

DETERMINANTS OF CORONARY HEART DISEASE AMONG PATIENTS ATTENDING A TERTIARY CARE HOSPITAL IN KANCHEEPURAM DISTRICT, TAMILNADU: A CASE CONTROL STUDY

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ABSTRACT

To determine the socio-demographic factors influencing Coronary Heart Disease among the cases and controls. To determine the dietary factors associated with Coronary Heart Disease among cases and controls, determine the life style factors associated with Coronary Heart Disease among cases and controls. To assess the metabolic determinants and family history associated with Coronary Heart Disease among cases and controls. This shows that there is still gaps in the level of awareness and life style practices in the study area.

Keywords

coronary heart disease, poverty and plaque

Introduction

Non-Communicable Diseases (NCD) are the leading cause of global mortality. They are also known as chronic diseases as they have prolonged course and occurs mainly due to the combined effects of environmental, behavioral, genetic and physiological factors. 1,2 Non-Communicable Diseases are one of the major challenges in health and development of any nation, not only in terms of human suffering they cause but also the harm they inflict on the socioeconomic development of countries, particularly Low- and Middle-Income Countries (LMIC). Historically they were considered to be the diseases of the rich and elderly, but now severely impacting on people in low- and middle-income countries. LMIC contribute for 75% of global death due to NCD. 3-5 In India, it is estimated that deaths due to NCDs were more than those from communicable diseases. This incremental trend in the disease pattern of NCDs foretells a serious public health threat. 6

By 2000, 30% males and 25% females died prematurely before 70 years of age. The global target is to bring down the premature mortality rate to 20% among males and around 15% among females by 2025. But Indian projected trends show slow progress in bringing down the premature mortality rate and attaining global targets. 7,8

NCDs hinders the progress towards the 2030 agenda for Sustainable Development, including a target of reducing premature mortality from NCDs by one-third by 2030. Poverty is closely related with NCDs.

Coronary Heart Disease is nothing but the disease of the blood vessels supplying the heart muscle. 9 They are also called as Coronary Artery Disease. 10 Coronary Heart Disease is caused by accumulation of plaque in the wall of the arteries that supply blood flow to the heart. Plaque is made of fat deposits. This Plaque accumulation narrows the arteries either partially or completely and is known as atherosclerosis. This, ultimately reduce the blood supply to the heart. When the heart muscle does not get adequate amount of blood, it can manifest clinically as chest pain or discomfort and is called as angina. Angina is the most common symptom of Coronary Heart Disease. 11

It has been evaluated that CHD attributes for 10% of DALY in low-income countries and 18% in high-income countries. In developed countries like United Kingdom, CHD is responsible for

mortality of 1 in 3 men and 1 in 4 women. It is estimated that about 2.3 million people are living with Coronary Heart Disease in United Kingdom. The death rates from Coronary Heart Disease are highest in Western European regions. But current trend shows declining pattern, particularly in younger populations over the last 5 decades. On the other hand, Eastern Europe and Asian countries were facing inclining trends in CHD mortality. 12

To lessen the burden of NCDs on individuals and community and to promote the appropriate interventions to prevent and control, a multi sectoral comprehensive approach is needed. Management of NCDs includes screening, detecting and providing access to treatment for the target population. This early detection and timely interventions can be delivered through a primary health care approach. These early intervention strategies are excellent economic investments in terms of reducing catastrophic out of pocket expenses to patients

Coronary Heart Disease can be addressed by a comprehensive multi sectoral approach which includes health promotion for adopting healthy life style practices, formulating strategies to reduce the exposure to these causative factors, periodic screening of the population to enhance early diagnosis and prompt treatment, human resource and infrastructure development for the comprehensive management, establishment of appropriate emergency and referral services, formulation of health legislation, Surveillance and monitoring the progress and research activities pertaining to these areas to help in finding out the lacking areas. 13

MATERIALS AND METHODS

Study Design:

This study is a hospital-based Case Control study conducted among patients attending a tertiary care hospital in Kancheepuram district, Tamil Nadu.

