



A STUDY OF THE MARKERS OF PATIENTS UNDERGOING CARDIOVASCULAR SURGERY

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ABSTRACT

Aim: To study the markers of patients undergoing cardio vascular surgeries.

Objectives: To estimate and compare the attributable markers of patients undergoing various cardiovascular surgeries and procedures.

Methods: The sample population (n=48) was randomly chosen from four different hospitals of Hyderabad. All the patients were of different age group, sex, socio-economic status, ethnicity with different co-morbidities. A pre-tested format consisting of patient profile, subjective data, objective data, biochemical data, medications and 24 hour dietary recall followed by Medical Nutrition Therapy during the hospital stay.

Results: Among 48 subjects the detailed study identified the common risk factors with respect to cardio vascular diseases. The bio-markers studied, showed a higher percentage in age group of 61-80 years and is mostly prevalent in males. Majority of patients are with normal BMI and are non-smokers. Hypertension and Diabetes are superiorly predominant and dietary patterns recorded are favorably non-vegetarians.

Conclusion: From the result it is very clear that majority of the patients studied with cardiovascular diseases belong to the age group 61-80 years and is mostly seen in males. Majority of them are accompanied with co-morbidities like hypertensive, obesity and diabetic. And predominantly follows a non-vegetarian diet.

Keywords: Cardio vascular diseases, cardiovascular surgery, hypertension, obesity, diabetes, myocardial infarction, stroke, heart failure, diet.

INTRODUCTION

Cardiovascular disease (CVD) is globally considered as the leading cause of death with 80% of CVD related deaths being reported from low and middle income countries like India. Cardiovascular disease (CVD) is the leading cause of death and disability worldwide. It is expected that by 2020, CVD would prevail as the leading cause of death and disability over infectious diseases globally. Cardiovascular disease encompasses atherosclerotic vascular diseases like coronary heart disease (CHD), cerebrovascular disease (CBVD), and peripheral arterial diseases. In recent years, demographics and health surveys have reported increasing malaise of CVD among individuals of all socioeconomic strata. According to recent statistics, incidences of CVD-related death and disability in low-income countries have grown at an alarming pace.

India alone is burdened with approximately 25% of cardiovascular-related deaths and would serve as a home to more than 50% of the patients with heart ailments worldwide within next 15 years . [1]

THE RISK FACTORS FOR CARDIO VASCULAR DISEASE IDENTIFIED ARE: [1]

- **MAJOR MODIFIABLE RISK FACTORS**

1. High Blood Pressure
2. Abnormal Blood Cholesterol
3. Tobacco Use (Chewing/Smoking)
4. Diabetes Mellitus
5. Obesity
6. Physical Inactivity
7. Unhealthy Diets

- **OTHER MODIFIABLE RISK FACTORS**

1. Low Socio Economic Status, Alcohol Use
2. Mental Health
3. Psychosocial Stress
4. Use of Certain Medication
5. Left Ventricular Hypertrophy

- **NON- MODIFIABLE FACTORS**

1. Advancing Age
2. Heridity of Family History
3. Gender
4. Ethnicity or Race.

Cardiovascular disease (CVD) is an umbrella term for a number of linked pathologies, commonly defined as coronary heart disease (CHD), cerebrovascular disease, peripheral arterial disease, rheumatic and congenital heart diseases and venous thromboembolism. Globally CVD accounts for 31% of mortality, the majority of this in the form of CHD and cerebrovascular accident.[2]

High cholesterol increases the risk of developing cardiovascular (CV) disease. About 45% of Medicare beneficiaries have high cholesterol, making it the second most common condition among all of the out-patient medical office encounters.[3] According to the World Health Organization, CVD will be the number one cause of morbidity and mortality in the world by the year 2015 (WHO 2000); and it is assumed that Indians would be the most affected amongst all ethnic population. There are various factors involved for rapid increasing of the CVDs. Cardiovascular mortality in Asian Indian population is likely to climb up 103% in men and 90% in women by 2015.[4] The prevalence and severity of Hypertension (HTN) increase with increasing BMI. Obesity is characterized by various hemodynamic and metabolic abnormalities, including an increase in circulating blood volume and systemic vascular resistance, which contribute to the development of HTN. Therefore, HTN associated with obesity is characterized by combined volume and pressure overload.[5] Cardiovascular disease (CVD) mortality and morbidity has been shown to be elevated in individuals who are overweight, particularly with central deposition of adipose tissues. Abdominal obesity has been shown to be a risk factor for CVD worldwide. Obesity may be associated with hypertension, dyslipidemia, diabetes, or insulin resistance, and elevated levels of fibrinogen and C-reactive protein, all of which increase the risk of CVD events.[6] Obesity can lead to a variety of other cardiac problems. In a sub-analysis of the Framingham data, the risk of developing heart failure was twice as high in patients with a BMI greater than 30 as compared to non-patients with obesity, independent of other co-morbidities. This may be due to a variety of physiological changes occurring in the heart, including an increase in the circulating blood volume and flow, which may lead to fluid retention. This can subsequently cause the heart to undergo volume overload, putting further strains on its capacity to work.[7] Adipose tissue (loose connective tissue) promotes the development of atherosclerosis. This is a hardening of the arteries believed to be an inflammatory disorder. Leptin is a hormone produced from excessive adipose tissue and “turns-on” inflammatory systems, accelerating coronary atherosclerosis, and inducing insulin resistance. This process can damage heart cells, inevitably leading to replacement of healthy heart cells by fatty cells. The implications of this are profound, leading to deadly rhythm disturbances.[8] Hypertension is quantitatively the most important risk factor for premature cardiovascular disease; it is more common than cigarette smoking, dyslipidemia, and diabetes, which are the other major risk factors . Hypertension accounts for an estimated 54 percent of all strokes and 47 percent of all ischemic heart disease events globally.[9] Systolic blood pressure exhibits a direct

