



A Study to Assess the Prevalence of Depression in Cardiovascular Disease Patient in The Nilgiris Population: Association with Blood Pressure

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ABSTRACT

Depression is a common disorder in Cardio-vascular patients with a prevalence of twenty percent (20%) to forty five percent (45%), which is much more frequent than in the general population. Depressive symptoms are often overlooked in cardiac patients and their manifestation, especially after MI, is considered normal. Almost every life-threatening condition, including MI, stimulates the hypothalamus to secrete the corticotropin-releasing hormone, which stimulates the HPA axis. The two-way connection between depression and heart disease, which share the pathophysiological mechanism of origin, affects the prognosis of post-infarction recovery of depressed patients due to the impact of depression on the HPA axis activation, endothelial dysfunction, platelet reactivation and enhanced inflammatory response. An observational, cross-sectional study was conducted at secondary care government hospitals located at the Nilgiris district on different cardiovascular disease patients using HAM-D questionnaires for the assessment of depression. In this study, the level of depression in cardiovascular disease patients were assessed associating with patient variability in relation to age, gender, education, food habits, social habits, duration of disease and blood pressure values. There was a significant increase in depression score with the increase in blood pressure level. The patients were found to be having depression even though they were on cardiovascular treatment after they were being diagnosed with cardiovascular disease.

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INTRODUCTION

Depression is the most common psychiatric disorder in the world population and the most frequent mental disorder in primary health care (Williams, 2012). It is ranked fourth in the cause of disability due to illness with constant growth tendency (Raic, 2017). According to the World Health Organization, it is estimated that in 2020 depression will be in the second place of public health problems, next to cardiovascular diseases (CVDs) (Williams, 2012; Raic, 2017). Depression is a severe illness with immense mental suffering, the tendency to recurrence, and often begins after a negative life event and is most commonly recognized among patients in primary

health care (Raic, 2017).

A depressive disorder is accompanied by significantly poor mood and loss of possible enjoyment in everyday things and activities (Raic, 2017). In addition to depressed mood, it is also featured by loss of interest and satisfaction, loss of self-confidence and self-respect, guilt, sleep disturbances, increased or decreased appetite, decreased concentration, tiredness and depreciation (Raic, 2017; Lang and Borgwardt, 2013). Unrecognized and untreated depression is associated with a lower quality of life, increased risk of suicide and poor outcome of treating chronic diseases which co-exist with depression (Williams, 2012). In contrast to the non-depressed patients, depressive patients have increased mortality with a relative risk of 1.81 (Williams, 2012).

Depression is a common disorder in cardiovascular (CV) patients with a prevalence of 20% to 45%, which is much more frequent than in the general population (Raic, 2017; Feng et al., 2016). Depressive episodes can often be overlooked in cardiac patients (Raic, 2017). Depressive symptoms are rarely neglected in cardiac patients and their manifestation, especially after myocardial infarction (MI) is considered a normal condition (Raic, 2017). Depressive patients have a double risk of developing CVD, and on the other hand, cardiac patients are at increased risk for the development of depression, which is usually long-term, especially in patients with chronic heart failure (Raic, 2017; Feng et al., 2016; Kang et al., 2016). Depression and CVD are bidirectional related conditions, risks are for each other, and they often co-exist (Raic, 2017).

Patients with depressive disorder carry a double risk of developing heart disease (Raic, 2017). Increased CV risk of depressive patients indicates an increased incidence of MI and CHD, and consequently higher mortality rate (Correll et al., 2017; Chapa et al., 2014; Tofler et al., 2017). Depression becomes an independent risk factor for the development of coronary artery disease, in both sexes, if other risk factors are under control (Raic, 2017). Based on numerous scientific studies, it was concluded that the comorbid states of depression and cardiovascular disease are highly probable and that these two entities often coexist (Shah et al., 2004). Psychiatric disorders, particularly depression and anxiety, recognized as a risk factor for heart disease have also a significant impact on the recovery and prognosis of cardiac patients (Shah et al., 2004). The relationship between depression and heart disease is not incidental, and the lack of recognition of the coexistence of these two entities and their untimely

and improper treatment creates a problem for the patient (Shah et al., 2004; Liu et al., 2017).

MATERIALS AND METHODS

This was a prospective, observational study. The study was carried out on cardiovascular disease patients and the duration of the study was 1 year with a sample size of 100. The approval to conduct this study was obtained from the Institutional Ethics Committee, JSS College of Pharmacy, Ooty.

The study required Data Collection Form, Depression scale (HAM-D) and Informed Consent Form in various regional languages and it was approved by the Institutional Ethics Committee.