Study Area:

This study was carried out in SreeBalaji Medical College and Hospital, a tertiary care hospital, situated at Chromepet, Kancheepuram district. The Hospital has been raised with the capacity of 1150 beds with Cardiac Care Center. At the Cardiac Care Center, comprehensive range of clinical services like electrocardiography services, echocardiography, treadmill testing, cardiac imaging, interventional cardiology, cardiac catheterization, pacemakers, defibrillators electrophysiology study and radio frequency ablation, cardio thoracic surgeries, Intensive Cardiac Care Units, Inpatient facilities and cardiac rehabilitation units are offered to save lives of the people in general and especially the needy, underprivileged and suffering section of humanity.

Study Period:

The study was conducted between November 2018 and April 2019.

Sample size calculation:

Exclusion criteria:

Individuals who are seriously ill, not willing and non-cooperative to participate in the study are excluded.

Study Tool:

A pre-tested, structured questionnaire (given as annexure) was used for data collection. The interview was conducted by the investigator himself and the responses were recorded in the questionnaire.

RESULTS

This case control study done in Kancheepuram district of Tamil Nadu consisted of 90 cases and 90 controls. The outcome of the study has many interesting findings, which are presented below, in the form of tables and graphs. Among the cases, 11.1% were engaged in professional jobs, 16.7% in semi-professional jobs, 12.2% in clerical, shop owners and farm category jobs, 13.3% in skilled work, 7.8% in semi-skilled work, 8.9% in unskilled jobs and 30% were unemployed. Among the controls, 16.7% were involved in professional jobs, 17.8% in semi-professional jobs, 16.7% in clerical, shop owners and farm category jobs, 10% in skilled work, 4.4% in semi-skilled work, 6.7% in unskilled jobs and 27.8% were unemployed.

Socio-economic status was categorized according to Modified Kuppuswamy classification (updated February 2019). Nearly 16.7% of the cases belonged to upper class, 20% to upper middle class, 16.7% to lower middle class, 41.1% to upper lower class and 5.5% to lower class. Meanwhile, among the controls, 22.2% were in upper class category, 35.6% in upper middle class and 5.5% in lower middle class, 25.6% in upper lower class and 11.1% in lower class (Figure 2). Nearly 55.6% of the cases and 67.8% of the controls belonged to nuclear type of family.

