International Journal of Research in Medical Sciences
Abdagire N et al. Int J Res Med Sci. 2025 Jan;13(1):216-220
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20244117

Original Research Article

Psychological determinants and its association with coronary artery disease: a prospective study

Nitinkumar Abdagire[1], Sandeep Patil[1], Dhaval Dalal[2], Harminder Singh[2], Soumya Ojha[3], Vijaykumar Gawali[3]*

[1]Department of Cardiology, Bhaktivedanta Hospital and Research Institute, Mira Road, Maharashtra, India
[2]Department of General Medicine Bhaktivedanta Hospital and Research Institute, Mira Road, Maharashtra, India
[3]Department Medical Research, Bhaktivedanta Hospital and Research Institute, Mira Road, Maharashtra, India

Received: 07 November 2024
Accepted: 11 December 2024

***Correspondence:**
Dr. Vijaykumar Gawali,
E-mail: drvijaykumar.g@bhaktivedantahospital.com

ABSTRACT

Background: Psychological diseases like depression, anxiety and burnout are major public health problems of concern, as it is affecting both general as well as cardiac health. Therefore, present study aims to screen the patients for psychological determinants and its association with coronary artery disease.
Methods: The study is prospective, questionnaire based, observational study conducted on 166 patients having coronary artery disease based on conventional coronary angiography. Out of 166 participants, 132 were in conventional risk factors Group (comorbid condition group), and 34 in non-conventional risk factors group (without any comorbid condition group). Patients were screened for depression, anxiety and burn out using the patient health questionnaire (PHQ-9), generalised anxiety disorder (GAD-7), burnout self-test questionnaires respectively.
Results: The present study revealed majority of the participants had moderate anxiety, depression, and risk for burnout. Significant positive correlation was found between Syntax score and depression ($P<0.05$). No statistically significant difference was noted for anxiety, depression, and burnout score between comorbid group having conventional risk factors (patients having diabetes, hypertension and dyslipidaemia) and non-comorbid group with non-conventional risk factors (patients suffering from anxiety, depression and burnout without any comorbid conditions), suggesting major role of anxiety, depression, and burnout for the development of cardiovascular diseases.
Conclusions: Non-conventional risk factors add increased risk for the development of coronary artery disease; therefore, efforts should also be made to assess cardiac patients for psychological determinants and to improve patients psychological and social function.

Keywords: Depression, Anxiety, Burnout, Coronary artery disease

INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of morbidity and mortality around the world.[1] In 2021, 20.5 million people died of CVDs globally.[2] According to WHO, India accounts for one-fifth of these deaths worldwide especially in younger population. In India the death rate due to CVD is 282 per 100,000 population which is much higher than that of global average of 233 as per the results of Global Burden of Disease study state age standardized.[3] The cause of concern in CVD is the early age of onset, rapid progression, and high mortality rate. Indians are known to have the highest coronary artery disease (CAD) rates, and the conventional risk factors fails to explain the reason of this increased risk.[4]

In literature there is considerable evidence that non-conventional risk factors like work stress, burnout and especially the psychological determinants have a strong

impact on cardiovascular health. Among the psychological determinants, disease like depression is an independent risk factor for CAD and, has gained most of the attention due to its high prevalence and association with poor cardiac health.[5] Anxiety on the other hand may influence cardiac health.[6] Among the risk factors of CVDs, work related factors are of concern and have become the most important issue all over the world. Furthermore, a number of sudden deaths because of overwork have drawn public attention and have been a major health issue these days.

The importance of non-conventional risk factors has often been ignored mainly due to the stigma associated with these conditions. Moreover, there are lack of studies evaluating the prevalence of non-conventional risk factor and its association with cardiovascular diseases and cardiac health. The present study will address this lacuna, it intends to screen the patients for psychological determinants and its association with coronary artery disease.

METHODS

This prospective, questionnaire-based cross-sectional observational study was conducted at Bhaktivedanta Hospital and Research Institute, Mira Road, Thane, India. The study focused on patients diagnosed with coronary artery disease through conventional coronary angiography. A total of 166 eligible patients were evaluated from September 2021 to January 2023 for depression, anxiety and burn out using the patient health questionnaire (PHQ-9), generalised anxiety disorder (GAD-7), burnout self-test questionnaires respectively. Sociodemographic status including age, gender, occupation, marital status and clinical data were recorded for all the participants

Inclusion criteria

Patients 18 to 60 years of age diagnosed with coronary artery disease based on conventional coronary angiography only were included.

