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EVALUATING THE ASSESSMENT IN RISK FACTORS OF CARDIOVASCULAR DISEASE

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Abstract

Cardiovascular disease (CVD) is the leading cause of global morbidity and mortality, with both modifiable and non-modifiable risk factors contributing to its prevalence. This cross sectional study, conducted over three months among 60 patients aged 18–60 years at MMCHRI, Enathur, aimed to evaluate the prevalence and impact of key CVD risk factors. Data were analyzed using descriptive statistics in MS Excel. The results revealed high rates of hypertension (63.3%), dyslipidemia (60.0%), diabetes mellitus (53.3%), obesity (51.7%), and elevated inflammatory markers (CRP ≥7 mg/L in 63.3%). Nearly half of the participants (46.7%) had already been diagnosed with CVD. Logistic regression identified CRP, hypertension, diabetes, and dyslipidemia as significant independent predictors of CVD ($p < 0.05$). The findings emphasize the urgent need for early detection, lifestyle modification, and preventive care to mitigate cardiovascular risk. A multifactorial approach addressing both metabolic and inflammatory pathways is critical for reducing the burden of CVD in high-risk populations.

Keywords: Cardiovascular disease, Risk factors, Hypertension, Diabetes, Dyslipidemia, C-reactive protein, Prevention

INTRODUCTION

Cardiovascular disease includes any conditions that affect the heart and blood vessels. It typically results from atherosclerosis the buildup of fatty deposits (plaques) inside the arteries, leading to narrowing and reduced blood flow. Framingham heart study in 1948, aiming to identify the common characteristics that contribute to cardiovascular disease by following a large group of participants over time. The study enrolled over 5,000 men and women, aged 30 to 62 years, from the town of Framingham, Massachusetts. These individuals were free of overt symptoms of cardiovascular disease at baseline. Participants were subjected to extensive physical examinations, laboratory tests, and regular follow-up every two years. The goal was to investigate the relationship between a variety of clinical and lifestyle variables such as blood pressure, serum cholesterol, cigarette smoking, body weight, and glucose intolerance and the subsequent development of CHD.

This article presents the findings of the first six years of follow-up of the original cohort. It marks a significant advancement in the understanding of CHD etiology and introduces the concept of "risk factors" variables that, although not necessarily causing the disease directly, are statistically associated with increased likelihood of developing it. The authors emphasize the importance of early detection and prevention by identifying these risk factors, laying the foundation for modern preventive cardiology. Cardiovascular disease (CVD) refers to a broad class of disorders affecting the heart and blood vessels, including coronary artery disease, stroke, peripheral arterial disease, rheumatic heart disease, and congenital heart defects. Globally, CVD is the leading cause of morbidity and mortality, responsible for an estimated 32% of all deaths in 2019, with a disproportionate burden in low- and middle-income countries.

The World Health Organization and major health bodies have consistently emphasized CVD as a critical global health issue due to its preventability and long-term socioeconomic impact. The pathogenesis of CVD is multifactorial and complex, typically arising from a combination of behavioral, environmental, genetic, and metabolic risk factors. Major modifiable risk factors include hypertension, dyslipidemia, tobacco use, diabetes mellitus, obesity, physical inactivity,

unhealthy diet, and excessive alcohol consumption. Non-modifiable risk factors, such as age, sex, and family history, also play a significant role in individual susceptibility. Over the past decades, large-scale epidemiological studies such as the Framingham Heart Study and the INTERHEART study have provided robust evidence linking specific risk factors to the development of CVD. These findings have shaped public health guidelines and clinical practices globally. Nevertheless, regional disparities in risk factor prevalence, awareness, and healthcare access continue to challenge efforts to reduce the global burden of CVD. In recent years, attention has also shifted toward emerging risk factors such as inflammatory markers (e.g., CRP), psychosocial stress, air pollution, and genetic predispositions, as well as the role of social determinants of health. The increasing prevalence of sedentary lifestyles and poor dietary patterns, particularly in urbanizing populations, further exacerbates the risk landscape. Given the preventable nature of most CVD cases, early identification of risk factors through population-level screening and targeted interventions remains a cornerstone of CVD prevention. This thesis aims to explore the key risk factors contributing to CVD, with a focus on their interrelationships, regional trends, and implications for preventive strategies.

MAJOR TYPES OF CVD

1. Coronary artery disease (cad) narrowing/blockage of heart arteries; can lead to heart attacks.
2. Cerebro vascular disease affects blood vessels of the brain; includes stroke
3. Peripheral artery disease (pad) reduced blood flow to limbs; causes pain/cramping.