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relation with the incidence of CHD; this relation is somewhat stronger for men than it is for women over age 65 years but with a steeper gradient for women under 65 years than for those who developed CHD later in life.[10]

The risk for both coronary disease and stroke increases progressively with incremental increases in blood pressure above 115/75 mmHg, as shown in numerous epidemiologic studies. However, these observations do not prove a causal relationship, since increasing blood pressure could be a marker for other risk factors such as increasing body weight, which is associated with dyslipidemia, glucose intolerance, and the metabolic syndrome. [11] Hypertensive coronary candidates usually have an increased low-density lipoprotein/high-density lipoprotein (LDL/HDL) cholesterol ratio, impaired glucose tolerance, ECG abnormalities, or a cigarette smoking habit. Those at risk for hypertensive stroke have left ventricular hypertrophy (LVH), atrial fibrillation, cardiac failure, coronary disease, diabetes, or a cigarette habit. Cardiovascular risk ratios for hypertension diminish with advancing age, but this is offset by a higher absolute risk, making hypertension an important precursor of cardiovascular disease in the elderly.[12] Most evidence about the effects of blood pressure on the risks of cardiovascular disease derives from two principal sources: prospective non-randomised observational studies of the associations between blood pressure and the incidence of stroke and of coronary heart disease, and randomised trials of antihypertensive drug therapy.[13] Smoking has been estimated to cause about 11% of all deaths due to Cardiovascular disease smoking contributes to the pathogenesis of coronary artery disease and sudden death through a variety of mechanism, including the promotion of atherosclerosis, through reduced capacity of blood to deliver oxygen.[14] Diabetes is a major risk factor for cardiovascular disease (CVD), and CVD is the most common cause of death in people with diabetes. Various studies have indicated that, relative to those without diabetes, the presence of diabetes significantly increases the risk (two- to fourfold) for developing CVD, and of dying when CVD is present. [15]

The incidence of diabetes rises with advancing age, and the number of older people in the United States is growing rapidly, insulin treatment for persons with type 1 diabetes has prolonged their lives significantly, and with each year of additional life comes an increased risk for CVD complications, type 2 diabetes occurs at an earlier age in obese and overweight persons, and the prevalence of obesity is rising in the United States.[16] The value of BMI is now used to diagnose the stage of overweight or obesity thereby fixing at 25.9–29 the limited BMI considered as overweight, while a BMI >30 constitutes obesity (2). According to the World Health Organization (WHO), in 2005, approximately 1.6 billion adults over the age of 15 were overweight (3). WHO defines 'globesity' as a worldwide epidemic of obesity that is currently on the increase. [17]

The analysis of long-term results included: status of angina pectoris, occurrence of MI, restenosis, repeat PTCA, CABG and death. Unstable angina and previous MI had no negative effects on immediate results, whereas a significantly lower success rate was noted in patients with angina for more than 1 year compared to patients with angina of shorter duration and patients older than 60 years compared with younger patients. [18] Diets that are extremely rich in carbohydrates and high doses of alcohol promote the increase of another lipid component present in the blood, that of triglycerides, which constitutes an additional risk factor of the formation of atherosclerosis. Other factors favoring the formation of atherosclerosis include physical inactivity, smoking, stress, inflammation and certain bacteria. However, the fat continually accumulated in branch vessels, thus blocking the blood flow of large arteries.[19] Recent evidence has emerged on the vegetarian diet from long-term cohort studies in the west, such as EPIC-OXFORD and the Adventist health study II, which have shown reduction in cardiovascular risk and mortality associated with vegetarian diet. [20] As the degree of coronary heart disease progresses, there may be near complete obstruction of the lumen of the coronary artery, several restricting the flow of oxygen carrying blood pressure to the myocardium. Individuals with this degree of coronary artery disease typically have suffered from one or more myocardial infarctions. [21] The successful trials tested dietary patterns characterized by a low intake of total and saturated fats and/or increased intake of marine or plant omega-3 fatty acids and were not intended primarily to reduce blood cholesterol. Two of these trials also included a high intake of fresh fruits and vegetables, legumes, and cereals containing large amounts of fibers, antioxidants, minerals, vegetable proteins, and vitamins of the B group. The credibility of these recent trials was considerably reinforced by a number of recent studies showing major cardio protective effects of most of these foods and nutrients, with a particular emphasis on ω -3 fatty acids and on folates for their role in hyperhomocysteinemia and in the arginine-nitric oxide-tetrahydrobiopterin pathway, possible major mediators in the development of CHD.[22] Lifestyle intervention is recommended as the cornerstone of therapy for obese persons who have metabolic risk

factors for CHD. Diet-induced weight loss and increased physical activity improve obesity-related metabolic abnormalities in young and middle-aged adults . However, weight-loss therapy in obese older adults is controversial because the relative health risks associated with increasing body mass index (BMI; in kg/m²) decrease and the BMI value associated with the lowest mortality rate increases with increasing age.[23]