Exclusion criteria

Patients with history of percutaneous transluminal coronary angioplasty (PTCA), coronary artery bypass graft surgery (CABG) and known mental disorders were excluded.

Ethical consideration

The study was approved by Institutional Ethics Committee (BMRC/32/2021).

Statistical analysis

Data was analysed using IBM SPSS (statistical package for the social sciences) for windows, version 26.0 for the generation of descriptive and inferential statistics. Patients having diabetes, hypertension, dyslipidaemia, obesity, smoking, tobacco and alcohol habits were classified in conventional risk factors Group (having comorbid conditions) and others in non-conventional risk factors group (non-comorbid condition). The statistically significant difference among groups was determined by the chi square and Fisher exact test and the level of significance was set at p<or =0.05.

RESULTS

A total of 166 participants participated in the study, out of them 120 were male, 46 were females, majority of the participants are working, majority of the participants had different type of comorbidities and majority of them falls under overweight category BMI 25.0 TO 29.9 (Table 1).

Table 1: Clinical characteristics of the study participants.

Characteristics	Male (N)	Female (N)	Total N (%)
Age (years)			
0-40	16	2	18 (10.8)
41-60	108	40	148 (89.1)
Above 60	0	0	0 (0)
Occupation			
Working	111	13	124 (74.6)
Non-working	8	33	41 (24.6)
Student	1	0	1 (0.6)
Co-morbidities			
Alcohol	17	1	18 (10.8)
Tobacco	18	1	19 (11.4)
Smoking	21	1	22 (13.2)
None	64	43	107 (64.4)
Diabetes	20	8	28 (16.8)
HTN	22	10	32 (19.2)
HTN and diabetes	27	12	39 (23.4)
Dyslipidaemia	25	8	33 (19.8)
None	26	8	34 (20.4)
BMI <18.5	1	1	2 (1.2)
BMI 18.5 to 24.9	47	14	61 (36.7)
BMI 25.0 to 29.9	50	25	75 (45.1)
BMI 30.0 or higher	22	6	28 (16.8)

A total of 166 participants comprised the study sample, of which 66.87% (111) had moderate anxiety scores (based on GAD-7 scale) 57.8% (96) had moderate depression (based on patient health questionnaire) and 64.5% (107) were at risk for burnout score (burnout self-test questionnaires) (Table 2).

Significant positive correlation was found between Syntax score and depression, burnout score as p=0.05, whereas no correlation was found between Syntax score and anxiety score p>0.05 (Table 3).

Table 2: Assessment of anxiety, depression, and burnout scores in the study group.

	No of cases/total no. of participants	%
Anxiety score		
0-4 (Minimal)	0	0
5-9 (Mild)	45/166	27.11
10-14 (Moderate)	111/166	66.87
15-21 (Severe)	10/166	6.02
Depression score		
0 (No)	0/166	0
1-4 (Minimal)	0/166	0
5-9 (Mild)	40/166	24.1
10-14 (Moderate)	96/166	57.8
15-19 (Moderately Severe)	27/166	16.3
20-27 (Severe)	3/166	1.8
Burnout score		
15-18 (No sign)	0/166	0
19-31 (little sign)	54/166	32.5
32-49 (At risk)	107/166	64.5
50-59 (Severe risk)	2/166	1.2
60-75 (Very severe risk)	3/166	1.8

Table 3: Correlation between Syntax score and anxiety, depression, and burnout score in the study group.

Correlation between Syntax score and	r value	P value
Anxiety score	0.1	0.06
Depression score	0.31	0.05
Burnout score	0.41	0.05

When we compared the means there is no statistically significant difference of anxiety, depression, and burnout score between the groups having conventional risk factors Group and without conventional risk factors group as $p>0.05$. Mean depression score higher in patients with non-conventional risk factors Group in comparison with patients with conventional risk factors group is noteworthy observation signifying impact of non-conventional risk factors on cardiovascular health of patients (Table 4).

