Unveiling Cardiovascular Risk Factors in Diagnosed and Undiagnosed Among Rural Population: A Prospective Observational Study

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ABSTRACT

Background: Cardiovascular disease is a leading cause of morbidity and mortality worldwide. It is caused by a combination of genetic, environmental, and lifestyle factors. Several risk factors contribute to the higher prevalence of CVD in rural areas.

Objective: The objective of this study was to determine prevalence of individual risk factors among undiagnosed and diagnosed patients with cardiovascular diseases.

Materials and methods: A prospective observational study was carried out among the rural areas of pathanamthitta district. The sample size of the study was 500 individuals. The study period ranged from 6 months. The data was collected using a semi structured questionnaire and various instruments to evaluate risk factors including diabetes mellitus, blood pressure and BMI were used.

Results: Of the total population of 500 individuals,22.4% of the total subjects were diagnosed with cardiovascular disease, and about 77.6% of the subjects were not diagnosed with cardiovascular disease. The prevalence of individual risk factors for the diagnosed population were higher than that of the undiagnosed population, although 27.5% of the undiagnosed population were found to have high risk for developing cardiovascular disease.

Conclusion: The prevalence of social habits such as smoking, alcoholism and tobacco consumption is a contributing factor to cardiovascular disease. Lifestyle diseases such as hypertension, diabetes mellitus, and dyslipidemia are prevalent in causing cardiovascular disease. Among the individuals not diagnosed with cardiovascular disease, one third of the population were having high risk of developing CVD

Keywords: cardiovascular disease,risk factors,diagnosed, undiagnosed

INTRODUCTION

Cardiovascular disease (CVD) refers to a group of disorders that mainly affects the heart and subsequent blood vessels. They include coronary artery disease, stroke, heart failure, and peripheral arterial disease. CVD is a leading cause of morbidity and mortality worldwide, accounting for approximately 17.9 million deaths each year, according to the World Health Organization (WHO). [1]

Several factors contribute to the high prevalence of CVD in India, such as changes in lifestyle, rising prevalence of risk factors, inadequate access to healthcare, and limited awareness of CVD prevention and management strategies. In Kerala, CVD is estimated to be 9.7%, higher than the national average of 6.2%. CVD also poses asignificant economic burden on individuals, families, and the healthcare system.[2]

Cardiovascular diseases (CVD) are influenced by various risk factors, including hypertension, dyslipidemia, diabetes, obesity, smoking, physical inactivity, unhealthy diet, family history, stress, and alcohol consumption. High blood pressure increases the risk of attack, stroke, and other cardiovascular complications. Dyslipidemia,a condition characterised by abnormal cholesterol and triglycerides, can lead to atherosclerosis, narrowing and hardening of arteries. Diabetes, obesity, smoking, and sedentary lifestyles also contribute to CVD.[3] Physical inactivity, unhealthy diet, and a family history of CVD increase the risk of CVD. Chronic stress can also contribute to CVD development. Alcohol consumption, although moderate, can have cardioprotective effects. [4]Identifying and managing these risk factors through lifestyle modifications, medication, and interventions is crucial for preventing and managing CVD. Regular health screenings and risk assessments can help identify at-risk individuals and facilitate early intervention.

METHODOLOGY

A prospective observational study was conducted among the rural areas of Pathanamthitta district which is located at the central-southern part of Kerala. The study period was 6 months. Using Slovin's formula, n=N/1+Ne 2, the sample size was determined. The population size is represented by N, and the margin of error is represented by e. The total population residing in the rural areas of Pathanamthitta district is 1,000,000., making N = 1,000,000. A five percent (0.05) margin of error (e) is used. The sample size (n) is 399.84 after entering these values into the formula. Although 400 people can be selected in total, 500 people are chosen in order to increase precision and decrease error margin.

Inclusion criteria include individuals aged above 30 years, those who are willing to participate in the study and are not previously diagnosed with any type of cardiovascular diseases. Exclusion criteria include pregnant or lactating mothers as well as those individuals that are unwilling to participate in the study.

The prevalence of risk factors was assessed by a self-prepared risk assessment tool, which is approved by institutional human ethics committee. Participants who were willing to participate in the study were asked to fill the consent form followed by a semi structured questionnaire to determine the knowledge and various risk factors affecting the individual.

Parameters like blood pressure, cholesterol, BMI, and glucose were measured in order to evaluate the different risk factors of CVD. Using a Glucometer, the random blood sugar (RBS) levels were determined in order to assess the glucose levels. The digital readout device uses a finger prick to obtain a small drop of blood, which is then placed on the test strip to determine the RBS level. Sphygmomanometers were used to measure blood pressure. The formula to calculate body mass index is as follows: BMI = weight in kilogrammes / (height in metres) 2. A weighing device calibrated to zero gives the weight in kilograms and the height is obtained in centimetres by a measuring tape. Subsequently the BMI of the individual is calculated and interpreted as underweight, normal weight, overweight, or obese. Lipid levels are recorded from the individual based on the latest available data in their recent lab assessments. Data was statistically analysed in Microsoft Excel 2019 and results were obtained. Findings are generated with the help of tables, charts or graphs and results interpreted accurately.

