

Prevalence of depression and anxiety, and their association with quality of life and physical activity in South Asian patients undergoing coronary artery bypass graft surgery.

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Abstract

Aims: To determine the prevalence of depression and anxiety in Indian patients undergoing CABG surgery and their relationship to physical activity and quality of life. **Methods:** 121 patients undergoing CABG surgery between November 2017 and May 2019 were included. The Hospital Anxiety and Depression Scale (HADS) was employed for the assessment of depression and anxiety. Health-related quality of life was assessed using the SF-36 questionnaire. The short form of the International Physical Activity Questionnaire (IPAQ) was used for assessment of physical activity. Participants were categorized into high, moderate or low physical activity. **Results:** The overall prevalence (95% CI) of depression and anxiety was 70.5% (0.61-0.78) and 64.6% (0.55-0.73) respectively. When a cut-off score of 11 instead of 8 was used on the HADS [Borderline cases excluded (HADS score 8-10)], the prevalence of depression and anxiety was 31.3% (0.22-0.40) and 40.7% (0.31-0.50) respectively. Patients with low levels of physical activity had a higher prevalence of depression and anxiety ($p < 0.05$). Patients with depression demonstrated a worse quality of life compared to those without depression in all domains measured by the SF-36 questionnaire. Among patients with anxiety, quality of life was worse in four out of the eight domains measured by the SF-36 questionnaire. **Conclusion:** Indian patients undergoing CABG surgery have a high prevalence of depression and anxiety. Patients with depression and anxiety were found to have low physical activity and poor quality of life when compared to their counterpart. **Keywords:** CABG; depression; anxiety; quality of life; physical activity.

INTRODUCTION:

Coronary Artery Disease is an important cause of morbidity and mortality in the world. Clustering of chronic diseases is common in patients with coronary artery disease (CAD). Chronic diseases such as diabetes, hypertension, dyslipidemia etc., have been well studied in the context of CAD. However, psychiatric co-morbidity especially depression and anxiety, is frequently overlooked in these patients. The proportion of CAD patients suffering from psychiatric co-morbidity is not insignificant. Previous studies have reported the prevalence of depression to be about 20-40% in patients with CAD(1). Similarly, anxiety has been reported in 20-30% of patients following an acute coronary syndrome (ACS)(2,3). Psychiatric co-morbidity has also found to be prevalent in cardiovascular disorders other than CAD. Depression and anxiety in chronic cardiovascular conditions such as chronic heart failure (CHF) are being increasingly recognized(4,5).

Patients of CAD referred for coronary artery bypass graft (CABG) surgery constitute a special population. Most of these patients are limited in their activity by angina which is attributable to their multivessel coronary artery disease. In addition, these patients are confronted with the problem of polypharmacy due to multiple antianginal medications apart from other agents which include but are not limited to antiplatelets, statins, antidiabetic and antihypertensive medications. Compounding these issues is the stress of an impending major surgery. All of these factors may add significantly to the burden of psychiatric co-morbidity in this

specific group of patients. Pre-operative depression and anxiety have been shown to be associated with worse outcomes post CABG surgery(6–9). In addition, untreated depression and anxiety hamper efforts at complete cardiac rehabilitation following CABG. Identification of co morbid psychiatric disorders is therefore of vital importance in patients undergoing CABG surgery. With an increasing burden of CAD in developing countries, there has been a rise in the number of CABG surgeries performed each year. Nearly 150,000 CABG surgeries are performed in India every year. Despite these large numbers, there is little available Indian data on the prevalence of depression and anxiety in patients undergoing CABG surgery. The present study was performed to determine the prevalence of depression and anxiety in Indian patients undergoing CABG surgery and their relationship to physical activity and quality of life.

METHODS:

Study Population

The present study was a quantitative research approach with a cross-sectional study design. Patients were recruited from the Cardiothoracic and Neurosciences Centre (CNC) out-patient department at the All India Institute of Medical Sciences, New Delhi which is a tertiary-care referral centre in North India. Individual informed consent was obtained from all the participants at enrolment in the study. Data was collected during hospital admission, two to seven days prior to elective CABG surgery. One hundred and twenty-one patients were included in the study. Study population included patients between 35 to 65 years of age with established CAD (double or triple vessel disease) planned for elective CABG surgery. Patients undergoing emergency CABG surgery or CABG surgery with valve replacement, patients with LV dysfunction (LVEF < 30%), renal dysfunction and known neuropsychiatric illnesses were excluded from the study. Baseline demographic and clinical data was obtained from all the patients.

Assessment of Depression, Anxiety, Quality of Life and Physical Activity

The Hospital Anxiety and Depression Scale (HADS) was employed for the assessment of depression and anxiety(10). Individual confidentiality was maintained. This is an easily administered questionnaire consisting of 14 questions (7 questions pertaining to depression and 7 questions pertaining to anxiety). Each question is answered by the selection of one of four options which are scored from 0-3. A score of [?] 8 was used to define cases of depression or anxiety.