When we compared the frequencies of anxiety, depression, and burnout score between the groups no significant difference was noted, suggesting role of anxiety, depression, and burnout as a risk factor for the development of cardiovascular diseases in the group of patients without comorbid conditions (Table 5).

Table 4: Comparison of anxiety, depression, and burnout score in patients with comorbid conditions and without comorbid conditions.

Parameter	Conventional risk factors Group [Comorbid conditions (n=132)]		Non- conventional risk factors Group – [Without comorbid condition (n=34)]		MW test Z Value	P value
	Mean	**SD**	**Mean**	**SD**		
Anxiety score	11.01	2.413	10.21	1.754	0.04	0.97
Depression score	11.88	3.128	11.97	3.424	1.66	0.097
Burnout score	34.39	6.132	33.85	6.359	0.43	0.67

Table 5: Association of anxiety, depression, and burnout score in group of patients with conventional risk factors group and non- conventional risk factors group.

Anxiety score	Conventional risk factors Group - comorbid condition N (%)	Non-conventional risk factors Group -without co-morbid condition N (%)	Total N (%)	Chi square value	P value
0-4 (Minimal)	0	0	0	0.43	0.51
5-9 (Mild)	35 (77.8)	10 (22.2)	45 (100)		
10-14 (Moderate)	88 (79.3)	23 (20.7)	111 (100)		
15-21 (Severe)	9 (90)	1 (10)	10 (100)		
Depression score					
1-4 (Minimal)	0	0	0	0.16	0.69
5-9 (Mild)	33 (82.5)	7 (17.5)	40 (100)		
10-14 (Moderate)	75 (78.1)	21 (21.9)	96 (100)		
15-19 (Moderately severe)	22 (81.5)	5 (18.5)	27 (100)		
20-27 (Severe)	2 (66.7)	1 (33.3)	3 (100)		
Burnout score					
15-18 (No sign)	0	0	0	0.02	0.89

Continued.

Anxiety score	Conventional risk factors Group - comorbid condition N (%)	Non-conventional risk factors Group -without co-morbid condition N (%)	Total N (%)	Chi square value	P value
19-31(little sign)	43 (79.6)	11 (20.4)	54 (100)		
32-49 (At risk)	85 (79.4)	22 (20.6)	107 (100)		
50-59 (Severe risk)	2 (100)	0	2 (100)		
60-75 (Very severe risk)	2 (66.7)	1 (33.3)	3 (100)		

DISCUSSION

The present cross sectional observational study was carried out on 166 participants diagnosed with coronary artery disease based on conventional coronary angiography. Out of 166 participants, 132 participants belonged to conventional risk factors Group and 34 participants belonged to non-conventional risk factors Group. Among 166 participants 89.6% aged between 41 to 60 years, 74.6% were working, 64.4% neither smoke nor consume tobacco or alcohol, 23.4% had both Hypertension and diabetes, majority of the participants 45.1% belonged to overweight group BMI 25.0- 29.9 (Table 1).

Our results are consistent with Toker S et al who conducted prospective study on burnout and risk of coronary heart disease in 8838 employees.[7] Study concluded Individuals with high levels of burnout (upper quintile) have a significantly higher risk of developing coronary heart disease compared with those with low levels of burnout.

Our results are in accordance with Najafipour et al who conducted study on 5900 residents in Southeast Iran on prevalence of anxiety and depression symptoms and their relationship with other coronary artery disease risk factors, which concluded that the majority of residents, particularly women, are suffering from mild to server depression and anxiety symptoms.[8]

In the present study, no positive correlation was found between syntax score and anxiety score as r value is 0.1, and $p<0.05$, however; correlation was found between syntax, depression, and burnout score (Table 3). Our results are consistent with Cerit L et al which concluded that non-negligible association between SYNTAX score (SS) and anxiety depressive disorders.[9]

