

## Mental Health and Depression after Coronary Artery Bypass Graft

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Article information	Abstract
<p>Article history: Received: 3 Oct 2013 Accepted: 20 Dec 2013 Available online: 20 Apr 2014 ZJRMS 2014 Oct; 16(Suppl 1): 50-54</p> <p>Keywords: Depression Mental health Coronary artery bypass graft surgery Ischemic heart disease</p> <p>*Corresponding author at: Department of Psychiatry; Zahedan University of Medical Sciences, Zahedan, Iran. E-mail: kianpoor@zaums.ac.ir</p>	<p><b>Background:</b> Mental health of those with ischemic heart disease (IHD) has been a focus of attention of researchers since it has always been considered as a psychosomatic disorder. The present study was designed to investigate mental health status of a group of patients before and after coronary artery bypass graft (CABG).</p> <p><b>Materials and Methods:</b> In this longitudinal descriptive study 63 candidates for CABG, referred by cardiologist and cardiac surgeon in a 6 month period were asked to take part in the study if they didn't have any exclusion criteria. The patients were the out-patients of cardiac clinics in Shiraz, Iran. The patients were assessed by general health questionnaire (GHQ-28) and beck depression inventory (BDI) at 3 phases, before surgery, 1 month after surgery and three months after surgery.</p> <p><b>Results:</b> The analysis did not show significant statistical change in GHQ-28 and BDI measures before and after CABG. There were statistically significant differences in the mentioned measures between male and female participants in initial assessment, i.e., women scores were higher than men in distress scores measured by GHQ-28 and BDI.</p> <p><b>Conclusion:</b> In our study, we observed no statistically significant differences between pre and post operation in general health and depression scales. However women showed higher degrees of depressed mood at any step of assessment.</p> <p>Copyright © 2014 Zahedan University of Medical Sciences. All rights reserved.</p>

## Introduction

The reciprocal relationship of emotional problem, especially depression and cardiovascular disease is a fact accepted since years ago by authors [1, 2]. Against the generally accepted truth that personality type A has been known as a risk factor for ischemic heart disease (IHD) lies the reasonable agreement that heart attack could be a traumatic experience for many people. It is a signal of unsafe life and death and may lead to prolong insecurity feeling. When person's life is threatened, there will be the possibility of changes in person's perceptions of life and death and produce high alert signal conveying mortality. Sense of shortening of life may make one prone to depression [3-5]. In this condition almost all people seeking specialized medical help and many of them become candidates for coronary artery bypass graft (CABG). Although it has been shown that the patients' health-related quality of life improve after CABG [6], operated patients are faced with many physical and emotional problems including post operation complications, anticipating the recuperation, and relative disability. All these problems may relate to depression in different ways. In addition, depression can affect the heart rhythm and blood pressure through autonomic nervous system and it has some effects on clot formation through activation of platelet. Depression changes the cortisol level and this makes the patient susceptible to atherosclerosis resulted from defects in the endothelium of vessels. Combination of these factors can create serious

complications for the patient who has already suffering from vascular vulnerabilities. It has been reported that 50% of those who were depressed before surgery, suffered from depression 1 month after surgery, and these patients might be at higher risk of heart failure and mortality after CABG [7-10]. Hence the diagnosis of depression before or after CABG may predict negative deteriorated outcome [11].

Contrary to expectations of patients and physicians, some studies show CABG per se does not cause changes in mental health and depression. In a report published by the Johns Hopkins medical institute, only 12 new cases of depression were diagnosed among 124 patients who had CABG [12]. Meanwhile in an authorized report by Timberlake study the rate of pre-operation depression was reported up to 37% and post-operation rates reached to 44% and 42% at 8 week and 12 month follow-ups respectively [13].

However comorbidity of depression and CABG is a controversial issue among physician and surgeons and may be regarded as a factor in estimation of long-term mortality rate in CABG [14]. It is a general agreement that patients with moderate to severe depression have a higher mortality rate than those who are not depressed [15, 16]. As it was declared, it has been shown that there is a two-sided relationship between depression and cardiac status, so there is the possibility that with and without depression, cardiac complications of CABG may

vary [17]. Because of controversial findings in CABG on mental health of patients this study was designed. The aim of the present study was to investigate mental health and depression in a group of Iranian patients, who were candidate of CABG before and after surgery.

## Materials and Methods

The sample of this prospective descriptive study was selected simply from the available candidates coming consecutively for CABG to cardiac surgery clinic and had inclusion criteria and lacked exclusion criteria. In this way of sampling, eighty candidates for CABG, referred by cardiology clinics of affiliated Namazi hospital of Shiraz University of medical sciences were requested to take part in the study. To encourage the patients to cooperate, the aims and importance of the study were clearly explained to them. The request and a written consent form describing the aim of study and investigators commitment about the privacy of information received from the patients were read and signed by them. The data were collected by a trained and experienced psychologist from June to December 2007.

Inclusion criteria were as follows: Elective type of CABG; signing a written consent form; ability to read and write (to fill in the questionnaire).

