



Association between cardiovascular diseases and the onset of depression and anxiety in young to middle age adults

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Abstract: *Depression and anxiety are common mental health disorders, and their association with cardiovascular diseases (CVDs) in young adults has been seen. Depression and anxiety impact not only quality of life but also on the prognosis and management of cardiovascular disease. The purpose of the study is to examine the prevalence of depression and anxiety among young and middle age individuals with CVDs and aims to identify the risk factors which contribute to poor mental health. Quantitative data were used to determine the prevalence and identify the correlation with depression and anxiety by using "Patient Health Questionnaire-9 (PHQ-9) for depression and Generalized Anxiety Disorder-7 (GAD-7) for anxiety. The Life's Essential 8 questionnaire was used to examine cardiovascular health. A strong link between poor cardiovascular health and higher levels of depression and anxiety. Cardiovascular health is a possible strategy for reducing the burdens of mental health issues.*

Keywords: Cardiovascular diseases (CVD), Depression in young adults, Anxiety Disorders, Young adults and, Depression and heart disease, Patient health questionnaire-9, Life's essential

Introduction

Anxiety and depression have a significant role in cardiovascular diseases (CVD), especially in less than 50 years' individuals. It has always been thought that CVD affects older people, but new researches show that young adults who suffer from mental health conditions like anxiety and depression are much more likely to have early-onset of cardiovascular problems (Association, 2023). According to a 2023 Johns Hopkins medicine study, young adults between the ages of 18 and 49 who were faced signs of worry or depression, are more likely to acquire cardiovascular disease. According to this study, young adults who frequently experience anxiety or depression are twice as likely to experience cardiovascular events like heart attacks and strokes. Interestingly, the risks of CVD were 1.5 times greater for those who reported up to 13 days of poor mental health each month and doubled for those who reported 14 or more days of poor mental health.

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Through various evidences, it has been proved that these mental health issues increase the risk of cardiovascular diseases (Kwapong et al., 2023). Furthermore, people who suffer from anxiety or depression frequently involved in harmful habits like smoking, drinking alcohol, eating poorly and not exercising regularly which increases their risk of heart diseases. According to the increasing amount of data, mental health issues should be regularly examined and treated alongside conventional cardiovascular risk factors as part of an integrated approach to healthcare. Young Adult's mental health examinations should be given top priority by healthcare systems as a preventive approach for their mental and cardiovascular health (Loftis et al., 2010).

In Pakistan, depression is quite common among cardiac patients, with around 74% of people with cardiovascular disorders being diagnosed with depression. Pakistan reports more than 918 incidents of heart sickness per 100,000 people putting a huge strain on the country's healthcare system. Patients with heart diseases not only have a lower quality of life because of their physical illness, but they also suffer from psychological burdens such as sadness and anxiety, which have a poor impact on their prognosis and increase healthcare expenses (Bonnet et al., 2005). However, in Pakistan, depression and anxiety are not received significant role in cardiovascular care, which directly influence mental health. Women in Pakistan frequently suffer additional stress such as cultural constraints, restricted access to healthcare and fewer economic prospects, all of which contributes to elevated levels of mental anguish lifestyle factors such as poor food, lack of physical activity, smoking and high levels of stress are contributing factor in CVD (Malema, 2021). The lack of adequate mental health support in the Pakistani healthcare system worsens the problem. There is an urgent need for healthcare changes that incorporate mental health screenings into routine cardiac care, allowing for early detection and treatment of depression and anxiety in these patients (Del Paso et al., 2022). Previous studies mostly derived from research conducted in rural or poor regions, which may not accurately reflect the whole population.

Existing study has analyzed the prevalence of depression and anxiety by using "Patient Health Questionnaire (PHQ-9)" to assess depression severity and the "Generalized Anxiety Disorder 7-item (GAD-7)" scale to measure anxiety (Del Paso, 2022 #56)²¹. Recent studies have found a strong link between mental health issues and cardiovascular diseases (CVD). Moreover, the inclusion of the lifestyle factors, as outlined in "Life's Essential 8," has drawn little attention in past contexts. Our study tackles the gap by combining recognized mental health indicators such as PHQ-9 and GAD-7 with lifestyle assessments. This approach allows for more comprehensive identification of high-risk patients, allowing to early interventions and better management of both mental and cardiovascular health. In addition, a questionnaire based on Life's Essential 8 which is developed by the American Heart Association that focuses on essential lifestyle factors such as food, physical activity, and smoking status that are important for cardiovascular health has used to recognized risk variable in predicting cardiovascular outcomes, especially in those with mental disorders (Lloyd-Jones et al., 2022). This method could allow healthcare practitioners to give more personalized interventions for both mental health and cardiac care.