Figure 1: Gender wise distribution of cases and controls

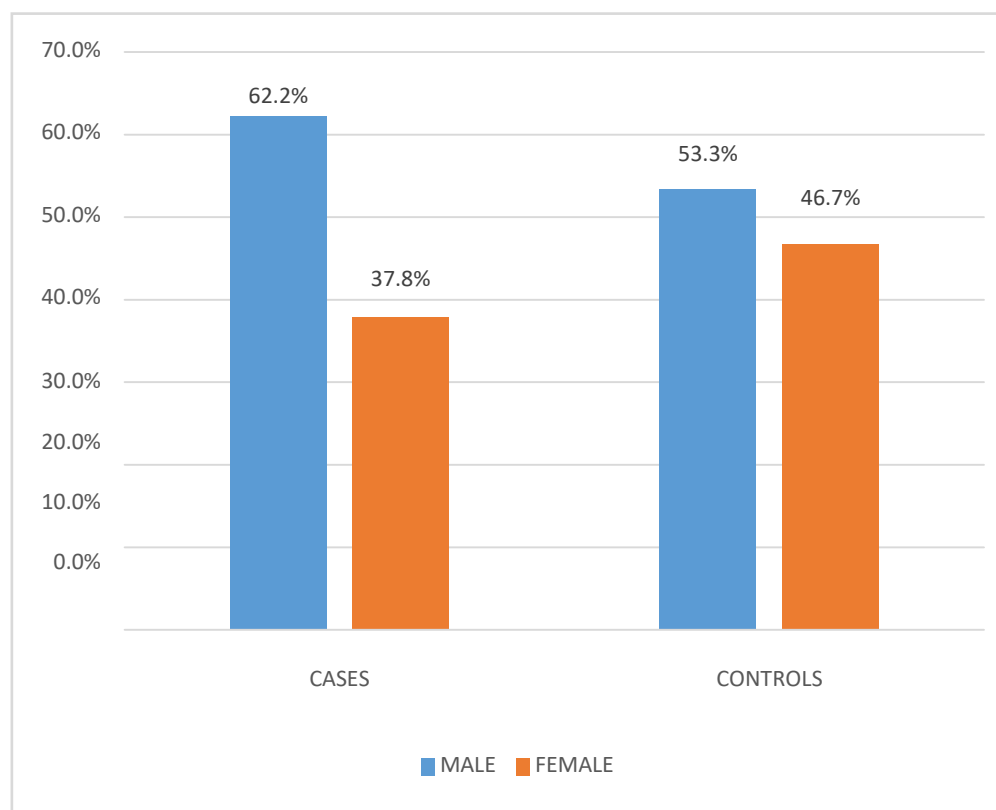
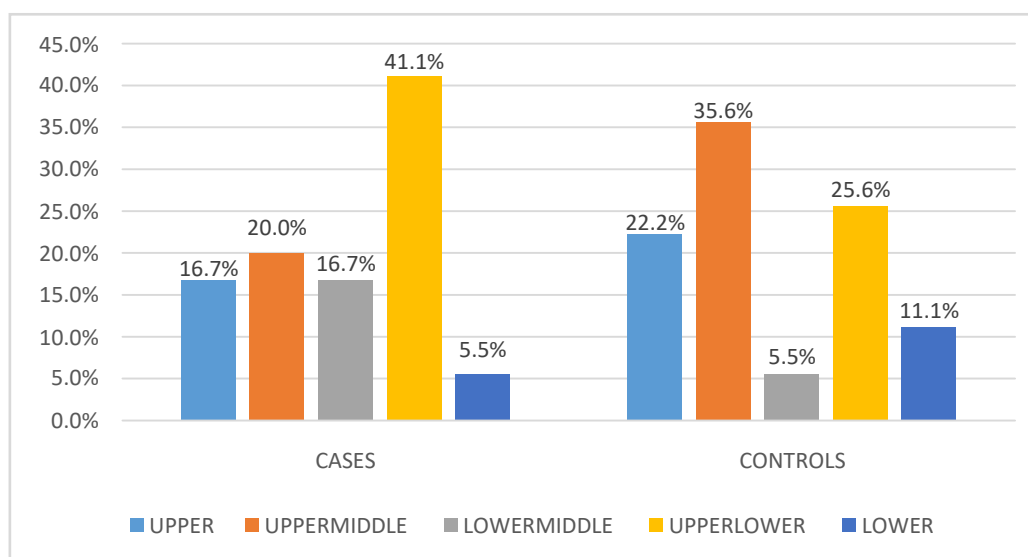


Figure 2: Socio economic class of the study participants.



The dietary patterns were compared between the cases and controls. About 74.4% of cases and 66.7% of controls were consuming mixed diet. Inadequate intake of fruits and vegetables was reported by 64.4% of cases and 40% of controls. The habit of eating fried foods for more than four times a week was noted in 43.3% of cases and 27.8% of controls.

Table 1: Dietary habits among cases and controls

S. No	Food habits	Cases		Controls	
		Frequency (N=90)	Percentage (%)	Frequency (N=90)	Percentage (%)
1.	Type of diet				
	Mixed	67	74.4	60	66.7
	Vegetarian	23	25.6	30	33.3
2.	Intake of fruits and vegetables				
	Inadequate	58	64.4	36	40.0
	Adequate	32	35.6	54	60.0
3.	Intake of fried foods >4 times a week				
	Yes	39	43.3	25	27.8

	No	51	56.7	65	72.2
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Lifestyle characteristics were compared between the cases and controls. About 46.7% of cases and 22.2% of controls were having the habit of tobacco smoking. The habit of alcohol intake was noted in 42.2% of cases and 26.7% of controls. Nearly 77.8% of cases and 43.3% of controls had inadequate physical activity. About 65.6% of cases and 41.1% of controls had abnormal sleep duration. Stress at home and/or work place was reported by 46.7% of cases and 31.1% of controls.