RESULTS

**Graph showing distribution of undiagnosed and diagnosed subjects with CVD.**

Distribution of diagnosed and undiagnosed CVD
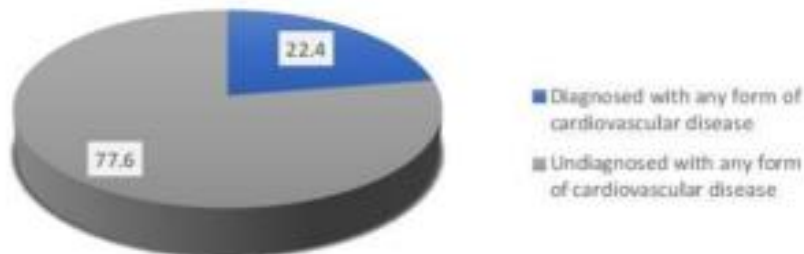
The above graph signifies that the 22.4% of the total subjects were diagnosed with cardiovascular disease, and about 77.6% of the subjects were not diagnosed with cardiovascular disease.

Graph showing distribution of individual risk factor among undiagnosed and diagnosed patients.

Comparison between diagnosed and undiagnosed individuals.
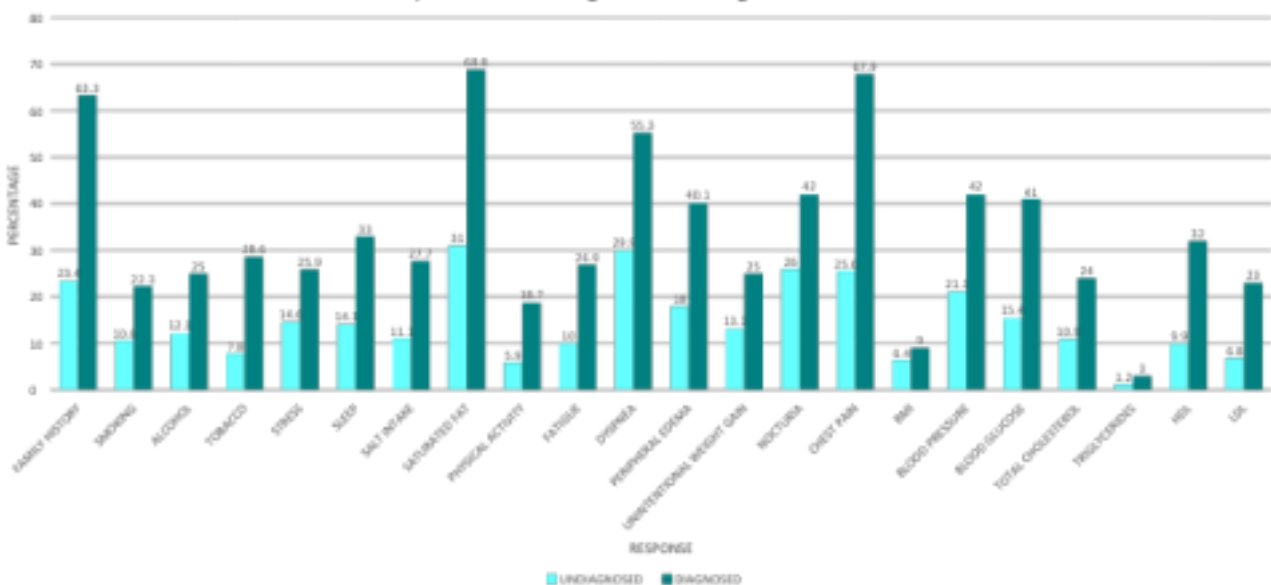
From the above figure we can understand that out of 500 people enrolled in the study, an undiagnosed population of 388 had a risk of family history of cardiovascular disease to be 23.4% and of 63.3% in diagnosed patients of 112 population. Similarly the undiagnosed population had a risk of smoking to be 10.6% and 22.3% in the diagnosed population. Likewise, alcohol intake of 12.1% was found undiagnosed and 25% was diagnosed. Risk of intake of Tobacco was found to be 7.8% in the undiagnosed and 28.6% in the diagnosed population. Risk of high stress was found to be 14.6% in undiagnosed and 25.9% in the diagnosed population. Reduced sleep of less than 5 hours was found to be 14.1% in undiagnosed and 33% in diagnosed. Risk of High salt intake was 11.1% undiagnosed and 27.7% diagnosed.