RISK FACTORS OF CVD

- Modifiable risk factors
- Non-modifiable risk factors

MODIFIABLE RISK FACTORS CAN BE CONTROLLED

- High blood pressure (hypertension)
- High Cholesterol (dyslipidemia)
- Diabetes or prediabetes
- Smoking and tobacco use
- Physical activity
- Obesity or over weight
- Unhealthy diet (high in salt, sugar, saturated fats)
- Excess alcohol
- Chronic stress and poor sleep

NON- MODIFABLE RISK FACTORS

- Age = (risk increases with age)
- Sex= (men have higher risk earlier in life; risk increases in woman post-menopause)
- Family history of heart disease
- Chest pain (angina)
- Shortness of breath
- Fatigue or weakness
- Irregular heart beat
- Swelling in legs, ankles or abdomen
- Dizziness or fainting.

CVD is the leading cause of mortality and morbidity worldwide, accounting for approximately 17.9 million deaths annually, according to the world health organization (who)these diseases which affects the heart and blood vessels, include coronary artery disease, stroke, heart failure and hypertension –related complications.

DIAGNOSIS OF CVD

- CVD is assessed using a combination of;
- Blood tests (lipids, glucose, inflammatory markers like HS-CRP
- ECG -(electrocardiogram) – detects arrhythmias or past heart attacks
- Echocardiogram – ultrasound to check heart structure and function
- Stress tests –evaluates heart performance under exertions
- Angiography – visualizes coronary artery blockages.
- CT/MRI - for detailed heart and vessel imaging.

prevention and management
- lifestyle modifications –regular physical activity (at least 150 mins per week)
- heart healthy diet –e.g. mediterranean r dash
- weight control

> ➢ quit smoking
> ➢ stress management and adequate sleep

Medical Management

> ➢ Blood pressure Medications (e.g. ACE inhibitors, beta blockers)
> ➢ Cholesterol-lowering drugs (e.g. Statins)
> ➢ Diabetes control (metformin, insulin)
> ➢ Antiplatelets (aspirin, if indicated)
> ➢ Therefore, this study aims to identify, assess and analyses the prevalence of key risk factors associated with cardio vascular disease among (target population. adults aged 18 to 60 in urban areas.
> ➢ The findings are expected to provide evidence – based insights for prevention program clinical practice, and health education.

AIM AND OBJECTIVES

To identify, analyze, and evaluate the major risk factors contributing to the development of cardiovascular disease (CVD) in a selected population, with the goal of informing effective prevention and intervention strategies.

The objectives of this study are to review existing literature on the known risk factors for cardiovascular disease (CVD), including both modifiable and non modifiable factors, and to assess the prevalence of key risk factors such as hypertension, diabetes, smoking, obesity, physical inactivity, poor diet, and dyslipidemia within the study population. Additionally, the study aims to examine the association between socio demographic characteristics (such as age, gender, education, and income) and the presence of CVD risk factors, as well as to evaluate the level of awareness and knowledge among individuals regarding these risk factors and related preventive practices.

METHOD AND MATERIALS

> ➢ Study design;
>   Cross Sectional Study
> ➢ Study period ;
>   3 Months
> ➢ Sample size
>   60
> ➢ Inclusion criteria
>   Age group above -18 to 60 years old .

Known diagnosed patients of Cardio Vascular Disease MMCHRI, Enathur, Kanchipuram .

EXCLUSION CRITERIA

Patients will be excluded if they have any of the Following,

- Age below 18 years and more than 60 years old.
- Terminal illness(advanced cancer)
- Severe kidney or liver disease
- Pregnant or lactating woman
- Severe Mental Illness
- Recent surgery Or Major Trauma.
- Patients on Immunosuppressive Therapy.
- SAMPLING METHOD ; Convenience sampling
  STATISTICAL ANALYSIS;
  The analysis of data will be done by using descriptive statistics and the significance will be assessed by using MS EXCEL.