Figure 3: Smoking habit among cases

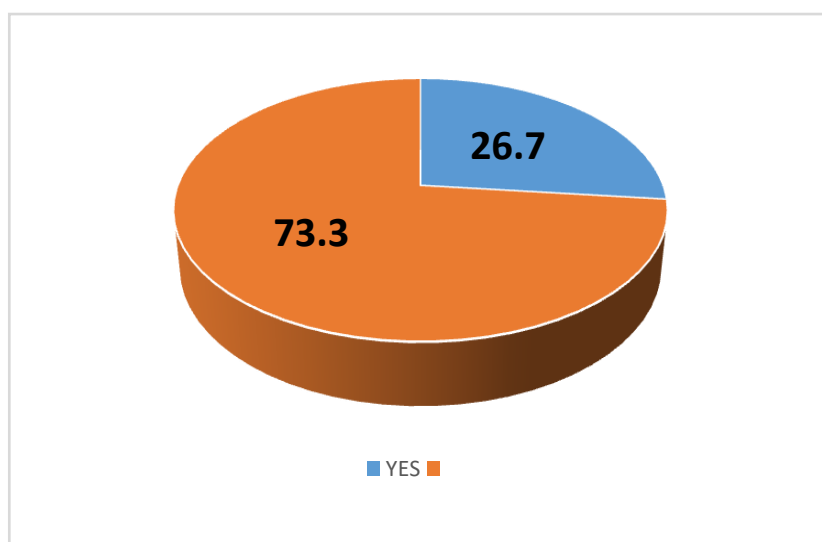


Figure 4: Alcohol intake among cases

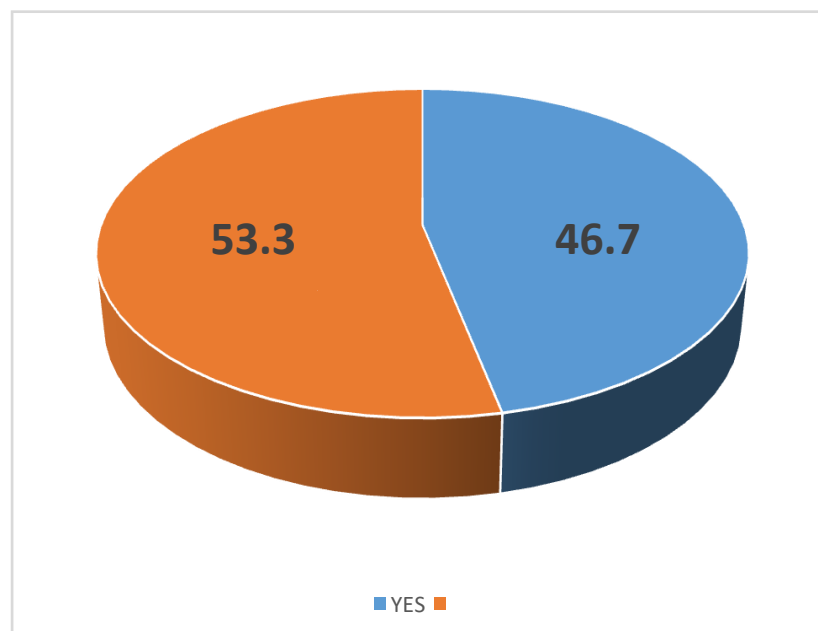


Figure 5: Physical activity of study participants.

