A Comparative Study on Assessment of Depression in Cardiovascular Disease Patients

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ABSTRACT
Aim: To assess depression level in cardiovascular disease patients and compare it with the individual without cardiovascular disease.
Methods: A comparative study was conducted to assess the level of depression in cardiovascular disease (CVD) patients. The sample size was 200 (100 CVD patients and 100 non-CVD participants) with a random sampling technique. The Depression, Anxiety, and Stress Scale (DASS-42) was used to assess the level of depression of the study participants.
Results: Cardiovascular disease patients recorded significantly higher depression levels than the control group (without CVD). The impact of demographic variables such as gender, age, education and socioeconomic also revealed significant differences in depression level among them. Both, females and elderly CVD patients were more affected. Depression was also higher in CVD patients who had lower levels of education and socioeconomic status.
Conclusion: The results of the study revealed that depression is a psychological risk factor and CVD patients. Females, less educated, elderly and with low socioeconomic status CVD patients were more affected. Understanding the complex relationship between mental health issues like depression and cardiovascular disease and impact of gender, education, age and socioeconomic status socioeconomic status has not been researched extensively. Further studies are needed to understand the complexity of these interrelationships.
Keywords: Depression, Cardiovascular disease, Gender, Age, Education and Socioeconomic status.

INTRODUCTION
Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels and comprise coronary artery disease, rheumatic heart disease, peripheral artery disease and congenital heart disease. Cardiovascular diseases (CVDs) have been widely acknowledged as a prominent global health issue, contributing significantly to both morbidity and mortality on a global scale. In 2019, about 32% of mortality was caused by CVDs (World Health Organization, 2021).

Cardiovascular diseases (CVDs) are the major cause of mortality due to CVD and a significant public health concern in Pakistan, and the number of patients is growing every day. Common cardiovascular risk factors include an abnormal lipid profile, elevated blood pressure, and smoking. However, mental health issues like depression are emerging as novel risk factors for CVDs. The findings from a study highlighted that about 17.5% of the population had CVDs, with 16.6% of men and 18.3% of women being affected (Zubair et al., 2018). Coronary artery disease develops and manifests as a result of psychological and social variables. Studies relating the risk of CAD to certain psychological dimensions, including depression, anxiety, chronic stress, and social isolation, provide the majority of this evidence. The pathophysiological mechanisms are neuroendocrine, platelet activation, and behavioral mechanisms, where psychosocial factors lead to unhealthier health habits like smoking. Socioeconomic status social also affects CVD and the prognosis and results are worse for patients. Treatment compliance and quality of life are also significantly impacted. (Rozanski et al., 1999)

Depression affects more than 300 million individuals globally, with a prevalence ranging from 1 to 17%. Women have 70% higher incidence than men. The association between depression and CVD is two way, with depression predicting cardiovascular illness and vice versa. Chronic diseases like depression and CVD have a significant impact on cardiovascular and all-cause morbidity and mortality (Rivera et al., 2022).

Depression is the risk factor for incidence, severity and outcomes for cardiovascular disease (CVD). About one out of every five patients suffers from major depressive disorder (Elderon & Whooley, 2013). Depression may increase the tendency to suicide due to its effects on mood and the severity of CVD. This risk was elevated in CVD patients as compared to normal population (Grobnan et al., 2023). Depression is frequent in cardiac patients, with 20% to 40% meeting criteria for major depressive disorder. Depression symptoms are typically chronic and persistent, and have been linked to the development and progression of coronary artery disease, poor health-related quality of life, reduced physical performance, recurrent cardiac events, and a 2- to 2.5-fold increased risk of mortality. (Ceclano & Huffman, 2011).

Important public health issues like depression and cardiovascular disease (CVD) have strong connections to one another. Depression and cardiovascular disease (CVD) have been the subject of extensive study due to their high prevalence, serious consequences, and mutually reinforcing relationship. The mechanism through which depression causes harmful effects on patients’ debatable, but there seems to be no dispute about the importance of recognizing and treating this widespread condition for our patients’ best health (Bradley & Rumsfeld, 2015).