Exclusion criteria consist of positive history of endocrine, metabolic or neurologic disorders, emergency CABG, previous CABG, positive history of a depressive disorder based on patient's biography and self report.

The measures include: Beck depression inventory (BDI); a 21-item questionnaire which is widely used for assessment of depression in psychiatry or secondary depression in medicine and represents depressed mood in a Likert scoring system. This self report questionnaire has a range of total scores zero to 63, i.e., higher scores represent more depressed mood. The Persian version of BDI showed high level of internal consistency and test-retest reliability in Iranian samples [18]. Correlation coefficient of BDI and Hamilton depression scale has been reported about 66% in an Iranian sample [18]. The general health questionnaire (GHQ-28) was utilized for evaluation of general mental health level of subjects. This questionnaire is a self-administered screening questionnaire designed by Goldberg and Williams [19]. This test is designed for identification of mental disorders (excluding psychoses). The questionnaire consists of 4 subscales including: perceived physical health, anxiety, social functioning and depressed mood. This test evaluates mental health in general and a cut-off point equal or over 23 is considered to screen those who need psychiatric interventions. The questionnaire has an index which determines which one of the people requires psychiatric interventions. The GHQ-28 had been used in a wide range studies in Iran as well as other nations and had shown satisfactory reliability and validity [20, 21]. It has a Likert scoring system (0, 1, 2 and 3), and the scores can vary between zero to 84, i.e., higher score represent poorer mental health. A demographic fill in questionnaire

was also employed for recoding data such as age, gender, education, marital status, medication and history of depression. All patients were evaluated at about a week before surgery, 1 month after surgery and 3 months later on.

Data were analyzed using SPSS-11.5 software. Descriptive statistics was used for demographic data and percentages, inferential statistics for comparing dependent variables were utilized by using Repeated Measure Analysis of Variance.

## Results

Initially 80 patients were enrolled in the study. The final analysis was carried out on data of 63 individuals (17 cases were dropped from analysis due to unavailability). Among the participants 22 individuals (34.9%) were females and 41 (64.1%) were males. The Mean $\pm$ SD age of females was 57.6 $\pm$ 8.23 and 54.9 $\pm$ 6.46 years for men. The mean $\pm$ SD years of formal education for women was 6 $\pm$ 2.54 and 6.46 $\pm$ 2.69 for males. Seventeen people out of total number of subjects were unemployed and 46 ones had a pay duty job. Out of total number of subjects, 28 persons (44.4%) had a history of regular smoking. Also, 6 persons (9.50%) reported addiction to narcotics. Hypertension history was reported by 12.7% of the subjects. Beta blocker agents were used by 58.7%. Only 3.2% of participants reported using antidepressants and anti-anxiety medications.

Data were analyzed using repeated measure analysis of variance. In this method, dependent variables were 3 times evaluation and 2 types of total scores of BDI and GHQ. Independent variable was gender (female/male). Age by years and years of formal education variables were used as co-variance. Table 1 shows the mean $\pm$ SD of depression and general health tests scores.

This result of analysis revealed that years of age had significant effect on the measure scores ( $p=0.008$ ), but the years of formal education did not affect the test scores. It is noteworthy that by inserting the years of age as co-variance, its effect on test scores and results can be controlled or moderated. The results also showed that test scores measured at three episodes of assessment had no statistically significant difference. A statistically significant differences were found in scores between subjects (males and females) ( $p=0.01$ ). Table 1 shows higher scores in females for depression and general health measures in contrast to those for male participants. The interaction of gender and episodes of assessments and also the interaction of gender, episodes of assessment and 2 types of measures (GHQ-28 and BID) showed no statistical significant effect. These findings reveal that females represented higher scores than men in 2 tests measuring general health and depression at any steps of assessment. In general females had higher degrees of depressed mood and lower general health condition than men. In addition no significant difference was observed in the scores before operation, one and three months after operation in male and female participants.

**Table 1.** The results of post-hoc test (LSD) in aerobic dancing group in three phrases

Test group	Before operation (Mean±SD)	BDI Score		Before operation (Mean±SD)	GHQ Score	
		1 month after operation (Mean±SD)	3 month after operation (Mean±SD)		1 month after operation (Mean±SD)	3 month after operation (Mean±SD)
Female	13.4±9.27	15.9±12.56	13.2±13.71	28±13.86	31.7±17.94	25.6±16.07
Male	8.88±7.94	12.2±10.06	9.10±8.94	21.5±13.02	22±11	19.4±11.82
Total	10.5±8.63	13.5±11.04	10.5±10.91	23.8±13.58	25.4±14.44	21.6±13.66

BDI: Beck Depression Inventory; GHQ: General Health Questionnaire; SD: Standard Deviation