Methodology

The study design is cross-sectional to identify the association of depression and anxiety in CVD patients. The study was conducted in territory care hospitals. The duration of research was four months. The sample size was 200 with 95% confidence interval and

5% of margin error according to 15% prevalence. Sample size was calculated through WHO scale. Random sample technique was used to collect the data of CVD patients. Both gender male and female are included in study. Depressive patients associated with CVD, anxiety patients associated with CVD, young and middle age adults (18-49yrs) and those patients who are willing to participate are in inclusion criteria. While people over 49 years, patients with history of substance abuse or addiction, comorbidities (Chronic pain, Sleep disorders), traumatic brain injury, who are not willing to participate, and non-cardiac patients are excluded from the study. The PHQ-9 (Patient Health Questionnaire) for depression and General Anxiety Disorder Scale (GAD-7) for anxiety have been used to measure patients stress level. Both questionnaires consist of nine-item which measure the amount of stress in CVD patients. Using questionnaire parameters, we have determined the severity of heart problems (CVD) or the patient's potential risk of developing CVDs if they have mental difficulties. The Life's Essential 8 questionnaire has also used for measures the cardiac health. These Survey or questionnaire forms has been used for data collection. Data has collected from those patients whose cardiac function has impaired. Patients or their family members have sign informed consent. Patients are selected randomly from different hospitals and applied convenience sampling technique. The ethical approached has ensured for consent and confidentiality of the patients (Del Paso et al., 2022) (Lloyd-Jones et al., 2022).

The data has analyzed using SPSS software version 21. Descriptive statistical approaches, such as mean, frequency, and standard deviation are used to investigate the distribution and occurrence of results. Additionally, cross tabulation analysis is used to investigate associations between categorical variables.

Result

Socio-Demographic Characteristics of Participants

The sociodemographic of 200 individuals is displayed in Table 1. The age distribution shows that the majority of participants lies in age group of 40 -49 (49%). While 28.5% patients in 29-39 age group and 22.5% in the 18-28 age group. The gender breakdown shows that 69.5% male participants while 30.5% female participants are involved. In terms of marital status, the majority of participants are married (69.5%) while 30.5% are unmarried. In terms of educational level, the graduate category has the most representation 68.5% whereas undergraduate 17% and uneducated category 15.5% has reported.

Table No 1

Explanatory variables	Frequency	Percentage
Age in numbers	18-28	45
	29-39	57
	40-49	98
Gender	Male	139
	Female	61
Marital status	Single	61
	Married	139

Education level	Uneducated	29	14.5%
	Undergraduate	34	17%
	Graduate	137	68.5%

Depression and Anxiety Category

Data has been analyzed among 200 individual and divided in to two category depression and anxiety. In the depression category, the majority of individuals reported moderate to severe depression (62%) while 35% reported mild depression. Only 3% of subjects has no symptoms of depression. Similarly, in the anxiety category large number of individuals suffered from moderate to severe anxiety (63.5%), whereas mild anxiety was resulted in 33.5%. Only 3% of the subjects reported having no anxiety symptoms. Depression and anxiety category among 200 individuals are displayed in Table 2.

Table 2 Depression and Anxiety Categories

Category	Severity	Frequency	Percent
Depression Category	None	6	3%
	Mild	70	35%
	Moderate-Severe	124	62%
Anxiety Category	None	6	3%
	Mild	67	33.5%
	Moderate-Severe	127	63.5%

Life's Essential 8 Category

People has distributed across the three health categories of poor, intermediate and ideal health according to Life's Essential 8 parameters. Highest number of populations 49% (98 persons) has classified in bad health. However, 44% (88 persons) of the population has reported to be in the intermediate health group. Just 7% (14 persons) of the population has categorized as in ideal health. Table 3 represented the categories.

Table 3: Life Essential Categories

Category	Frequency	Percent
Poor Health	98	49
Intermediate Health	88	44
Ideal Health	14	7

Cardiovascular Health Score (CVH)

Individuals with a low CVH score 0-7 have the highest frequency of moderate-to-severe depression 31.0%, with only 0.5% exhibiting no indication of depression. Moderate anxiety is the most common in 0 -7 CVH score, affecting 32.5% of people, while 15% have mild anxiety. In comparison, people with a moderate CVH score 8-11 have a decreased prevalence of moderate-to-severe depression 24.5% and anxiety 25.0% with

2.5% displaying no signs of depression and 1.5% showing no indicators of anxiety. Depression and anxiety are uncommon among those with a high CVH score 12-14 with just 6.5% experiencing moderate-to-severe depression and 6.0% experiencing moderate-to-severe anxiety, and none claiming to be anxiety free. These data point to a significant inverse association between CVH scores and the intensity of depression and anxiety symptoms. According to table (4a and 4b) (Graph no 1 and 2) the prevalence of depression and anxiety among several categories of overall cardiovascular health (CVH) scores are represented.

