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Original Research Article

TO STUDY ASSOCIATION BETWEEN HYPERHOMOCYSTEINEMIA AND CARDIOVASCULAR DISEASE IN YOUNG PEOPLE FROM SOUTHERN INDIA

Anjum Sultana Khatoon[1], Suhail Bin Ahmed[2], Ayesha Ajaz Khan[3]

[1]*Associate Professor, Department of Medicine, Deccan College of Medical Science, Owaisi Hospital and Research Center, Hyderabad, Telangana, India.*
[2]*Professor, Department of Medicine, Deccan College of Medical Science, Owaisi Hospital and Research Center, Hyderabad, Telangana, India.*
[3]*Student MBBS Final Year, Shadan Institute of Medical Sciences, Hyderabad, Telangana, India.*

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Corresponding Author:
Dr. Ayesha Ajaz Khan,
Student MBBS Final Year, Shadan Institute of Medical Sciences, Chanchal Guda Hyderabad, Telangana, India.
Email: aishaajazkhan29@gmail.com

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ABSTRACT

Background: CVDs are the most important public health problem because they cause so many illnesses and deaths around the world. The goal of this study was to find out how strong an independent risk factor link there is between higher plasma homocysteine levels and the chance of coronary heart disease.
Materials and Methods: A case-control study was done in the Deccan College of Medical Science, Owaisi Hospital and Research Center, Hyderabad, Telangana, India. From July 2023 to June 2024, this study was done. The study had 100 volunteers between the ages of 25 and 60. There were 100 newly diagnosed patients with coronary heart disease as cases and 100 healthy people of the same age and gender who had never had CHD as controls.
Results: Our results are the same as those of a related study that looked at the average amount of homocysteine. A different case-control study clearly shows that having high homocysteine levels is linked to a higher chance of heart disease, which supports the results of this investigation. Our results back up what other studies have found: that people with coronary heart disease have higher amounts of homocysteine in their plasma. Plasma homocysteine levels were very different between people with coronary heart disease and healthy controls. However, only a few studies have shown that the amounts of homocysteine in the plasma of people with CAD and people who did not have CAD were the same.
Conclusion: Plasma homocysteine was much higher than controls. Logistic regression strongly links hyperhomocysteinemia to coronary heart disease. The above findings imply that plasma homocysteine levels can predict coronary heart disease.
Keywords: Homocysteine, risk factor, coronary heart disease, and cardiovascular diseases.

INTRODUCTION

The fast growing number of noncommunicable chronic diseases, especially cardiovascular diseases (CVDs), affects every part of the world. Although they used to be called "diseases of affluence," chronic illnesses are becoming more common in developing countries compared to rich countries. Heart and blood vessel problems are thought to be responsible for 30% of all deaths in the world, and that number is expected to rise by 2030.[1-3]

Even though the number of deaths from cardiovascular disease dropped by 31% from 2000 to 2010, it is still expected to be the world's top cause of death. Heart disease affects both developed and developing countries, even though a lot of study has been done on how to prevent and treat it.[2-4] CVD is thought to be the cause of one in three deaths, with 80% of those deaths happening in countries with few resources. Asian and African countries have the highest rates of cardiovascular illness and death. The

age group most likely to have heart disease is the older people.[3-5]

Cardiovascular diseases (CVDs) are the biggest public health problem because they cause the most illness and death around the world. Heart diseases are still one of the main causes of death around the world, according to the relevant research.[4-6] Even though the number of diseases has changed little or not at all in most places, have changes in population and income over the past 25 years been linked to a drop in cardiovascular diseases in some places.[5-7]

The main focus of ongoing attempts to control this deadly disease has shifted to ways to keep it from happening. Coronary heart disease is less common now that standard risk factors like smoking, high blood pressure, dyslipidemia, a history of the disease in the family, and diabetes mellitus are known and can be managed effectively. Still, no link has been found between these risk factors and coronary heart disease in 15-20% of people, suggesting that basic prevention is not taken into account.[6-8] Even though more risk factors are being looked into, homocysteine has gotten a lot of attention. Recently, homocysteine, an amino acid with sulfur that is made when the important amino acid methionine is broken down, has been identified as a risk factor. Hyperhomocysteinemia, which is when plasma homocysteine levels are higher than 15 micromoles per liter, raises the chance of heart problems and makes clotting easier. The point of this study was to look into the link between high homocysteine levels and heart disease risk in South Indian teens.[7-9]

MATERIALS AND METHODS

A case-control study was done at the Deccan College of Medical Science, Owaisi Hospital and Research Center, Hyderabad, Telangana, India. From July 2023 to June 2024 this study was done. The study had 100 volunteers between the ages of 25 and 60. There were 100 newly diagnosed patients with coronary heart disease as cases and 100 healthy people of the same age and gender who had never had CHD as controls.

Inclusion Criteria

- Patients with a history of coronary heart disease
- Patients with a no hepatitis/thyroid disorder

Exclusion Criteria

- Patients with a history of diabetes and renal impairment
- Patients with a hepatitis and thyroid disorder
- Those taking antiepileptic drugs.