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RESULT

Hemodynamic parameters of age group discussion

Age Group Distribution
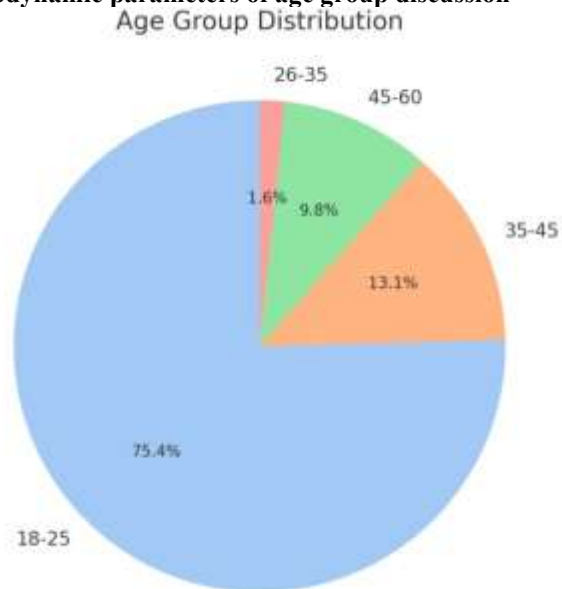
THIS ILLUSTRATES THE PROPORTION OF PARTICIPANTS IN DIFFERENT AGE CATEGORIES,
 - 18-25 years ;largest group, making up 75.4% indicating a predominantly young population
 - 35-45 years; 13.1%, representing the second largest segment.
 - 45-60 years; 9.8%, showing a smaller proportion of middle – aged individuals.
 - 26-35years; 1.6%, the least represented group.

PIE CHART **FOR GENDER**
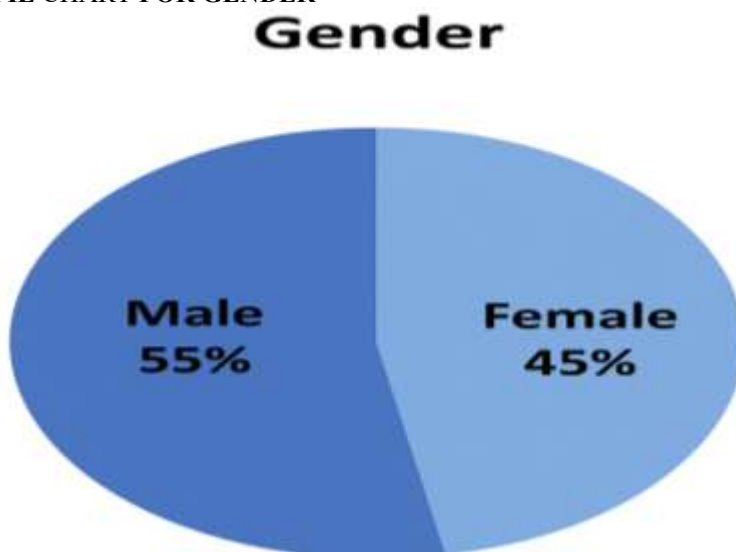
Gender

THE GENDER DISTRIBUTION PIE CHART SHOWS THAT
1. 45% are female indicating a slightly higher representation of males compared to female in the sample
2. 55% pf participants are male

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PIE DIAGRAMMATIC REPRESENTATIVES OF HEMODYNAMIC PARAMETERS

DESCRIPTIVE STATISTICAL METHOD (RESULT)

VARIABLE	MEAN	STANDARD DEVIATION	MINIMUM	25 %	MEDIAN	75%	MAXIMUM
age	1.30	0.53	1	1	1	2	3
Gender(1-male,2-female)	1.45	0.50	1	1	1	2	2

Currently \formerly smokes	1.82	0.83	1	1	2	3	3
Cigerattes per day	1.65	0.63	1	1	2	2	3
150 min physical activity	1.57	0.50	1	1	2	2	2
Consumes fast food	2.03	0.66	1	2	2	2	3
Consumes alcohol	1.32	0.60	1	1	1	1.25	3
Diagnosed with high blood pressure	1.83	0.38	1	2	2	2	2
On blood pressure medications	2.00	0.00	2	2	2	2	2
Diagnosed with diabetes	1.70	0.46	1	1	2	2	2
Diagnosed with cholestrol	1.73	0.45	1	1	2	2	2
On cholesterol medications	1.82	0.39	1	2	2	2	2
Parental heart attack before 55 age	1.73	0.63	1	1	2	2	3
Emotional stress(1-4 scale)	2.68	1.14	1	2	3	4	4
ECGchanges	1.50	0.50	1	1	1.5	2	0

THE FORMULA USED
STANDARD DEVIATION;

$$SD = \sqrt{\frac{1}{n-1} \sum (x_i - \bar{a}}$$

MEAN;

$$\text{Mean} = \frac{\sum x_i}{n}$$

- ➢ SD- standard deviation
- ➢ n- total numberofobservation±s (sample siType equation here.ze)
- ➢ Xi- the value of each individual observation
- ➢ X-(bar) – the sample mean (average of all observations)
- ➢ (n-1) – degrees of freedom (used for sample standard deviation)