Inclusion Criteria

Patients with 18 years of age & above. Patients with a confirmed diagnosis of cardiovascular diseases.

Exclusion Criteria

Patients with any other comorbidities that might lead to depression such as diabetes, COPD, CKD.

RESULTS AND DISCUSSION

The study was carried out by making an attempt to enrol 150 patients based on inclusion and exclusion criteria. After screening, a total of 100 patients were enrolled. The study patients were classified according to socio-demographic, lifestyle and medical variables. The socio-demographic variables include age, education and sex. The lifestyle variables are smokers alcoholics, and people with disorderly food habits. Variables related to medical conditions are patients with different diagnosis, duration of disease and co-morbidities. Out of 100 cardiovascular patients enrolled, 8.0% (8) were aged between 31-40 years, 13.0% (13) were aged between 41-50 years followed by 34.0% (34) and 36.0% (36) that were aged between 51-60 years and 61-70 years respectively. The remaining patients were segregated as 71-80 years and 81-90 years, these groups contained the remaining 6.0% (6) and 3.0% (3) respectively. 49.0 % (49) of patients were male, whereas females formed the remaining 51.0% (51) of entire study participants. On examining social habits, 53.0% (53) were found to be devoid of using alcohol or smoking. 15.0% (15) admitted of smoking. The remaining 32.0% (32) patients were found to be using both alcohol and smoking. The patients taken for this study fell under either one or other education qualifications, i.e., either illiterate or primary or secondary or higher studies. On this segregation 19.0% (19) patients were found to be illiterate, 61.0% (61) were found to be hav-

Table 1: General characteristics of cardiovascular disease patients

Description of variables (N=100)		%
Age	31-40	8.0
	41-50	13.0
	51-60	34.0
	61-70	36.0
	71-80	6.0
	81-90	3.0
Gender	Female	51.0
	Male	49.0
Social Habits	Only Smoker	15.0
	Smoker & Alcoholic	32.0
	None	53.0
Duration of Disease	<5 years	61.0
	5-10 years	33.0
	11 years & above	6.0
Food Habits	Vegetarian	19.0
	Non-Vegetarian	81.0
Education	Illiterate	19.0
	Primary	61.0
	Secondary	16.0
	Higher Studies	4.0
Diagnosis	Hypertension	45.0
	Other Cardiovascular Disease	55.0
Duration of Disease	Below 5 years	54.0
	5-10 years	36.0
	11 years & above	10.0
Comorbidity	Gastritis	3.0
	Common Cold	3.0
	Osteoarthritis	2.0
	Myalgia	8.0
	Urinary Tract Infection	1.0
	Respiratory Tract Infection	5.0
	Ascites	1.0
	None	77.0
Patient Type	In-Patient	43.0
	Out-Patient	57.0
HAM-D	Normal	26.0
	Mild	39.0
	Moderate	27.0
	Severe	8.0

Table 2: Effect of Systolic Blood Pressure on HAM-D scores in cardiovascular

Systolic Blood Pressure	%	HAM-D Mean \pm SEM
Group A 100-120	9.0	11.56 \pm 1.22
Group B 130-140	29.0	12.79 \pm 0.63
Group C 150 & above	36.0	15.08 \pm 0.61*

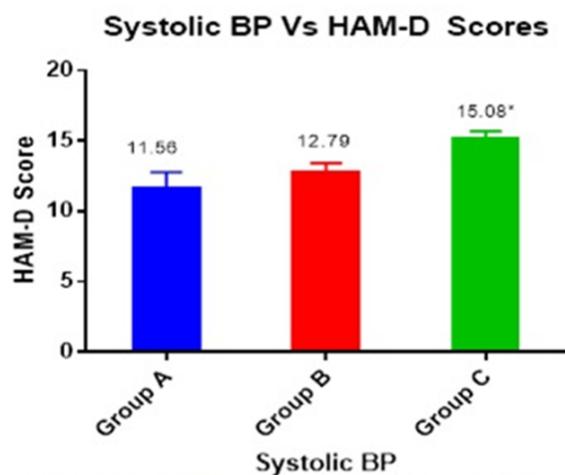
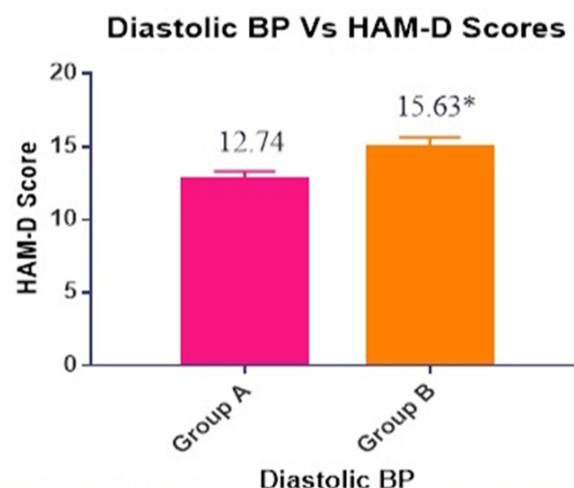
Table 3: Effect of Diastolic Blood Pressure on HAM-D scores in cardiovascular