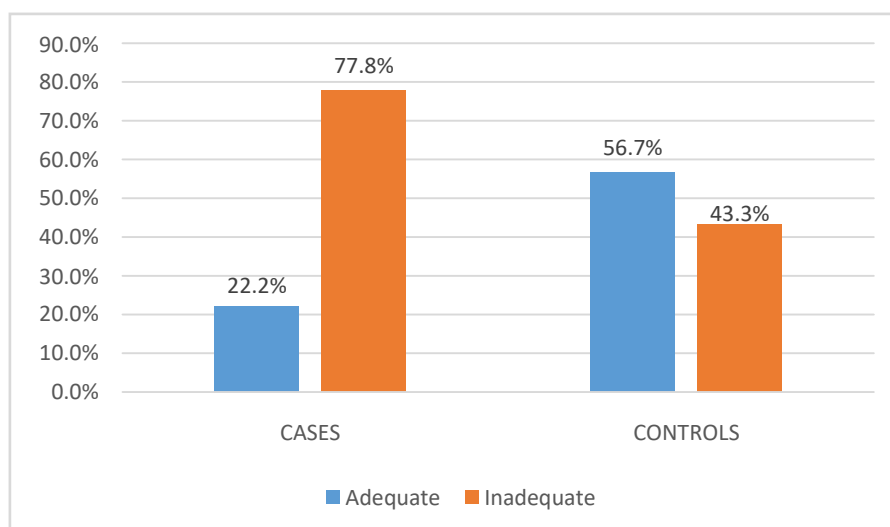


Table 2: Dietary habits associated with coronary heart disease.

S. No	Factors	Cases (N=90)	Controls (N=90)	OR (95% CI)	Chi square	p value
1.	Type of diet					
	Mixed	67	60	1.46 (0.76 – 2.78)	1.30	0.25
	Vegetarian	23	30	ref		
2.	Fruits and vegetables intake					
	Inadequate	58	36	2.72 (1.49 – 4.97)	10.72	0.001*
	Adequate	32	54	ref		
3.	Intake of fried foods >4 times a week					
	Yes	39	25	1.99 (1.07 – 3.70)	4.73	0.03*
	No	51	65	ref		

OR: odds ratio; CI: confidence interval; ref: reference; *P value <0.05 is significant at 95% CI

It is found from table 3, about 42.2% of cases were having the habit of alcohol intake, whereas among controls only 26.7% were having the habit of alcohol intake. Therefore, there is an association between alcohol intake and coronary heart disease and this association was found to be statistically significant (p value – 0.03). The odds of developing coronary heart disease is about 2 times higher for individuals with the habit of alcohol intake than those individuals who do not have the habit of alcohol intake (OR-2.01, 95% CI: 1.07-3.76).

Table 3: Metabolic risk factors associated with coronary heart disease.

S. No	Factors	Cases (N=90)	Controls (N=90)	OR (95% CI)	Chi square	p value
1.	Hypertension					
	Yes	55	30	3.14 (1.71 -5.78)	13.85	0.0002*
	No	35	60	ref		
2.	Diabetes					
	Yes	53	26	3.53 (1.9 – 6.55)	16.35	<0.0001*
	No	37	64	ref		
3.	Dyslipidemia					
	Yes	50	25	3.25 (1.75 -6.05)	14.21	0.0002*
	No	40	65	ref		
4.	Body Mass Index					
	Over- weight and Obese	54	39	1.96 (1.08 -3.55)	4.98	0.03*
	Normal	36	51	ref		
5.	Central obesity					
	Yes	49	33	2.06 (1.14 -3.75)	5.70	0.02*
	No	41	57	ref		

OR: odds ratio; CI: confidence interval; ref: reference; *P value <0.05 is significant at 95% CI

As per table 4, we found that about 55.6% of cases were having positive family history of CHD, whereas among controls only 30% were having positive family history of CHD. Therefore, there is an association between family history of CHD and coronary heart disease

and this association was found to be statistically significant (p value – 0.0006). The odds of developing coronary heart disease is about 2.9 times higher for individuals with positive family history of CHD than those without positive family history (OR-2.92, 95% CI: 1.58-5.39). Therefore, positive family history of CHD is a statistically significant risk factor for coronary heart disease.

Table 4: Family history of CHD associated with coronary heart disease.