Table 4a CVH score of depression

Overall CVH Score	Overall N (%)	None Depression	Mild Depression	Moderate to Severe Depression
Low (0-7)	98 (49)	1 (0.5)	35 (17.5)	62 (31)
Moderate (8-11)	88 (44)	5 (2.5)	34 (17)	49 (24.5)
High (12-14)	14 (7)	0 (0.0)	1 (0.5)	13 (6.5)

Table 4b CVH score of Anxiety

CVH Score	None Anxiety N (%)	Mild Anxiety N (%)	Moderate to severe Anxiety N (%)
Low (0-7)	3 (1.5)	30(15)	65 (32.5)
Moderate(8-11)	3 (1.5)	35(17.5)	50 (25)
High (12-14)	0(0.0)	2 (1.0)	12 (6)

Figure: 1 Depression prevalence across CVH Score

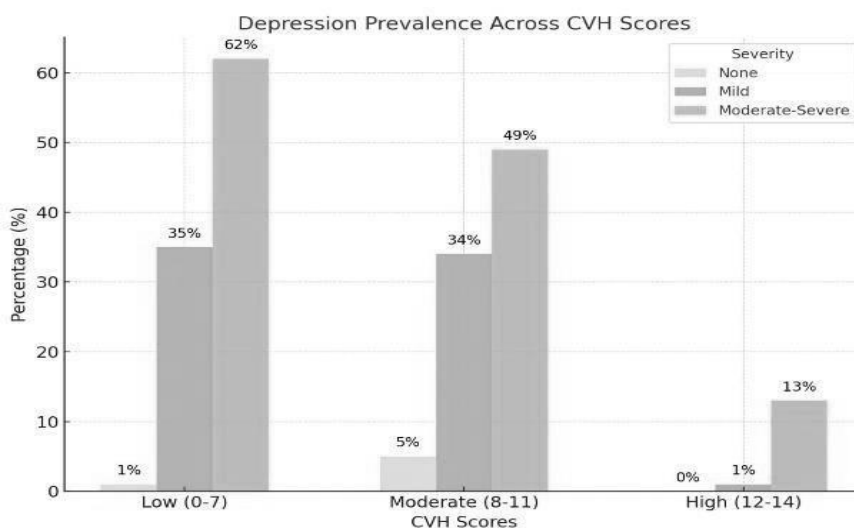
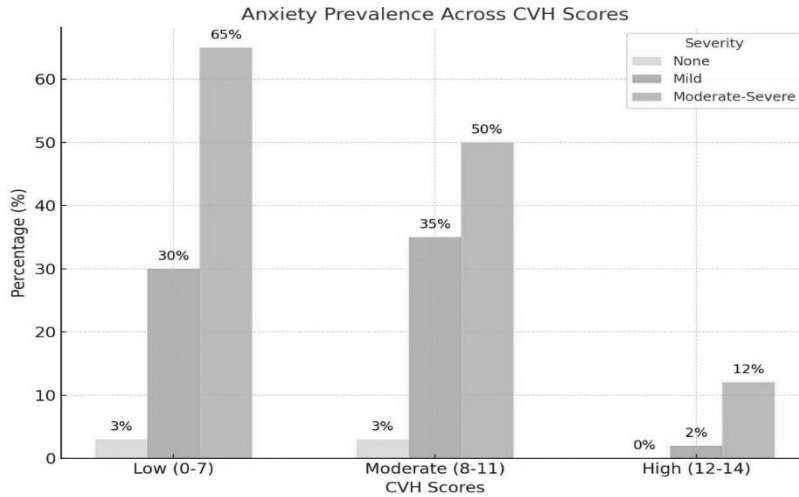


Figure: 2 Anxiety Prevalence across CVH Score



Discussion

Recent study highlights the strong relationship of CVD with anxiety and depression. The frequency of moderate-to-severe depression in recent study's population is 62%, which is consistent with current global research findings. Dragioti et al. (2023) found a comparable prevalence, with 64% of young individuals with CVDs experiencing depressed symptoms (Dragioti et al.). These rates are significantly greater than those seen in whole population implying that the psychological burdens of controlling CVDs worsen mental health issues. Kwapong et al. et al. (2023) underlined that untreated depression worsens the prognosis, contributing to higher hospitalization and mortality rates (Kwapong et al., 2023). Recent research also suggest that depression is linked to poor adherence to cardiovascular therapies, resulting in unsatisfactory outcomes. This is especially concerning in low-resource countries, when healthcare infrastructure may be inadequate (Abbas et al.). The link between depression and inflammatory pathways has been highlighted in studies such as McEwen et al. (2022), emphasizing the necessity of addressing both physical and mental health aspects in CVD treatment (Khan et al., 2025). The high incidence found in this study emphasizes the critical need for focused interventions that address these simultaneous issues. Emerging research suggests that gender specific variables contribute to the burden of depression in young people with CVDs. Lloyd- Jones et al. (2022) discovered that women with depressive symptoms are less likely to follow cardiovascular treatment regimens than males, which affects results (Lloyd-Jones et al., 2022). Addressing gendered patterns of behavior is critical to enhancing patient care.