METHODOLOGY

Description:- A pooled study of individual – level analysis sampling of 48 subjects was done. All the subjects were diagnosed with several Cardiovascular diseases such as Coronary artery disease (CAD) , Coronary rheumatic heart disease (CRHD), Atrial septal defect (ASD) ,Ventral septal defect (VSD) .Subjects with and without co-morbidities like hypertension , obesity or diabetes and combination of these were analyzed.

Participants:- The study was taken up by 12 students pursuing Post graduate diploma in Nutrition and Dietetics as part of their dissertation work. Each student carried out a study of 4 subjects individually from various hospitals of Hyderabad (viz .KIMS hospitals, Global hospital , Sunshine hospital and Kamenini hospital) overall 48 subjects were analyzed.

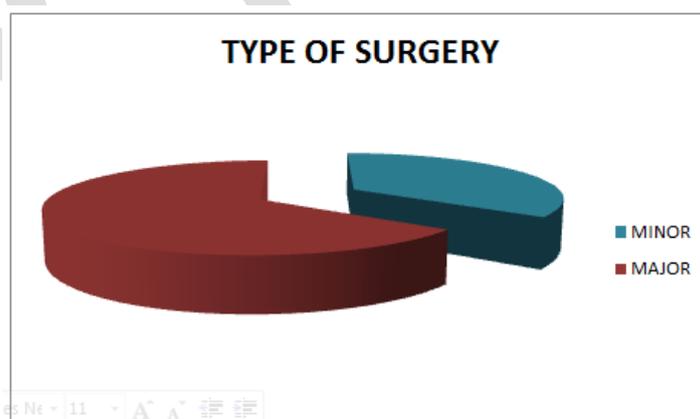
Materials And Method:- A format was designed and pre-tested for undertaking this study and the parameters consisted were patient profile ,chief complaints , diagnosis , present illness, history of past illness ,cardiovascular surgery the patient underwent, subjective data , objective data , biochemical data , medication given , 24 – hour dietary recall ,follow up diet , diet on discharge of individual subjects were followed and analyzed.(annexure1)

The entire data was recorded and analyzed in detail. The markers dealt in depth were gender , age group, BMI ranges , biochemical parameters mainly creatinine, haemoglobin ,sodium , fasting blood sugars , types of medication given , cardiovascular surgeries underwent ,type of diet , diet on discharge ,their percentages and number were calculated for the compilation of the data.

The most common symptoms analyzed in the compilation of study are anxiety , shortness of breath (SOB) , sweating , dizziness , low blood pressure etc.

**RESULTS AND DISCUSSION
CARDIOVASCULAR SURGERIES PERFORMED**

TYPE OF SURGERY	NUMBER	PERCENTAGE
Minor (PTCA)	17	35%
Major (CABG,MVR,AVR,DVR,BENTALS, ASD CLOSURE, TPI)	31	65%



The above diagram represents the percentages of the surgeries i.e., 65% major and 35% are minor surgeries.

Angioplasty for heart attack treatment saves lives. It is an effective way to get blood flowing to the heart again quickly. Angioplasty also relieves chest pain and may prevent shortness of breath and other symptoms associated with heart attacks.[24]

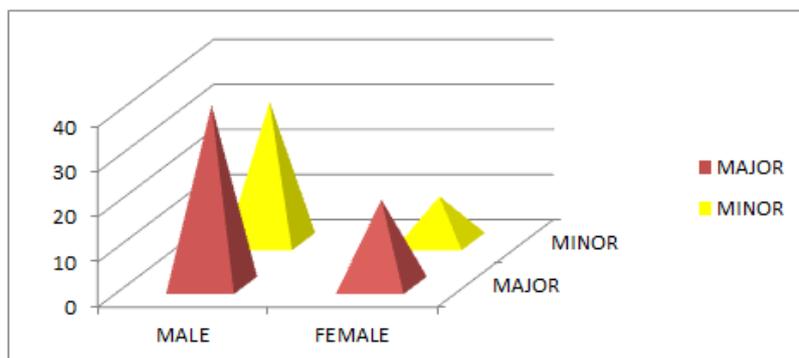
Coronary artery bypass grafting(CABG) is a surgical procedure that improves blood to the heart by bypassing clogged arteries .The procedure is typically used to relief disabling angina or chest pain . [25]

GENDER CLASSIFICATION

The total number of patients assessed was 48 of which male and female patients were present. The table below gives the gist.

