with individual drugs.
- Drug therapy in angina was associated with lot of side effects.
- The present study demonstrates a high prevalence of angina risk factors in the population. The incidence of angina is likely to increase further because of rapid urbanisation and it's accompanying life style changes. There is an immediate need to raise awareness among the general population about the risk factors, promote the correct diet and physical activity.
- We need to develope guidelines for screening and preventive therapeutic programmes to identify and manage individuals with high risk for future events.

- Many patients experience frequent symptoms which reduces the quality of life. Alternative effective treatment of angina can have a beneficial impact on patient recovery.

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PROFORMA

PATIENTS DETAILS FORM:

NAME	AGE	GENDER	HEIGHT	WEIGHT
BMI	**IP NO:**	**DEPARTMENT**	**DOA**	**DOD**

FAMILY HISTORY	
EDUCATION	
SOCIAL HISTORY	
KNOWN ALLERGIES	
REASON FOR ADMISSION	
PAST MEDICAL HISTORY	
PAST MEDICATION HISTORY	
CO-MORBID CONDITION(IF ANY)	

ASSOCIATED ILLNESS	YES	NO
HYPERTENSION		
DIABETES MELITUS		
HIGHER CHOLESTEROL LEVEL		
POST MENOPAUSAL WOMAN		
MYOCARDIAL INFRACTION		
OBESITY		
FAMILY HISTORY OF CAD		

PHYSICAL EXAMINATIONS:

BP:

TEMP:

PR:

RR:

SYMPTOMS:

DIAGNOSIS:

DRUG CHART

SL NO:	NAME OF DRUG	DOSE	ROA	FREQUENCY	DURATION

DURATION OF THERAPY:

INFORMED CONSENT

Participant written informed consent

I understand that my participation is voluntary and that I may withdraw from this study at any time without giving any reason or to decline to answer any particular question in the study. I consent the members of the study to have access to my response and to publish the result, provided my identity is not revealed. I voluntarily agree to participate in the study.

Participant signature with date

ஒப்புமை படிவம்

பங்கேற்பாளர் ஒப்புதல்

என் பங்களிப்பு தன்னார்வமாக இருப்பதை நான் புரிந்துகொள்கிறேன், எந்தவொரு காரணமும் இன்றி இந்த ஆய்விலிருந்து நான் விலகி இருக்கலாம் அல்லது எந்த குறிப்பிட்ட கேள்வியையும் ஆய்வு செய்ய மறுக்கிறேன். எனது அடையாளம் வெளிப்படுத்தப்படவில்லை எனில், என்னுடைய பதில்களை அணுகவும் முடிவுகளை வெளியிடவும் ஆய்ந்துள்ள உறுப்பினர்களை நான் ஒப்புக்கொள்கிறேன். ஆய்வில் பங்கேற்க நான் தானாகவே ஒப்புக்கொள்கிறேன் .

பங்பேற்பளார் கையொப்பம் மற்றும் தேதி