Anxiety prevalence in this study's population is observed at 63.5%, which supports Shah et al.'s (2023) finding that more than 60% of CVD patient exhibits clinically severe anxiety symptoms. These high rates emphasize the importance of incorporating mental health therapies into cardiovascular care plans. Anxiety greatly relates to harmful lifestyle choices such as smoking, poor food habits, and physical inactivity, all of which increase cardiovascular risk (Rashid et al., 2023). Carola et al. (2024) found that people

with high levels of anxiety frequently participate in maladaptive behaviors which worsen their overall health (Carola et al., 2024). These findings are corelate with those reported in this study, demonstrating the cyclical nature of anxiety and CVD progression. Additional research focuses on the effect of socioeconomic and environmental stress in aggravating anxiety among heart patients. Rashid et al. (2023) connected financial insecurity to higher anxiety, which worsen inflammation and dysregulation of the hypothalamic- pituitary-adrenal axis, raising the risk of severe cardiovascular events (Rashid et al., 2023).

The findings also reveal gender-specific patterns, with women having greater rates of depression and anxiety, which is consistent with the findings other researchers who found that hormonal and sociocultural factors increase mental health risk among women (Arenas & Parejo, 2025). Vaccarino found that societal pressures frequently aggravate women's internalization of stress, raising their likelihood of mental health disorders (Vaccarino et al., 2025). This observation is consistent with the findings of this study, which indicate that customized mental health therapies may enhance health outcomes in female CVD patients. Sociocultural hurdles in Pakistan, such as mental health stigma and rigid gender standards, interfere with women's access to care. Tuaf & Orkibi in 2023 proposed community-based programs to educate and empower women, allowing them to seek quick mental health treatment (Tuaf & Orkibi, 2023). The "Life's Essential 8" system, which analyzes lifestyle determinants, offers greater clarity on the relationship between physical and mental health. Among 200 indivial 49% were identified as having poor cardiovascular health (CVH), which was substantially associated with greater rates of sadness and anxiety. This is aligned with Lloyd-Jones et al. (2022), who said that poor adherence to healthy lifestyle increases CVD risk (Lloyd-Jones et al., 2022). Socioeconomic stressors, which are prevalent in low-income countries such as Pakistan, also have a substantial impact on these outcomes, as financial barriers and limited health, infrastructure limit access to preventive care and mental health treatments (Abbas et al.). Financial instability-related stress has been demonstrated to have a direct impact on mental health, resulting in increased levels of hopelessness and anxiety. Henein et al. (2022) found that, the financial stress worsens inflammation and dysregulation of the hypothalamic-pituitary-adrenal axis, raising the risk of CVDs (Henein et al., 2022). These findings highlight the importance of public health programs that encourage healthier lifestyles and offer services to help people modify their behaviors.

Recent study indicates that anxiety has stronger effect on CVD than depression. Anxiety not only contributes to physiological dysregulation but it is also closely associated with detrimental lifestyle choices that effect cardiovascular outcomes. Existing findings has revealed that participants with lower CVH scores have a higher prevalence of moderate-to-severe depression and anxiety. In comparison to global data, Pakistan's young adults with CVD tend to have a higher mental health burden. This gap may be due to improved mental health resources and comprehensive care models in certain locations, emphasizing the critical need for systemic reforms in low and middle-income countries. Furthermore, Burg et al. (2013) proposed the "perfect storm" hypothesis which suggests that psychological and pathophysiological factors interact to increase CVD risk (Burg et al., 2013). This approach is still relevant, highlighting the significance of tackling many stressors in vulnerable populations. Sobolewska-Nowak et al. (2023) stated that mental health therapies are critical for improving cardiovascular outcomes, particularly in high-risk populations (Sobolewska-Nowak et al., 2023). This is consistent with current

study's findings, which emphasize the importance of integrated mental health screens and therapies within cardiac care system. Adopting measures in Pakistan's healthcare system could help alleviate the twin burden of mental and cardiovascular health issues.

Conclusion

This study stresses the critical link between adult's mental health and cardiovascular health, calling for integrated care approaches. Addressing mental health in cardiovascular treatment, especially in resource-limited settings, can considerably enhance health outcomes. Prioritizing mental health screening and implementing through treatment plans can help to lower the prevalence of depression, anxiety and cardiovascular disease. The data shows that anxiety has a greater impact than depression, contributing to physiological dysregulation and bad lifestyle choices, highlighting the importance of targeted anxiety treatment in cardiovascular risk strategies.

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