Health-related quality of life was assessed using the SF-36 questionnaire(11,12). It is a 36-item questionnaire that measures physical functioning, role limitation due to physical health, bodily pain, general health, energy or vitality, social functioning, role limitation due to emotional problems and mental health. The test was administered by well-trained nursing staff. Average time taken to administer the test was kept equal for all patients. The eight scaled scores were given a value of 0-100 with lower scores representing more disability.

The short form of the International Physical Activity Questionnaire (IPAQ) was used for assessment of physical activity of patients(13). This consists of seven questions regarding vigorous physical activity, moderate physical activity, walking and sitting in the preceding one week. The participants were categorized into high, moderate or low physical activity.

Statistical Analysis:

Data was recorded on a predesigned proforma and managed on an excel spreadsheet. All the entries were checked for any possible keyboard errors. Categorical variables were summarized as frequency (percentage). Quantitative variables were assessed for approximate normality and summarized as mean \pm SD. In this study we defined four outcomes: depression, anxiety, both depression and anxiety and depression and/or anxiety. Chi square test was used to compare frequencies across various socio-demographic characteristics for each of the four outcomes separately. Independent sample t-test was used to compare mean values across categories. Odds ratio (95% CI) was computed to determine the strength of association between each of the socio-demographic characteristics and the four outcomes using binary logistic regression. To determine the independent role of each factor with each of the four outcomes i.e. depression, anxiety, depression and/or anxiety, and depression and anxiety, stepwise multivariable logistic regression analysis was used to compute

adjusted odds ratio (95% CI). Statistical software Stata 14.2 was used for data analysis. In this study, p-value <0.05 has been considered as statistically significant.

RESULTS:

A total of 121 patients were included in this study between November 2017 and May 2019. The baseline socio-demographic and clinical variables are presented in Table 1. The mean age of study participants was 54.9 ± 7.5 years. The predominant study participants were male [83.5% (95% CI, 0.75-0.89)]. Nearly three-fourths of the patients were either overweight or obese. The overall prevalence (95% CI) of depression in the study population was 70.5% (0.61-0.78). On the other hand, anxiety was present in 64.6% (0.55-0.73) of patients. When a cut-off score of 11 instead of 8 was used on the HADS for diagnosis of depression/anxiety [Borderline cases excluded (HADS score 8-10)], the prevalence of depression and anxiety was 31.3% (0.22-0.40) and 40.7% (0.31-0.50) respectively. 51.2% (0.41-0.60) of patients had both depression and anxiety. However, when borderline cases (HADS score 8-10) were excluded, both depression and anxiety were present in 19% (0.12-0.27) of patients. The prevalence and characteristics of patients with depression and anxiety are presented in Table 2. Obese individuals were more likely to have depression compared to those individuals with a normal weight (OR 5.7; 95% CI, 1.2-25.5) [Table 3]. The odds of anxiety were higher in patients with dyslipidemia (OR 5.3; 95% CI, 1.9-14.3) compared to those with absence of dyslipidemia (Table 3). The relationship between physical activity and depression/ anxiety is shown in Figure 1. Patients with low levels of physical activity had a higher prevalence of depression and anxiety ($p < 0.05$). A similar relationship was not observed in those with moderate and high levels of physical activity. Patients with depression demonstrated a worse quality of life compared to those without depression in all domains measured by the SF-36 questionnaire (Figure 2). Among patients with anxiety, quality of life was worse in four out of the eight domains (physical functioning, vitality, mental health and general health measured by the SF-36 questionnaire (Figure 2).

DISCUSSION

Psychiatric co-morbidity in the form of depression and anxiety is not uncommon in patients with CAD. The INTERHEART study results have drawn attention to the role of psychosocial factors in CAD(14). Several studies have demonstrated that depression and anxiety are associated with worse outcomes in CAD patients(15–18). These factors may be even more prevalent in patients referred for CABG surgery given the severity of CAD and the anticipated major surgery. This makes identification of depression and anxiety in these patients an essential part of preoperative evaluation. To our knowledge, the present study is the largest Indian study of psychiatric co-morbidity in patients undergoing CABG.