Diastolic Blood Pressure	%	HAM-D Mean \pm SEM
70-80	38.0	12.74 \pm 0.56
90-100	35.0	15.03 \pm 0.63*

ing primary education, 16.0% (16) were having secondary education and the remaining 4.0% (4) were found to be having higher education. Among 100 patients recruited 19.0% (19) were found to be vegetarian and remaining 81.0% (81) were found to be non-vegetarian. Among 100 recruited patients 3.0% (3) were having gastritis, 3.0% (3) common cold, 2.0% (2) osteoarthritis (OA), 8.0% (8) Myalgia, 1.0% (1) urinary tract infection (UTI), 5.0% (5) respiratory tract infection (RTI), 1.0% (1) ascites and remaining 77.0% (77) were found to be without any comorbidities. On 100 recruited patients the HAM-D questionnaires were administered and scores were recorded and interpretation was done. 26.0% (26) patients were found to be normal, 39.0% (39) patients were found to be having mild depression, 27.0% (27) were found to be having moderate depression and the remaining 8.0% (8) patients were found to be having severe depression as shown in Table 1.

Out of 100 enrolled patients 74 patients were found to be having depression. The 74 depressed were divided into 3 groups according to their Systolic blood pressure. Group A (100-120), Group B (130-140) and Group C (150 & above). The mean HAM-D scores obtained in Group A, Group B and Group C were found to be 11.56 \pm 1.22, 12.79 \pm 0.63 and 15.08 \pm 0.61 respectively. When unpaired t test with Welch correction was performed, the t tailed P value obtained was 0.0117, which was considered as significant (Table 2 & Figure 1).

Out of 100 enrolled patients 74 patients were found to be having depression. So, the 74 depressive patients were divided into 2 groups according to their Diastolic blood pressure. Group A (70-80)

**Figure 1: Showing the mean HAM-D score with respect to Systolic Pressure****Figure 2: Showing the mean HAM-D score with respect to Diastolic Blood Pressure**

and Group B (90-100). The mean HAM-D scores obtained in Group A and Group B were found to be 12.74 ± 0.56 and 15.03 ± 0.63 respectively. When unpaired t test with Welch correction was performed, the t tailed P value obtained was 0.008, which was considered to be substantial (Table 3 & Figure 2).

In the present study, we assessed the level of depression in cardiovascular disease patients. It also assessed the patient variability in relation to age, gender, education, food habits, social habits, various cardiovascular disease condition, patient type, duration of disease and blood pressure values. Overall 100 cardiovascular patients were enrolled for the present study. After assessing the depression level in the patients, it was found that 26 patients were normal and 74 patients were found to be having various levels of depression. So, the analysis was carried out on 74 patients. The variation in the level of depression in different cardiovascular disease was also observed. This may be due to alterations in the autonomic nervous system, platelet receptors and function, coagulopathic factors such as plasminogen activator inhibitor-1 and fibrinogen, pro-inflammatory cytokines, endothelial function, neurohormonal factors, and genetic linkages such as with the serotonin transporter mechanism (Hare et al., 2014). The blood pressure analysis was done compared with depression level, the significant difference in the depression was observed with the increasing level of blood pressure. It may be justified as with the increasing level of blood pressure (Systolic BP >150 and Diastolic BP >90) there is also an alteration in the level of neurotransmitters (Rubio-Guerra et al., 2013).

CONCLUSIONS

The cardiovascular patients were found of having significant depression level in various diagnosed cardiovascular condition. Therefore, the screening for depression in cardiovascular patients may be recommended, because, as time progresses the depressive symptoms may worsen, which may in turn degrade the cardiovascular disease condition in the patient. The patient with hypertension was also found to be having depression and the increase in depression was with the increase in blood pressure level. Even though the patient receiving treatment for their cardiovascular disease symptoms, the assessment for depression should be done and if required, depending on the level of depression, counselling and/with psychotherapy (eg. Cognitive behavioural therapy) are recommended to avoid cardiac morbidity and mortality. However further

research is required in a larger population to understand the influence of other confounding factors so as to reach a definite conclusion.

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