S.No	Factors	Cases (N=90)	Controls (N=90)	OR (95% CI)	Chi square	p value
1.	Family history of CHD					
	Yes	50	27	2.92 (1.58-5.39)	11.94	0.0006*
	No	40	63	ref		

OR: odds ratio; CI: confidence interval; ref: reference; *P value <0.05 is significant at 95% CI

DISCUSSION

This hospital-based Case Control study was conducted among patients attending a tertiary care hospital in Kancheepuram district, Tamil Nadu to assess the determinants of coronary heart disease. Many interesting results were obtained from this study and were explained already. Findings of the study is discussed in comparison with similar studies done elsewhere. Among the socio demographic characteristics analysed, determinants like gender, marital status, education, occupation, socio economic class and type of family did not show statistical significance with coronary heart disease.

The raising trends among females during recent years is mainly due to changing behaviour pattern and lifestyle practices among female individuals. In contrary to the above, Ariyanti R et al in their case control study showed a statistically significant association between male gender and coronary heart disease (p value - 0.002).¹⁴ Similarly the study done by Sattar KA et al to assess the psychosocial risk factors also reported a statistically significant male preponderance (p value - <0.001).¹⁵ In addition to these studies, Xu W et al also reported a statistically significant association between male gender and CHD (p value - <0.001).¹⁶ This variation could be due to the difference in study settings. control study in Kerala also reported similar results with statistical insignificance (p value - 0.077).^{4,17,18} This clearly shows that coronary heart disease has no relation with the type of family rather than one's individual behavioural and metabolic risk factors.

In our study majority of cases were smokers when compared with controls. This difference was found to be statistically significant (p value – 0.0006). The odds of developing coronary heart disease is about 3 times higher for individuals with the habit of tobacco smoking than those individuals who do not smoke tobacco (OR-3.06, 95% CI: 1.60-5.85).

It is observed from the current study that the habit of alcohol intake was predominant among cases than the controls. This difference was found to be statistically significant (p value – 0.03). In contrary to the above studies, Shrestha S et al in their case control study, assessed the association between alcohol Consumption and coronary heart disease. But it was found to be statistically insignificant.¹⁹ (OR-0.79, 95% CI: 0.35-1.79, p value- 0.58).²⁹ In a case control study by Waingankar P.J et al, alcohol Consumption was assessed for its association with

coronary heart disease. But it was not statistically significant (p value > 0.05).³⁸ Inconsistency in the above results might be attributed to the type of alcohol, quantity, frequency and duration of consumption.

In the present study various determinants like socio demographic characteristics, dietary habits, lifestyle characteristics, metabolic factors and family history were assessed for its association with coronary heart disease.²⁰ These interesting determinants and their statistical significance were discussed in comparison with similar studies done elsewhere with appropriate explanations. Among them the determinants which were found to be statistically significant were inadequate fruits and vegetables intake, excessive fried foods intake, tobacco smoking, alcohol intake, physical inactivity, abnormal sleep duration, stress at home and/or work place, hypertension, diabetes, dyslipidemia, obesity, central obesity and family history of CHD.

CONCLUSION

This Case Control study assessed the socio demographic characteristics, dietary habits, lifestyle characteristics, metabolic risk factors and family history associated with coronary heart disease among patients attending a tertiary care hospital in Kancheepuram district, Tamil Nadu. The total sample size was 90 cases and 90 controls. The cases and controls were group matched for age.

This case control study highlights various risk factors associated with coronary heart disease. Life style related risk factors lead to development of metabolic risk factors which in turn leads to the development of coronary heart disease in the later stages, thereby affecting the quality of life in adulthood.

Though there is a national programme for prevention and control of cancer, diabetes, cardio vascular diseases and stroke in India [NPCDCS], the burden of coronary heart disease still remains to be in escalating phase. This shows that there is still gaps in the level of awareness and life style practices in the study area. Majority of the risk factors associated with coronary heart diseases are modifiable. But, due to the devastating lifestyle practices this inclining trend of CHD burden remains stable which is quite alarming. To address this, effective intervention strategies like intensive awareness activities and periodical screening camps need to be planned at the national level. This in turn modify the risk promotive behaviours among every individual.

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Ethical approval: The study was approved by the Institutional Ethics Committee

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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