The prevalence of depression and anxiety in our population was 70.5% and 64.6% respectively. Even after exclusion of borderline cases, the prevalence of depression and anxiety remained high at 31.3% and 40.7% respectively. Interestingly, 19% of patients were found to have both depression and anxiety, even after the exclusion of borderline cases. Previous studies have evaluated depression and anxiety in patients being referred for CABG surgery. Different questionnaires which are self-reported by the patient have been used for this purpose(10,19–22). These questionnaires have variable sensitivity and specificity(23). Pirraglia and colleagues studied 237 patients undergoing CABG surgery and found the prevalence of pre-operative depression to be 43.1%. Similarly, other studies have shown a prevalence of pre-operative depression ranging from 27 to 47%(24,25). Pre-operative anxiety has also been evaluated in patients undergoing CABG. Out of 142 patients undergoing CABG surgery, Krannich et al. found preoperative anxiety in 34% of patients(26). Younger patients had more anxiety compared to older patients and showed a decline in symptoms following surgery, in contrast to older patients who did not demonstrate a similar change. In a study of 172 patients, Gallagher et al. reported anxiety in 40.6% patients(27). Data from India on preoperative anxiety and depression is scant. In a small study by Chaudhury et al. from a tertiary hospital in India, preoperative anxiety and depression was reported in 43.3% and 30% before CABG surgery(28). These numbers indicate a significant burden of depression and anxiety in patients undergoing CABG.

Preoperative anxiety and depression are not limited to CABG surgery alone and are frequently diagnosed in

patients undergoing elective non-cardiac surgery. Using HADS, Kuzminskaitė and colleagues demonstrated preoperative anxiety in 12.6% of patients undergoing elective non-cardiac surgery(29). The burden of multiple chronic risk factors and previous acute coronary syndromes in a large proportion of patients undergoing CABG surgery may place this subset of patients at a relatively higher risk of preoperative anxiety and depression compared to patients undergoing non-cardiac surgery. Most studies evaluating preoperative anxiety have administered questionnaires on the preoperative day(30,31). Procedure related anxiety related to impending surgery may theoretically be highest on the day preceding surgery. In the present study however, the questionnaires were administered two to seven days prior to elective CABG surgery.

Depressed patients were found to have a worse quality of life compared to those without depression in our study. This was true for all domains measured by the SF-36 questionnaire. We also found that patients with anxiety had a worse quality of life compared to those without anxiety, in the domains of physical functioning, vitality, mental health and general health. Our findings are in agreement with existing literature. In a large study of 1282 patients with stable CAD, Spertus and colleagues found that co-morbid depression was associated with a worse angina-specific functional status, more frequent anginal episodes and a worse quality of life(24). Similar results were demonstrated by Ruo et al., who showed that depressive symptoms were associated with a greater symptom burden, worse health-related quality of life (HRQOL), greater physical limitation and poorer overall health(33). It has been demonstrated previously that depression predicted poor functional improvement after CABG surgery compared to traditional measures of cardiovascular disease severity(34).

We also found that patients with low levels of physical activity were more often depressed and anxious. This was not the case in those with moderate and high levels of physical activity. Patients with multivessel CAD referred for CABG surgery often have limitation of moderate and high levels of physical activity on account of exercise limiting angina. A large proportion of these patients are therefore condemned to low levels of physical activity. The additional burden of psychiatric co-morbidity in the form of depression and anxiety in these patients is associated with worse outcomes if left untreated(35,36).

Preoperative depression and anxiety have been demonstrated previously to increase post-operative morbidity following CABG surgery(6–9,37). Preoperative identification of these patients allows maximization of efforts towards the treatment of depression and anxiety. Early interventions aimed at treatment of these disorders have been associated with a reduction in length of hospital stay, analgesic use, and postsurgical morbidity(38–41). Treatment measures not only include non-pharmacologic measures such as cognitive behavior therapy (CBT) but also pharmacologic therapy in some of these patients. Although, psychosocial interventions constitute an essential component of cardiac rehabilitation programs, patients with depression and anxiety may not be sufficiently motivated to actively take part or continue with these programs in the post-operative period(42). Early identification and treatment of co-morbid depression and anxiety is therefore essential towards improving outcomes post-CABG surgery.

There are a few limitations of our study. Our study included a small number of patients. Since the data was from a single tertiary center, it may not be reflective of the wider population of CAD patients undergoing CABG. Most of the study participants were male patients. Female patients constituted only a small proportion of the study population. This is important because depression and anxiety in patients with cardiovascular disease has been known to affect women more than men(43). Data on income status and pill burden was not collected from the study participants. These factors may have had a bearing on the HADS scores. In the present study we did not follow up patients after CABG surgery. Therefore, the impact of successful CABG surgery on HADS scores could not be assessed.

In conclusion, we found a significant prevalence of anxiety and depression in patients undergoing CABG surgery. In addition, depression and anxiety were associated with a worse quality of life in these patients. There was a high prevalence of depression and anxiety among patients with low level of physical activity who were referred for CABG surgery. It is important to evaluate patients undergoing CABG for co-morbid depression and anxiety. Pre-operative identification of depression and anxiety allows focused efforts to be directed towards treating these disorders, which if untreated have been associated with worse postoperative

outcomes.

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