DISCUSSION

A descriptive analysis was conducted on a total of 60 participants to assess the distribution and prevalence of various cardiovascular disease (CVD) risk factors. The findings are summarized below:

Demographic Characteristics,

The mean age of participants was 1.30 (SD = 0.53), indicating a predominance of younger individuals in the sample. The mean gender score was 1.45 (SD = 0.50), suggesting a nearly even distribution of males (coded as 1) and females (coded as 2), with a slight male predominance.

The mean score for smoking status was 1.82 (SD = 0.83), indicating that a considerable proportion of the sample were either current or former smokers .Cigarette consumption per day averaged 1.65, suggesting light smoking among those who smoke .Physical activity had a mean of 1.57, showing that nearly half of the participants did not meet the recommended 150 minutes of weekly physical activity .The mean for fast food consumption was 2.03, reflecting frequent intake of processed or unhealthy foods. Alcohol consumption showed a lower mean of 1.32, suggesting that most participants either do not consume or rarely consume alcohol.

A high proportion of individuals had been diagnosed with hypertension, with a mean score of 1.83. All diagnosed participants were on blood pressure medication (mean = 2.00).he mean score for diabetes diagnosis was 1.70, indicating a notable presence of diabetes among participants .Similarly, cholesterol diagnosis was reported with a mean of 1.73, and cholesterol medication use had a mean of 1.82. A positive family history of heart attack or stroke before the age of 55 was noted with a mean of 1.73, signifying an inherited risk component. Psychosocial and Diagnostic Indicators The level of emotional stress averaged 2.68 on a 4-point scale, pointing to moderate to high levels of stress among the sample .The mean score for ECG changes was 1.50, indicating that approximately half of the sample had elevated or abnormal ECG results, a direct indicator of cardiac abnormality.

The results reveal a moderate to high prevalence of multiple CVD risk factors among the study participants. Particularly concerning are the high rates of hypertension, physical inactivity, processed food consumption, stress levels, and family history, all of which significantly contribute to cardiovascular risk. These findings underline the importance of early screening and lifestyle interventions to mitigate the burden of CVD in this population.

Summary

Risk Factors In Cardiovascular Disease (CVD)

Cardiovascular Disease (CVD) remains a leading cause of morbidity and mortality globally. This study aimed to identify and evaluate the prevalence and impact of key risk factors associated with CVD in a sample of 60 Patients . The most common risk factors observed were hypertension (63.3%), dyslipidemia (60.0%), diabetes mellitus (53.3%), obesity (51.7%), and elevated inflammatory markers (CRP ≥ 7 mg/L in 63.3%). A significant proportion of patients (46.7%) had already been diagnosed with CVD. Correlation analysis showed strong associations between. CRP and other metabolic factors such as BMI, blood pressure, and LDL cholesterol. Logistic regression identified high CRP, diabetes, hypertension, and dyslipidemia as significant independent predictors of CVD ($p < 0.05$). These findings highlight the importance of early detection and management of modifiable risk factors—especially inflammation, metabolic disorders, and lifestyle factors—in reducing the burden of cardiovascular disease. Targeted prevention strategies and public health awareness are essential to address these risks effectively.

CONCLUSION

This study demonstrates that cardiovascular disease is strongly associated with a combination of modifiable risk factors, including hypertension, diabetes mellitus, dyslipidemia, obesity, and chronic inflammation. Among the sample of 60 patients, a significant proportion exhibited multiple co-existing risk factors, with elevated C-reactive protein (CRP) emerging as a key inflammatory marker linked to CVD. Statistical analysis confirmed that high CRP, hypertension, diabetes, and dyslipidemia are significant independent predictors of CVD. These findings emphasize the urgent need for early screening, lifestyle modification, and preventive care to address these risk factors, particularly in high-risk populations. Overall, a comprehensive, multifactorial approach targeting both metabolic and inflammatory pathways is essential for the effective prevention and management of cardiovascular disease. Future research should explore longitudinal trends and the impact of integrated interventions on CVD outcomes.

The study confirms that inflammatory markers (CRP), diabetes, and hypertension are significant independent risk factors for CVD. Early detection and control of these modifiable factors can potentially reduce the cardiovascular burden in high-risk populations.

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