RESULTS

Out of the 100 people who took part in the study, 45 had clinical signs of coronary heart disease and the other 55 were in the control group. Compiled a list of the study population's initial traits. People from 25 to 60 years old took part in the study. Those in the experimental group were 44.7 ± 8.5 years old, while those in the control group were 43.0 ± 8.4 years old. Out of 100 cases, 45 (45.0%) were women and 55 (55.0%) were men. [Table 1]

Based on a study of the socioeconomic status of the research population, most of the cases and their control subjects (65%) were in the middle income range. The next largest group, with 20% of cases and controls, was the low income range. One fifth are from the top class. The numbers are shown in Table 2. [Table 2]

Also, study on the familial history of coronary heart disease (CHD) found that 25 patients had a family history of the condition, while 75 cases did not show that family history is a risk factor for CHD. When the number of smokers in cases and controls was compared, it was found that smoking increases the chance of coronary heart disease (CHD). There were no changes in physical exercise that were statistically significant between the case group and the control group. 68 times, people were not physically active, and 32 times, they were not active at all. [Table 3]

Out of the 100 cases we looked into, 21% had normal homocysteine values, 59% had moderate hyperhomocysteinemia, and 20% had intermediate hyperhomocysteinemia. Out of the people in the control group, 21.0% had normal homocysteine levels and 59.0% had minor hyperhomocysteinemia. In any of the groups, there was no intermediate hyperhomocysteinemia found. There was a statistically significant difference between the cases and the controls. [Table 4]

One group's mean ± SD Hcy level was 21.88 ± 9.66 µmol/L, while the other group's was 13.35 ± 4.84 µmol/L. There was a big difference between the average amounts of Hcy in the plasma of patients and healthy people. [Table 5]

Table 1: Gender wise distribution

Sr. No.	Gender	Patients
1	Male	55
2	Female	45
	Total	100

Table 2: Socio-economic status

Gender	Number	%
Lower	20	20.0
Middle	65	65.0
Upper	15	15.0

Total	100	100.0

Table 3: Demographic data of the population

Characteristics	Cases	%
Family History		
Yes	25	25
No	75	75
Smoking		
Yes	47	47
No	53	53
Physical Activity		
Yes	68	68
No	32	32
Hypertension		
Yes	40	40
No	60	60
Total Cholesterol		
Mean Total	182.12±35.24	-
Cholesterol mg/dL		
Mean Total	125.25±30.78	-
Triglyceride mg/dL		
Mean Total	35.14±6.13	-

Table 4: Cases with Normal and Hyperhomocysteinemia

Sr. No.	Plasma Homocysteine Level	Cases	%
1	Normal (5-15 µmol/L)	21	21.0
2	Moderate Hyperhomocysteinemia (>15-30 µmol/L)	59	59.0
3	Intermediate Hyperhomocysteinemia (>30-100 µmol/L)	20	20.0
Total		100	100.0

Table 5: Differences in plasma homocysteine between patients and controls

		Mean	S.D	IQR
Homocysteine (µmol/L)	Control	13.35	4.84	5.64
	Experimental	21.88	9.66	7.37

DISCUSSION

Cardiovascular diseases (CVDs) are illnesses that affect the heart and blood systems. They are responsible for about one-third of all deaths in the world. According to the data, these diseases kill more people than any other cause in the world, and 80% to 86% of those deaths happen in low- and middle-income countries. Pakistani data showed that the things that put people at risk for noncommunicable diseases are getting worse.[10-12]

Finding a single place to take appropriate action is almost impossible because there are so many risk and contributing factors. The goal of this study was to find out how strong plasma homocysteine levels are as a risk factor for coronary heart disease. The experimental group had a mean age of 44.72±8.59 years, while the control group had a mean age of 43.00±8.42 years. The average ages in our study are lower than those in many other studies.[13-15] This supports a new trend in Asian research that shows younger Asians are being diagnosed with heart disease than people in other parts of the world.[14-16] The fact that the patients in their study had a low mean age backs up our claim. Studies in the past have shown that men are more likely to have heart problems. Seventy men and twenty-five women took part in the study groups. The study mostly looked at guys because young men are more likely than women to get coronary artery disease. This difference between men and women is due to estrogen, which protects women from getting atherosclerosis until menopause.[15-17]

Our results are the same as those of a related study that looked at the average amount of homocysteine. Additionally, a case-control study that supports the results of this study shows that high homocysteine levels are definitely linked to a higher chance of cardiovascular disease. Our results back up what other studies have found: that people with coronary heart disease have higher amounts of homocysteine in their plasma. There were big differences in the average amounts of Hcy in the plasma of people with and without coronary heart disease. However, only a few studies have shown that the amounts of homocysteine in the plasma of people with CAD and people who did not have CAD were the same.[18-20] It's possible that this explains why homocysteine has a high chance ratio for risk. Traditional risk factors, such as smoking (2.70 times), high blood pressure (1.34 times), a history of the disease in the family (2.40 times), high cholesterol (1.85 times), low HDL cholesterol (2.52 times), and high LDL cholesterol (2.82 times), are strongly linked to a higher risk of coronary heart disease (CHD).[21-23] Multivariate logistic regression was used to figure out the corrected odds ratio. Multivariate logistic regression analysis showed a strong link between hyperhomocysteinemia and coronary heart disease (CHD). This means that people whose plasma

homocysteine levels were high were seven times more likely to develop CHD.[23-25]

CONCLUSION

There was a lot more homocysteine in the plasma than in the controls. A simple logistic regression study shows a strong link between high homocysteine levels and coronary heart disease. From what we know so far, we can say that high amounts of homocysteine in the blood are a separate risk factor for coronary heart disease and may be able to predict the development of cardiovascular disease in the future.

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