Risk of intake of high amounts of saturated fat was 31% undiagnosed and 68.8% diagnosed. Lack of physical activity was seen 5.9% in undiagnosed and 18.7% in diagnosed. Risk of increased fatigue during

no physical activity was found to be 10% in undiagnosed and 26.9% in diagnosed. Dyspnoea was found to be 29.9% in undiagnosed and 55.3% in diagnosed. Higher risk of peripheral edema was found to be 18% in undiagnosed and 40.1% in   diagnosed. Risk of unintentional weight gain was 13.1% in undiagnosed and 25% in diagnosed.

 Nocturia was found to be 26% in undiagnosed and 42% in diagnosed. Increased risk of chest pain was found to be 25.6% in undiagnosed and 67.9% in diagnosed. BMI of greater than 30 (obese) was found to be 6.4% in undiagnosed and 9% in diagnosed. Increased blood pressure of 180/120 was found to be 21.1% in undiagnosed and 42% in diagnosed. Increased level of blood glucose of more than or equal to 200 was found to be 15.4% in undiagnosed and 41% in diagnosed. Increased risk of total cholesterol of greater than or equal to 240 was found to be 10.9% in undiagnosed and 24% in diagnosed. Increased triglyceride of greater than or equal to 400 was found to be 1.2% in undiagnosed and 3% in diagnosed.Decreased HDL of less than 40 was found to be 9.9% in undiagnosed and 32% in diagnosed. Increased LDL of greater than or equal 160 was found to be 6.8% in undiagnosed and 23% in diagnosed.

DISCUSSION

Considering the distribution of prevalence of undiagnosed and diagnosed individuals, the prevalence of undiagnosed subjects was found to be 77.6% and the prevalence for diagnosed patients was found to be 22.4%. Undiagnosed population of 27.5% are at a higher risk to develop cardiovascular disease, this is mainly due to increase in risk factors such as saturated fat and family history was seen along with increased prevalence of dyspnoea and chest pain.

According to the study conducted by **Faisal Saed Alharthi *et. al***, it was found that All participants were between 20 and 40 with a mean age of 31.6 6.06 SD.[5] We found the prevalence of undiagnosed HBP to be 8.3% and males showed a significantly higher percentage   (P < 0.001) when compared to females. HBG prevalence was only 0.6%. Regarding body mass index, the prevalence of overweight and obesity together was 66.3% and males showed significantly higher percentage in falling in this category (P < 0.001). Smoking prevalence was 37.9% with a significantly higher percentage among males (P < 0.001), this is similar to our study in which undiagnosed patients were also found to have certain risk factors in order to develop cardiovascular diseases.

According to the study conducted by **Umesh N. Khot *et. al***, it was found that prevalence of conventional risk factors were found to be high among patients diagnosed with cardiovascular disease.[6] This is similar to the area where there is high prevalence of risk factors among the population diagnosed with CVD. According to our study when we compare the population with and without CVD it was found that patients with CVD among the rural population were known to possess more risk of cardiovascular diseases when compared to the undiagnosed population due to the lack of knowledge among the population in rural areas.

CONCLUSION

The study reveals high prevalence of risk factors for cardiovascular diseases in rural populations, emphasizing the need for targeted interventions and community-based approaches. It emphasizes the importance of promoting healthy lifestyle behaviors and improving access to preventive care to reduce CVD incidence.

ACKNOWLEDGMENT

CONFLICT OF INTEREST

There are no conflicts of interest.

ABBREVIATIONS

CVD: cardiovascular disease
BMI: body mass index
HDL: high density lipoprotein
LDL: low density lipoprotein

REFERENCE:

1. World Health Organization. Health topics: Cardiovascular diseases. Fact Sheet. Available online: http://www. who. int/cardiovascular_diseases/en/(accessed on 11 December 2020). 2013.
2. Gupta R, Joshi P, Mohan V, Reddy KS, Yusuf S. Epidemiology and causation of coronary heart disease and stroke in India. Heart. 2008 Jan 1;94(1):16-26.
3. World Health Organization. Cardiovascular diseases (CVDs) [Internet]. World Health Organization. World Health Organization; 2021.
4. Sharifi-Rad J, Rodrigues CF, Sharopov F, Docea AO, Can Karaca A, Sharifi-Rad M, Kahveci Karıncaoglu D, Gülseren G, Şenol E, Demircan E, Taheri Y. Diet, lifestyle and cardiovascular diseases: linking pathophysiology to cardioprotective effects of natural bioactive compounds. International journal of environmental research and public health. 2020 Apr;17(7):2326.
5. Alharthi FS,Alrahimi JS, Alotaibi AA, Alhamdi DA, Ibrahim BM, Badeeb YA. Prevalence of undiagnosed cardiovascular risk factors in adults aged 20-40: a cross-sectional Study in 2016 in Jeddah, Saudi Arabia. Cardiology research. 2017 Jun;8(3):111.
6. Khot UN, Khot MB, Bajzer CT, Sapp SK,Ohman EM, Brener SJ, Ellis SG, Lincoff AM, Topol EJ.Prevalence of conventional risk factors in patients with coronary heart disease. Jama. 2003 Aug 20;290(7):898-904.