GENDER PROFILE

GENDER	MAJOR SURGERIES		MINOR SURGERIES	
	Number	Percentage	Number	Percentage
MALE	19	40	15	31
FEMALE	10	19	5	10

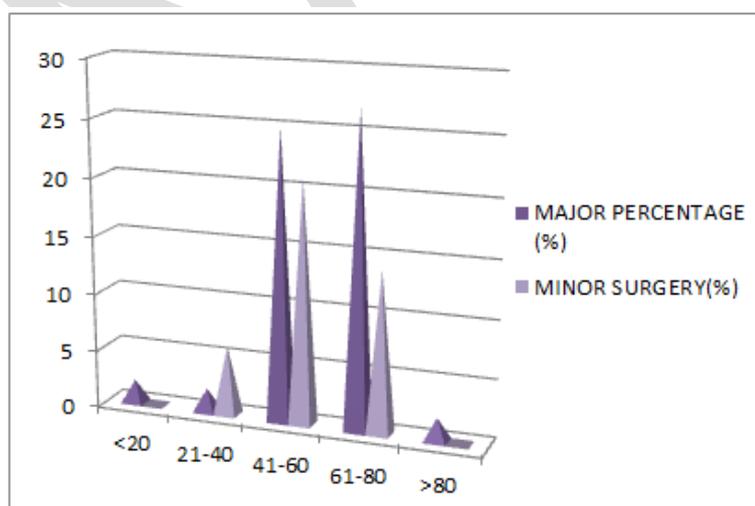


The above pyramid represents that the majority of the patients assessed with major and minor surgery profile were males (40% and 31%) and females (19% and 10%) respectively. Heart disease is the leading cause of death for men, killing 321,000 men in 2013—that's **1 in every 4** male deaths. **Half** of the men who die suddenly of coronary heart disease have **no previous symptoms**. Even if you have no symptoms, you may still be at risk for heart disease. **Between 70% and 89%** of sudden cardiac events occur in men. [26].

AGE CLASSIFICATION

The age distribution of the patients is shown below:

AGE	MAJOR SURGERIES		MINOR SURGERIES	
	NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
<20	1	2%	-	-
21-40	1	2%	3	6%
41-60	12	25%	10	21%
61-80	13	27%	7	14%
>80	1	2%	-	-



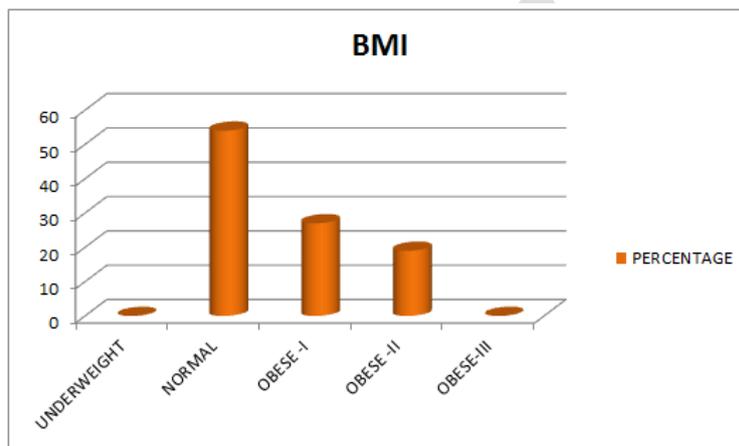
From the above representation, it is observed that major surgeries performed are estimated highest i.e.. 27% in the age group 61-80years followed by 25% in the age group 41-60years. Minor surgeries performed are highest in the age group 41-60 years i.e..21% followed by 14% in the age group of 61-80

years.[27] Young adults who underwent coronary artery bypass grafting had a lower long term mortality and incidence of adverse cardio vascular events than older patient. Once the body reaches physiologic maturity, the rate of catabolic or degenerative change may become greater than the anabolic regeneration. The resultant loss of cells can lead to varying degrees of decreased efficiency and impaired function.

BMI PROFILE

The patients were assessed as per BMI and classified according to their nutritional status.

BMI RANGES	NUMBER	PERCENTAGE
UNDERWEIGHT(<18.5)	0	0
NORMAL(18.5-24.9)	26	54%
OBESE GRADE –I(25-29.9)	13	27%
OBESE GRADE –II(30-39.9)	9	19%
OBESE GRADE – III(>40)	0	0

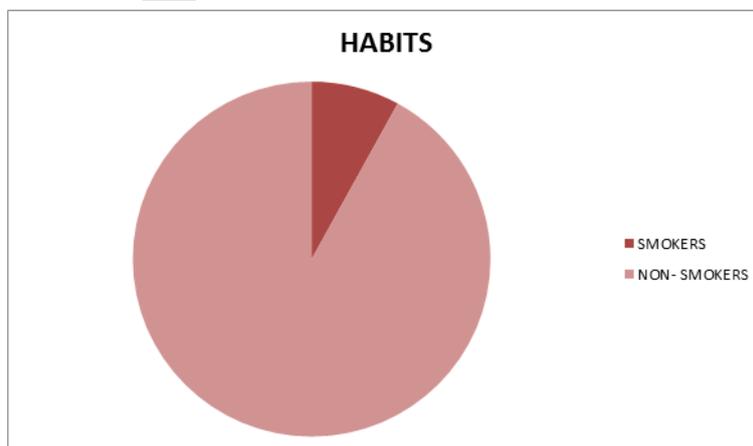


The graph represents the percentage of BMI of the subjects; of which 0% are Under weight , 54% are normal , 27% are grade I obese , 19% are grade II obese and lastly 0% are grade III obese. Results from the 1999 national health and nutrition examination survey (NHANES) indicates the prevalence of overweight and obesity measured by BMI among people >50 years of age.