In the present study no statistically, significant difference noted for anxiety, depression, and burnout score between the groups of patients having conventional risk factors group and non- conventional risk factors group (Table 4). Our results are inconsistent with Fava M et al who conducted study on cardiovascular risk factors in depression which revealed anxiety scores on the anxiety symptom questionnaire (SQ)were found to be related to two of four cardiovascular risk factors examined. Study also revealed that no statistically significant associations observed amongst anger, irritability with cardiovascular risk factor.[10]

In the present study no significant difference was noted between the groups with conventional risk factors group and non-conventional risk factors group (Table 5) however similar study conducted by Holt RIG et al revealed that the baseline hospital and anxiety depression scale HAD-D score, was significantly associated with baseline plasma triglycerides, glucose and insulin resistance (men only) and HDL cholesterol (women only).[11]

Limitations

Study lacked control group, assessment of psychological determinants between control group (healthy individuals) and cardiac patients would have improved the result outcomes.

CONCLUSION

Present study revealed that, while the conventional risk factors for CAD are already known, this study adds supportive evidence that presence of psychological determinants certainly adds increased risk for the development of CAD, and therefore should be taken as a part of evaluation and assessment of psychological determinants in cardiac patients under hospital health policy.

ACKNOWLEDGEMENTS

Authors would like to thank Ms Ria Vijay (Senior - Clinical Research Associate) and Ms Vrutti Mistry (Clinical Research Associate) from Medical Research Department for their assistance in manuscript writeup and data analysis. Also, we are grateful to Ms. Vedanti Patil (Medical Research department) for her assistance throughout the publication process.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. World Health Organization. Cardiovascular diseases (CVDs). World Health Organization. Published 2021. Available at: https://www.who.int/news-room/fact-

sheets/detail/cardiovascular-diseases-(cvds). Accessed on 17 March 2024.
2. World Health Organisation (WHO). World Heart Report 2023: Full Report. World Heart Federation. Published 2023. Available at: https://world-heart-federation.org/resource/world-heart-report-2023/. Accessed on 17 March 2024.
3. Institute for Health Metrics and Evaluation. GBD Compare. VizHub. Published 2019. Available at: https://vizhub.healthdata.org/gbd-compare/. Accessed on 20 March 2024.
4. Sreeniwas Kumar A, Sinha N. Cardiovascular disease in India: A 360 degree overview. Medical Journal, Armed Forces India. 2020;76(1):1-3.
5. Khawaja IS, Westermeyer JJ, Gajwani P, Feinstein RE. Depression and coronary artery disease: the association, mechanisms, and therapeutic implications. Psychiatry (Edgmont (Pa: Township)). 2009;6(1):38-51.
6. Celano CM, Daunis DJ, Lokko HN, Campbell KA, Huffman JC. Anxiety Disorders and Cardiovascular Disease. Current Psychiatry Reports. 2016;18(11):1.
7. Toker S, Melamed S, Berliner S, Zeltser D, Shapira I. Burnout and risk of coronary heart disease: a prospective study of 8838 employees. Psychosomatic medicine. 2012;74(8):840-7.
8. Najafipour H, Banivaheb G, Sabahi A, Naderi N, Nasirian M, Mirzazadeh A. Prevalence of anxiety and depression symptoms and their relationship with other coronary artery disease risk factors: A population-based study on 5900 residents in Southeast Iran. Asian Journal of Psychiatry. 2016;20:55-60.
9. Cerit L, Cerit Z, Duygu H. The non-negligible association between SYNTAX score and anxiety–depressive disorders. Cardiovascular journal of South Africa: official journal for Southern Africa Cardiac Society [and] South African Society of Cardiac Practitioners. 2023;34(1):32-36.
10. Fava M, Abraham M, Pava J, Shuster J, Rosenbaum J. Cardiovascular Risk Factors in Depression. Psychosomatics. 1996;37(1):31-37.
11. Holt RIG, Phillips DIW, Jameson KA, Cooper C, Dennison EM, Peveler RC. The relationship between depression, anxiety and cardiovascular disease: Findings from the Hertfordshire Cohort Study. Journal of Affective Disorders. 2013;150(1):84-90.

Cite this article as: Abdagire N, Patil S, Dalal D, Singh H, Ojha S, Gawali V. Psychological determinants and its association with coronary artery disease: a prospective study. Int J Res Med Sci 2025;13:216-20.