Depressive symptoms are more common in people with CVD, according to several studies (Davidson, 2012; Li et al., 2020; Inoue et al., 2020; Zhang et al., 2018; Thrombs et al., 2006). The depression was associated with the risk with CHD and MI. This risk was independent which may have implications for CHD etiological research and psychological treatment (Gan et al., 2014). Depression caused heart failure in about three-quarters of patients and the heart-failure group had the highest percentage of patients with depressive symptoms. The high levels of emotional discomfort seen in cardiac patients are not due to aging, because healthy seniors have low levels of anxiety, sadness, and hostility. (Moser et al., 2010).

Depression has been linked to an increased mortality risk in people with cardiovascular disease (Huang et al., 2021; Yu et al., 2020; Farooqi et al., 2019). Myocardial infarction, readmission to the hospital, and arrhythmias are just some of the cardiac complications that have been linked to depression, as reported by Gelano et al. (2016). Mattioli et al. (2020) suggested that the depression may have direct physiological effects on the cardiovascular system. The complicated link between depression and cardiovascular outcomes has been linked to dysregulation in the autonomic nervous system and inflammatory mechanisms (Carney & Freedland, 2017). Depression was at higher level in CVD patients as compared to the general population. Depressed patients are more likely to develop CVD and have a higher mortality rate than the general population. Patients with CVD who...
are also depressed may have adverse outcomes than those who are not depressed. The risk of mortality and other cardiovascular problems increases with increasing depression level, which was linked to an increased risk of cardiovascular complications (Hare et al., 2019). In addition to the well-known risk factors, new diseases that increase cardiovascular morbidity and death are emerging. Anxiety and depression, for example, appear to contribute to the aggravation of cardiovascular diseases. On the other side, deteriorated heart and vascular disorders result in disrupted mental and emotional health. In both cardiovascular and psychological disorders, the pathophysiological basis of this bidirectional interplay could be an improper activation of vegetative neurohormonal and other humoral systems. As a result, it appears critical to investigate the changes in emotions, cognition, and behavior in cardiovascular patients (Repova et al., 2022).

Depression is a prevalent and complicated mood condition in older people and may cause significant cognitive impairment and disability, and higher mortality. The factors that determine the likelihood of late-life depression (LLD) are still unknown. The cerebrovascular illness or vascular risk factors might also predispose, trigger, and sustain geriatric depressive syndromes (Jellinger, 2020). Endothelial activation and dysfunction are major contributors to the onset of atherosclerosis and hypertension, both of which are associated with an increased risk of cardiovascular events (Zhang, 2022). According to the research presented by Shao et al. (2020), there is a significant correlation between an increased risk of CVD and depression. The association between depression and risk factors like smoking, inactivity, and inflammation can be explained by behavioral and physiological mechanisms (Paul et al., 2021). Cardiovascular disease (CVD) patients, on the other hand, may experience challenges associated with their physical abilities and the unpredictability of their condition, both of which can cause worsening of depressive symptoms (Dornelas & Sears, 2018). Increased inflammation and dysregulation of the hypothalamic-pituitary-adrenal axis are both associated with cardiovascular disease-related chronic stress and may both play a role in the onset of depression (Mattina et al., 2019).

Pharmacotherapy (the administration of selective serotonin reuptake inhibitors) and psychotherapy (cognitive-behavioral therapy) have both been used to treat depression in patients with cardiovascular disease (Zambrano et al., 2020). In most cases, participants in such programs receive both physical and mental benefits. Depression and poor mental health are linked to impaired cardiovascular health (CVH) in young adults. Although this relationship is most likely bidirectional, addressing mental health in young individuals may help reduce CVD risk and improve CVH (Kwapong et al., 2023).