Obesity is an accepted risk factor for CAD; therefore, it may be assumed that obese patients have poorer outcomes than nonobese patients. However, published findings contradict this supposition about the relationship between BMI and mortality in patients undergoing CA for suspected CAD. The influence of BMI on extent of coronary atherosclerosis and cardiac events in a cohort of patients at risk of CAD was examined by Rossi et al.[28]

SOCIAL HABITS

SOCIAL- HABIT	NUMBER	PERCENTAGE
SMOKERS	4	8%
NON- SMOKERS	36	92%



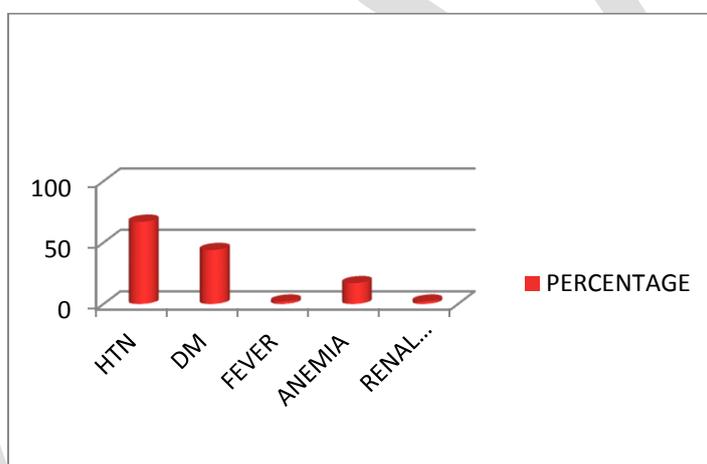
The above diagram represents the percentage of social habits (smoking) of the subjects out of which 8% are smokers and 92% are non-smokers.

Smoking damages the lining of the arteries leading to built up of fatty materials which narrows the artery causing angina, heart attack or a stroke. The nicotine in the cigarettes stimulates the body to produce adrenaline, which makes the heart beat faster and raises the blood pressure making the heart work harder. When non smokers breathe in second hand smoke, also known as passive smoking it can be harmful. Research shows that exposure to second hand tobacco smoke is a cause of heart disease in non-smokers, which can harm the health.[29]

VARIOUS DISEASE CONDITION OBSERVED IN PATIENTS:

The patients were admitted due to various metabolic diseases such as Hypertension, diabetes, fever, anaemia, renal diseases.

DIAGNOSIS	NUMBER	PERCENTAGE
Hypertension	32	66.6%
Diabetes Mellitus	21	43.7%
Fever	1	2.08%
Anaemia	8	16.6%
Renal Diseases	1	2.08%



From the estimated data collected of all the patients, 66.0% were hypertensive, 43.7% were diabetic, 16.6% were anemic and <5% were febrile accompanied with renal disorders. Hypertension is approximately twice as frequent in patients with diabetes compared with patients without any disease. Compared with the year 2000, the number of adults with hypertension is predicted to increase by 60% to a total 1.56 billion by the year 2025. [31]

Diabetes appears to contribute directly to the development of cardiomyopathy, rather than solely via coronary atherosclerosis and hypertension. Diabetic neuropathy is one of the factors that may explain the increased incidence of silent ischemia in patients with diabetes mellitus.[31]

Iron deficiency affects up to 1/3rd of the world's population and is particularly common in elderly individuals and those with certain chronic diseases. Patients with heart failure and iron deficiency have shown symptomatic improvements from intravenous iron administration and some evidence suggests that these improvements occur irrespective of the presence of anaemia. [32]

SUBJECTIVE DATA

The subjective data of the patient were evaluated as shown in table.

SUBJECTIVE DATA	STATUS	NUMBER	PERCENTAGE
Appetite	normal	45	93.7%
	polyphagia	---	---
	decreased	3	6.25%
Hunger	Normal	45	93.7%
	Sub-optimal	1	2.08%
	starvation	2	4.16%
Thirst	normal	46	95.8%

	polydypsia	2	4.16%
	decreased	--	---
Bowel	normal	44	91.6%
	constipated	3	6.25%
	diarrhoea	1	2.08%
Micturation	Normal	45	93.7%
	polyuria	2	4.16%
	oliguria	1	2.08%
Sleep	Disturbed and unrefreshing	4	8.33%
	Sound and refreshing	44	91.6%