**Table 2.** Mean and standard deviation of subscale score of general health questionnaire (GHQ) according to gender

		Female	Male	Total
Physical symptom	Before sx (Mean±SD)	8.91±4.56	6.8±3.87	7.54±4.21
	1 month after sx (Mean±SD)	7.82±4.88	6.05±3.28	6.67±3.97
	3 month after sx (Mean±SD)	7.36±5.31	5.9±4.11	6.41±4.58
Anxiety	Before sx (Mean±SD)	7.27±6.00	5.32±4.97	6.00±5.39
	1 month after sx (Mean±SD)	8.45±6.26	5.73±5.08	6.68±5.63
	3 month after sx (Mean±SD)	6.14±5.41	4.05±4.22	4.78±4.73
Social function	Before sx (Mean±SD)	8.95±2.85	8.07±2.61	8.38±2.7
	1 month after sx (Mean±SD)	10.4±4.34	8.54±2.69	9.19±3.44
	3 month after sx (Mean±SD)	8.59±2.51	8.02±2.60	8.22±2.56
Depression	Before sx (Mean±SD)	2.91±4.23	1.29±3.77	1.86±3.98
	1 month after sx (Mean±SD)	5.00±6.25	1.73±2.30	3.87±4.37
	3 month after sx (Mean±SD)	3.54±5.21	1.39±2.85	2.14±3.94

Sx: Surgery

Regarding the importance of issues related to these scales and their associated difference of scores at pre and post operation phases, a statistical analysis was utilized for subscales of GHQ-28 (i.e., perceived physical health, anxiety, social functioning and depression). A repeated measure analysis of variance for 3 episodes of assessments using age and years of education as co-variances was carried out. Table 2 shows the mean±standard deviation of the scores of GHQ in 3 times of evaluation in men and women.

The results showed no effect of age and education on the scores. The interaction of episodes of assessment and GHQ-28 subscales' scores were not significant. The scores of subscales for males and females were different ( $p=0.004$ ). Table 2 shows that anxiety of perceived physical health before and after surgery, has a bit reduction, whereas, the scores of anxiety, social function and depression show a bit increase 1 month after operation and again reduce 3 months after operation. Table 2 shows higher scores for females than males in all scores of GHQ in all three episodes of assessments.

## Discussion

The results of this study show no significant difference in the mean of general health and depression tests scores in 3 times of evaluations, indicating no increase in the rate of post operation depression compared with pre-operation state which agrees with previous reports [3]. In a study conducted on 72 patients of coronary by-pass, the rate of depression were 49.2% and 26.7%, respectively in 2 steps of pre-operation and 6 months after operation using BDI. Despite reduction of depression, larger numbers of depressed patients could not return to their routine work compared with non-depressed ones or suffered from

complications, such as hypertension [22]. Thomson et al. on the other hand found that the patients' health-related quality of life improved 4 month after CABG [6]. In a similar study, there were more depressed patients, but recovery was occurred in 3 months after surgery [23]. In the contrast to these reports the present study showed that the scores of females were higher than males for both depression and general health measure indices and this finding was consistent over all 3 episodes of assessments. The female participants were more depressed and had lower general health condition in contrast to male participants. This finding is consistent with the elevated level of depression and anxiety in female compared with males in general population. This finding may be due to mood problems in their middle age stage [24] that has been aggravated by a life threatening event i.e., coronary heart disease.

Finally with regards to the reports indicating the probability of lasting post-operation depression [25] and increased consequences of cardiac complications, even with the presence of minor depression [26], it could be mentioned that different types of depression can be considered as a risk factor for complications caused by coronary atherosclerosis [27].

Factors that may influence the finding of lack of elevation in depression level in the present study include: exclusion of patients with endocrine, major or chronic disease. These potentially chronic diseases can cause negative feelings of ineffectiveness and depression, complicating heart disease and induce special complications. Exclusion of patients experienced depression in their medical history, because of the probability of post-operation depression increases in patients with mood disorder history. In spite of evidences indicating the relationship of individual awareness about

the need of cardiac surgery with increase of depressive symptoms, which are known clinically and statistically important in some studies [28], it is probable that fear and anxiety from heart disease have been reduced due to facilitation and availability of diagnostic and treatment programs, prevalence of necessary surgeries which are associated with survival rate, applying proper treatment methods helping patients before the disease becomes chronic and traumatic and finally, before surgery patients might have remarkable psychological stress that faded out after operation [29, 30]. In other words, surgery provides the chance of improving mood status of the patients through increasing living hope. This study also excluded patients who are candidate for emergency CABG. Emergency candidate for CABG may have different mental health condition. Future research in the field on these patients may find different results.

In the present study, compared with pre-operation, no statistically significant post-operation increase of depression rate was observed, but due to the clinical importance of depression in the development of complications of coronary artery disease and related surgeries [7-10], particularly in patients with emergency CABG, psychiatric evaluation seems to be important.

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Also, attention should be drawn on the effects of diseases associated with coronary atherosclerosis in female patients for having higher degrees of depression and poorer mental health condition in general and particularly in non-emergency CABG condition.

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## Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

## Conflict of Interest

The authors declare no conflict of interest.

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