**Objectives:**
- To study the level of depression in CVD patients and to compare it with the level of the participants with no CVD
- To examine the impact of gender, age, education, and socioeconomic status on level of depression in CVD patients

**Hypothesis:**
1. Patients with cardiovascular disease will have significantly increased scores of depression than the control group with no cardiovascular disease on DASS-42.
2. Female cardiovascular disease patients will record a higher level of depression as compared to male CVD patients on DASS-42.
3. Cardiovascular disease older patients will record a higher level of depression as compared to younger CVD patients on DASS-42.
4. Cardiovascular disease patients with a lower level of education will record a higher depression scores than CVD patients with a higher level of education on DASS-42.
5. Cardiovascular disease patients with lower level of socioeconomic status will record a higher level of depression as compared to CVD patients with higher a level of socioeconomic status on DASS-42.

**MATERIALS AND METHODS**

**Study Design:** Patients with cardiovascular disease and a control group were evaluated and compared depression level using a comparative study design.

**Sample:** Two hundred males and females (N=200) were selected randomly from OPDs of a government and private hospital. The study sample comprised of 100 CVD patients diagnosed by a cardiologist and 100 non-CVD participants from the general population. Sample sizes were The G*Power version 3.1.9.7 was used to determine sample size.

**INSTRUMENT**

Depression, anxiety, and stress scale - 42 (DASS; Lovibond & Lovibond, 1995): The instrument (DASS-42) used in this study consisted of a self-report questionnaire comprising 42 items. The measure has good convergent and discriminant validity, as well as internal consistency (Lovibond & Lovibond, 1995). The instrument consists of three subscales, each comprising 14 items, which assess levels of anxiety, depression, and stress experienced within the past seven days, both in clinical and non-clinical environments. The items are evaluated using a 4-point Likert scale, with scores ranging from zero to three. According to Brown et al. (1997), the DASS-42 questionnaire demonstrated high internal consistency with Cronbach's alpha coefficients of 0.93, 0.96, and 0.89 the stress, depression, and anxiety subscales, respectively.

**Procedure:** The researcher obtained permission from the hospital authority and acquired verbal consent from all of the patients. The participants were randomly recruited and randomly assigned to two groups: one consisting of patients with cardiovascular diseases, and the other comprising patients without cardiovascular diseases. The Depression, Anxiety, and Stress Scale-42 (DASS; Lovibond & Lovibond, 1995) was administered to the patients in both groups, and demographic information was also collected from each participant. The data was subjected to analysis through the application of various statistical tests utilizing SPSS version 25. The demographic characteristics of the participants were elucidated through the utilization of descriptive statistics. We used an independent sample t-test and analysis of variance (ANOVA) for analysis of the data. The Bonferroni test was used for post hoc comparison.

**Ethical considerations:** The participants were explained and ensured that ethical considerations like informed consent, privacy, and confidentiality were observed. Confidentiality was ensured by assigning a code to each participant, and his/ her participation was voluntary. The right to withdraw was explained to them before participation. The participants were briefed about the nature and aim of the study and their questions were answered properly. Verbal consent was obtained from the participants. The data was kept confidential and anonymous, and access was only given to the research team.

**RESULTS**

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<td>High socioeconomic status</td>
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Sociodemographic data was collected from the participants by administering of the demographic sheet. For this comparative study, out of 200 participants, 100 (50%) were male, and 100 (50%) were female. The age of the participants was reported that...
The objective was to test depression level in male and female CVD patients. For this purpose, we used t-test.

Table 3 indicates the mean comparison of study variables in terms of gender. The findings indicate that female patients (M= 17.12, SD= 3.70) have reported higher level of depression as compared to male patients (M= 14.70, SD= 3.81). The results were significant (p < 0.01) with a medium effect size 0.64.

The results were significant (p < 0.01) with a medium effect size of 0.55.

Table 5 depicts that CVD patients with matric education (M= 17.40, SD= 3.29) reported highest level of depression, followed by graduate CVD patients (M= 14.96, SD= 3.3) and postgraduate CVD patients (M= 13.10, SD= 3.10). The results were significant (p < 0.01) and partial eta square of 0.20 with a large effect size.