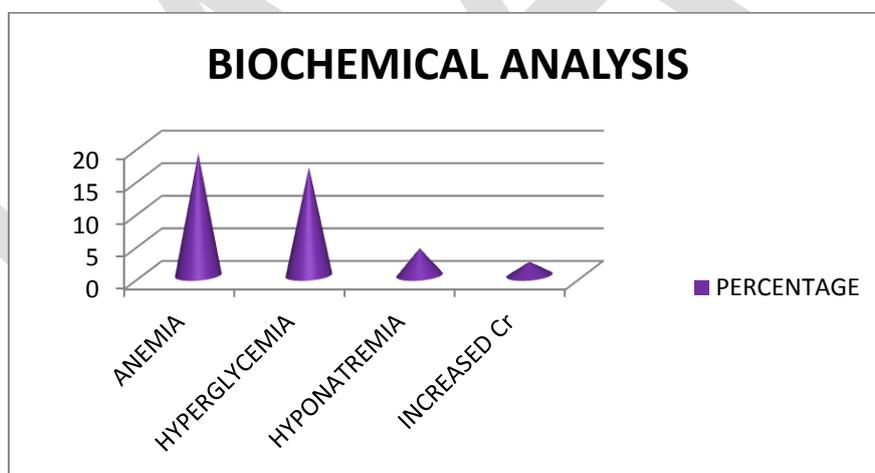
Most of the patients suffering from cardiovascular disease have normal appetite, only few are assessed with loss of appetite. About 43% were diabetic among which 4% complained of polydypsia; 2% were complaining of polyuria, 1% had oliguria and 93% were having normal micturation.91% had normal GI function except for few. And also 91.6% was not having sound and refreshing sleep whereas 4% were having disturbed sleep due to pain and discomfort.

BIOCHEMICAL VALUES

The biochemical data of the patients were evaluated and interpreted. The details are shown in table

BIOCHEMICAL ANALYSIS

Biochemical parameters	Number (n=48)	Percentage
Anemia	9	18.75%
Hyperglycemia	8	16.6%
Hyponatremia	2	4.16%
Increased Creatinine	1	2.08%



From the analysed data, 18.7% subjects were anemic, 16.6% were hyperglycemic, 4.16% were hyponatremic and 2% were with increased creatinine. Majority of assessed subjects were anemic.

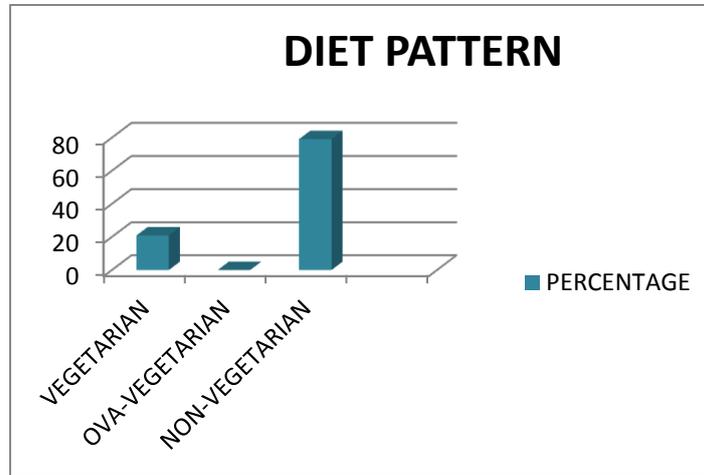
In patients with heart failure, anemia is the most part been found to be associated with increased risk for hospitalization. In patients with coronary diseases ,the relationship between anemia and adverse outcomes have been less consistent. The pathophysiology of the link between diabetes and cardio vascular diseases is complex. Diabetes is a prime risk factor for cardio vascular diseases which include retinopathy, nephropathy. It also effects the heart muscles causing both systolic and diastolic heart failure.[33] There is a evidence that heart failure patients are more sensitive to low serum sodium levels than the general population.[34] In patients who are hospitalized for acute heart failure, renal artery stenosis, is a common finding among patients who undergo coronary angiogram. [35]

DIET PATTERN

On assessing the patients they were grouped under following type of diet pattern. Vegetarian/ova-vegetarian/ non-vegetarian. The following table shows the details of the same.

TYPES OF DIET PATTERN

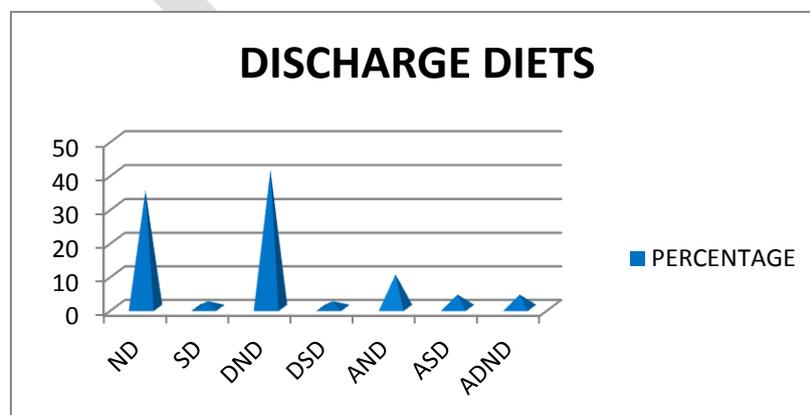
Types of Diet	Number (n=48)	Percentage
Vegan	10	20.83%
Ova-vegetarian	-	-
Non-vegetarian	38	79.1%