**DISCUSSION**

The objective of this study is to compare depressive level in (CVD) to those in a control group with no CVD. The study examined the impact gender, age and education on depression level socioeconomic status played a role in how severely depressed people with cardiovascular disease reported feeling. Significant insights into the association between depression and CVD, as well as the influence of demographic variables, are provided by the study’s findings.

The present study highlighted that the CVD patients would report significantly higher levels of depression than the control group without CVD. The results showed that people with CVD had a higher mean level of depression than people without CVD with the difference being statistically significant. These findings are in line with previous studies (Li et al., 2020; Inoue et al., 2020; Zhang, Chen, & Ma, 2018; Thombs et al., 2006). Female patients with cardiovascular disease (CVD) are more likely to report severe depression than male. Depression affects general population, but it
is more frequent among patients with coronary heart disease (CHD). Depression is a risk factor for incident CHD, and for cardiovascular morbidity and mortality in patients with established CHD. Depression, anxiety and strain on intimate relationships are familiar problems for people with advanced heart disease that often go untreated (Dornelas & Sears, 2018). The education level influenced depression level in CVD patients. According to the results, there is a statistically significant difference level in the severity of depressive symptoms in matric, graduate and postgraduate CVD patients. Similar findings were reported by (Lazzat Zhamaliyeva et al., 2023).

Socioeconomic status also affected depression level in CVD patients and those who have been diagnosed with cardiovascular disease and SES was low are more likely to experience clinically significant levels of depression. The results supported the hypothesized link between socioeconomic status and depression by showing that those with lower and middle socioeconomic status were more depressed than those with higher socioeconomic status. Similar findings were reported by Sullivan & Vaccarino, 2019.

**CONCLUSION**

The present study concluded significant correlation between depression and cardiovascular disease (CVD), elucidating the influence of demographic variables. The aforementioned results highlight the need to adopt a comprehensive strategy to patient treatment that encompasses the psychological welfare of individuals with cardiovascular disease (CVD), particularly those who exhibit an elevated susceptibility to depression due to factors such as gender, age, educational attainment, and socioeconomic standing. Additional investigation and longitudinal analyses are necessary to examine the intricate relationship between these variables and their influence on the mental and physical well-being of individuals with cardiovascular disease.

**Limitations and Suggestions:** The constraints and limits of this particular research effort must be recognized and accepted. A potential limitation of the study's findings is that the sample size was relatively small, and the participants were selected exclusively from a single geographic region. Future studies should aim to use larger and more representative samples of the population to strengthen the internal consistency of their results.

Self-report instruments were also heavily relied upon, which introduces the possibility of response bias into the research. Clinical interviews and objective assessments could be combined in future studies to learn more about depression in patients with cardiovascular disease (CVD).

**Implications:** The aforementioned results possess noteworthy ramifications for the field of therapeutic practice. It is important for healthcare practitioners to acknowledge that persons with cardiovascular disease (CVD) have an increased susceptibility to depression, with a particular emphasis on females, older adults, those with lower educational attainment, and those with lower socioeconomic position. Consequently, it is recommended that healthcare providers include regular depression screening into the management of CVD patients. Integrating psychological support and targeted therapies, such as cognitive-behavioral therapy, into cardiac rehabilitation programs may be effective in addressing both mental well-being and cardiovascular results.

**Conflict of interest:** Nil

**Funding source:** Nil

**REFERENCES**


46. Yu, Bin PhD; Steptoe, Andrew DPhil, DSc; Chen, Li-Jung PhD; Chen, Yi-Huei MSc; Lin, Ching-Heng PhD; Ku, Po-Wen PhD. Social Isolation, Loneliness, and All-Cause Mortality in Patients with Cardiovascular Disease: A 10-Year Follow-up Study. Psychosomatic Medicine 82(2):p 208-214, 2/3 2020. DOI: 10.1097/PSY.0000000000000777.