Among all the subjects assessed 20.8% are vegetarians , and majority of subjects i.e 79% are non – vegetarians. Dietary saturated fatty acids come chiefly from products containing animal fat. Determination of serum cholesterol is considered by some to be the best single measurement for estimating risk for persons less than 50 years of age but for those over 50 years of age, measurement of high density lipoprotein cholesterol is the best indicator. The decision to eat a vegetarian diet in India is driven by faith, culture or community, rather than a healthier lifestyle. With a higher prevalence of vegetarianism and less propensity for confounding by behaviors such as physical activity or tobacco use, India offers a unique opportunity for a more robust evaluation of vegetarian diets and CVD risk factors. [36]

TYPES OF DIET ADVISED ON DISCHARGE

TYPES OF DIET	NUMBER	PERCENTAGE
Normal diet	17	35%
Soft diet	1	2%
Diabetic normal diet	20	41%
Diabetic soft diet	1	2%
Acitrom normal diet	5	10%
Acitrom soft diet	2	4%
Acitrom diabetic normal diet	2	4%



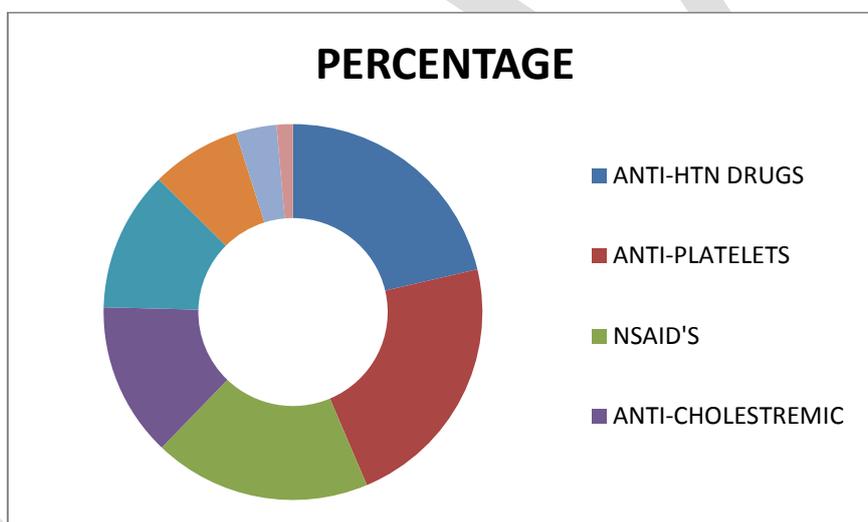
According to the data collected,35% were advised normal diet, 2% - soft diet, 41% -diabetic normal diet, 2%- diabetic soft diet,10%- acitrom normal diet, 4% -acitrom soft diet and 4% -acitrom diabetic normal

diet. Majority of the subjects were advised diabetic normal diet. Dietary patterns represent the overall combination of food habitually consumed which together produce synergistic health effects. The most well studied dietary patterns are traditional Mediterranean and DASH diet. In comparison with the conventional low fat, high carbohydrate DASH diet, modified DASH diet is higher in vegetable fats and lower in carbohydrates. [37]

MEDICATIONS

The various types of drugs prescribed to the patients (n=48) are as follows

CLASS OF DRUGS	NUMBER	PERCENTAGE
Oral hypoglycemic drugs	16	33%
Anti-coagulants drugs	46	95.8%
Anti-hypertensive drugs	44	92%
ACE inhibitors+ beta blockers	3	6%
NSAID'S	40	83.3%
Antacids drugs	25	52%
Anti-cholesteremic drugs	27	56.2%
Vitamin and mineral supplements	7	14.5%



According to the study, of all the subjects 92% were given anti-hypertensive drugs, and beta blockers and ACE inhibitors are 6%, 96% anti-coagulants drugs, 83% NSAID'S, 56% anti-cholesteremic drugs, 52% antacids, 33% oral hypoglycemic drugs and 15% vitamin and mineral supplements. Majority of patients were given anti-hypertensive drugs. Since hypertension is one of the major risk factor for cardiovascular disease.

Anti-hypertensive drugs have a variety of potentially beneficial properties that might favourably affect cardiovascular event rates. [38] Because of the central role of platelets in cardiovascular thrombosis, anti-platelet therapy [including the COX-1 inhibitor aspirin, the P2Y12 antagonist clopidogrel and integrin αIIbB3 antagonists] is a well established part of the treatment of cardiovascular disease. [39] Thrombosis has a prominent role in the pathogenesis of cardiovascular diseases, anti-thrombotic agents have been tested for the prevention of cardiovascular diseases. The anti-thrombotic properties of aspirin were first described in 1971 and the hypothesis that aspirin could efficiently prevent cardiovascular disease was subsequently raised and investigated. Aspirin therapy can reduce the risk of cardiovascular events such as heart attack and stroke. [40]

Lipid lowering drugs have significantly reduced the incidence of myocardial infarction, death from all the cardiovascular diseases. [41]

SUMMARY AND CONCLUSION

- This case study project was undertaken to explore the various markers of patients suffering from cardiovascular diseases and undergoing cardiovascular surgeries.

- As cardiovascular disease is globally considered as the leading cause of death with 80% of CVD related deaths being reported from low and middle income countries like India.
- CVD in India alone is burdened with approximately 25% of cardiovascular related deaths.
- According to the study the major modifiable risk factors are hypertension, tobacco use, diabetes mellitus, obesity where as the major non-modifiable risk factors are age and gender.
- From the evident data it is clear that majority of the subjects undergoing cardiovascular surgeries fall under the age group 61-80 years and majority of the subjects are found to have normal BMI.
- The results obtained clearly indicates that majority of patients with cardiovascular disease undergo major surgeries such as Coronary Artery Bypass Grafting(CABG),Mitral Valve Replacement(MVR) , Atrial Valve Replacement(AVR) ,Double Valve replacement(DVR) , Bentals, Atrial Septal Defect(ASD) Closure, Temporary Pacemaker Implantation(TPI) with males being the maximum in number.
- Almost all the subjects were non-smokers.
- From the estimated data collected predominant subjects are effected with hypertension,obesity and diabetes.
- Almost subjects have normal appetite, hunger, thirst, bowel, micturation and refreshing sleep.
- Most of the subjects are anemic and hyperglycemic and majority follow a non-vegetarians diet pattern.
- In this survey the patients were given different types of diets depending upon their co-morbidities and surgeries performed.
- All the subjects were on medications such as anti-hypertensive drugs, oral hypo-glycemic drugs, NSAID'S and anti-coagulant drugs.

SUGGESTIONS

- A medical nutrition therapy (MNT) can bring vast outcomes in mortality and morbidity rates of patients suffering from cardio vascular diseases.
- The role of human nutrition science in medicine shows that this branch of cardiology is fully covered by dietetics
- With increasing BMI necessary lifestyle intervention can prevent the incidence of cardio vascular surgeries.
- Cessation of smoking can reduce the cardiovascular mortality.
- . Include all the food groups in the diet .Choose fiber-rich whole grains for most grain servings.
- Eat good amount of high biological value protein i.e.. pulses ,legumes, sprouts ,milk and milk products (low fat).
- Eat a variety of fresh vegetables and fruits without high-calorie sauces or added salt and sugars. Replace high-calorie foods with fruits and vegetables.
- Choose poultry and fish without skin and prepare them in healthy ways without added saturated and transfat. If you choose to eat meat, look for the leanest cuts available and prepare them in healthy and delicious ways.
- Eat a variety of fish at least twice a week, especially fish containing omega-3 fatty acids.
- Inclusion of functional foods such as garlic, almonds, walnuts, flax seeds, fenugreek seeds.
- Limit saturated fat and trans fat and replace them with the better fats .
- Combinations of different oils are preferred.
- Cut on beverages and foods with added sugars.
- To lower blood pressure, aim to eat no more than 2grams of sodium per day. Reducing daily intake to 1.5grams is desirable because it can lower blood pressure even further
- Regular physical activity for about 30-45 minutes is recommended. Yoga and meditation should also be encouraged.
- Hence, this study was designed to quantify the risk factors associated with cardiovascular diseases which can be modified.

**ANNEXURE 1
CASE STUDY FORMAT**

NAME:
CONSULTANT:
AGE/SEX:
DATE OF ADMISSION:
DATE OF DISCHARGE:
P.O.M.R:
DIAGNOSIS:
PAST MEDICAL HISTORY:
FAMILY HISTORY:
SOCIO-ECONOMIC STATUS:
SOCIAL HABITS:
LITERACY:

SUBJECTIVE DATA:

- Appetite-
- Hunger-
- Thirst-
- Bowel-
- Micturition-
- Sleep-

OBJECTIVE DATA:

- Ht.-
- IBW-
- CBWt.-
- BMI-

BIOCHEMICAL DATA:

Blood Profile:

- Hb-
- PCV-
- Platelet-
- RBS-
- FBS-
- PPBS

Renal Profile:

- Urea-
- Creatinine-
- Sodium-
- Potassium-
- Chloride-
- HCO₃-

Liver Profile:

- Bilirubin T-
- Bilirubin DIR-
- SGPT-
- SGOT-
- T. Protein-
- Albumin-
- Globulin-
- Alk. Phosphate-

MEDICATIONS

S.NO	NAME OF THE MEDICINE	ACTION

CLINICAL FINDINGS:

DIET HISTORY:

Type of Diet-

Time	Food Item	Quantity	Energy	Protein	Fat	CHO

FOOD FREQUENCY:

- Cereals-
- Pulses-
- GLV-
- Vegetables-
- Non-Veg-
- Egg-

ASSESSMENT:

GOAL(S):

PLAN:

- Energy-
- Protein-
- CHO-
- Fat-
- Fibre-
- Salt-

FOLLOW UP:

DAY 1

Time	Food Item	Quantity	Energy	Protein	Fat	CHO

SAMPLE MENU:

Time	Food Item	Quantity	Energy	Protein	Fat	CHO

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