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Depression after CABG: a prospective study

Depressão após revascularização do miocárdio: um estudo prospectivo

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Abstract

Introduction: **Depression during or shortly after hospitalization elevated two to three times the risk of mortality or nonfatal cardiac events, significantly increasing the morbidity and mortality of these patients.**

Objective: **To assess the impact of revascularization on symptoms of depression in patients with coronary artery disease.**

Methods: **A prospective cohort study of 57 patients of both sexes undergoing coronary artery bypass grafting between June 2010 and June 2011. We used the SF-36 to assess quality of life, and the Beck Depression Inventory to detect depressive symptoms, applied preoperatively and six months.**

Results: **The prevalence of patients aged 60-69 years was 22 patients (38.60%), 39 men (68.42%), 26 described themselves as mixed race (45.61%), 16 literate (28.07 %) and 30 married (52.63%). The beck depression inventory score demonstrated increased after revascularization: 15 patients mild (26.32%) at time zero to 17 (29.82%) after. And with moderate, seven patients (12.28%) before and 10 (17.54%) after. In the categories of individuals with decreased minimum degree of 32 (56.14%) to 28 (49.12%), and severe of three (5.26%) for two (3.51%) patients. Association was observed between beck depression inventory, gender, age, lifestyle, comorbidities and quality of life.**

Conclusion: **There was a high prevalence of elevated beck depression inventory scores, lowest scores of depressive symptoms among men and association between the improvement of quality of life scores and beck depression inventory.**

Descriptors: **Myocardial revascularization. Depression. Quality of life.**

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Abbreviations, acronyms & symbols	
BDI	Beck Depression Inventory
CABG	Coronary artery bypass grafting
CAD	Coronary artery disease
CVD	Cardiovascular disease
MR	Myocardial revascularization
QOL	Quality of life
WHO	World Health Organization

Resumo

Introdução: **A depressão durante ou logo após a hospitalização, eleva duas a três vezes o risco de mortalidade ou eventos cardíacos não-fatais, aumentando sensivelmente a morbimortalidade desses pacientes.**

Objetivo: **Avaliar o impacto da revascularização do miocárdio nos sintomas de depressão de pacientes portadores de doença arterial coronariana.**

Métodos: **Estudo de coorte prospectivo de 57 pacientes de ambos os sexos, submetidos à revascularização do miocárdio, entre junho de 2010 e junho de 2011. Foram utilizados os questionários SF-36 para avaliar a qualidade de vida, e o Inventário de Depressão Beck para detectar sintomas depressivos, aplicados no pré-operatório e após seis meses.**

Resultados: **A prevalência de pacientes na faixa etária de 60 a 69 anos foi de 22 (38,60%) pacientes, 39 (68,42%) homens, 26(45,61%) autodeclarados pardos, 16 (28,07%) alfabetizados e 30 (52,63%) casados. O escore Inventário de Depressão Beck demonstrou aumento após a revascularização de 15 (26,32%) pacientes em grau leve no momento zero para 17 (29,82%) após. E com grau moderado, sete (12,28%) pacientes antes e 10 (17,54%) após. Nas categorias de indivíduos com grau mínimo houve redução de 32 (56,14%) para 28 (49,12%) e grave de três (5,26%) para dois (3,51%) pacientes. Observou-se associação entre Inventário de Depressão Beck, sexo, idade, estilo de vida, comorbidades e a qualidade vida.**

Conclusão: **Observou-se elevada prevalência de escores elevados de inventário de depressão Beck, piores escores de sintomas depressivos entre homens e associação entre a melhoria dos escores de qualidade de vida e o Inventário de Depressão Beck.**

Descritores: **Revascularização miocárdica. Depressão. Qualidade de vida.**

INTRODUCTION

The WHO [1] cites cardiovascular disease (CVD) and depression as the most two debilitating and costly conditions in the health context, and these chronic diseases are among the diseases of greatest impact on quality of life (QOL) of the individual. The projections for 2020 remain CVD as the leading cause of death and disability, and currently developing regions contribute most strongly to the burden of these diseases than developed regions [2]. In Brazil, it is estimated that CVD accounts for over 30% of deaths from the 20 years-old subjects [3,4].

It is well known the association between depression and CVD. Furthermore, it has been given its impact on outcome of patients hospitalized for acute coronary disease, as well as pre- and postoperative of myocardial revascularization (MR) [5].

The presence of depressive symptoms during or shortly after hospitalization increases by two to three times the risk of mortality or nonfatal cardiac events, significantly increasing the morbidity and mortality of these patients [6-11].

As one of the treatments of CVD, CABG surgery is indicated for patients with angina not controlled with medical therapy and for patients with high-grade obstruction of major arteries, meaning the risk of life [12]. About 60% of CVD patients with multivascular indication for surgery may technically be treated by RM [13]. MRI aims to improve the quality of life of patients, relieving symptoms of angina, restoring physical capacity, and increasing their survival [14].

Thus, CABG surgery is an effective intervention for the treatment of symptoms of CVD, prevention of myocardial infarction and reduction of mortality. Furthermore, several studies have shown improvement in both the physical and mental aspect, as well as the overall health status of patients undergoing this intervention providing them best prognosis [15-19].

Due to the importance of coronary artery disease and depression as a public health problem as well as the paucity of information on the topic in our region, this study assessed the impact of coronary artery bypass grafting on quality of life, as well as the prevalence of depressive symptoms in patients with Coronary Artery Disease, at the President Dutra University Hospital (HUUFMA), a reference hospital of the state of Maranhão, in the city of São Luís, aiming at filling this knowledge gap.

METHODS

It was a prospective analytical cohort study, developed at the Presidente Dutra University Hospital in São Luís, Maranhão.

The study included patients between 39 and 80 years of age, of both genders, with CVD referred for isolated CABG surgery who agreed to participate by signing the written informed consent form. Patients with depression under antidepressant use during psychotherapy or other psychiatric disorders that impede comprehension and communication during the interview were not included. There are also not included patients with unstable angina that required emergency surgery, those with compromised ventricular function and those who refused to sign the consent form.

We consecutively assessed 57 patients between June 2010 and June 2011 who underwent isolated CABG surgery. Two

patients progressed to death after three months of RM, and were excluded from the analysis.

The information was obtained through individual interviews performed preoperatively and by telephone after discharge with six months of MRI follow-up.

The instruments used in the research were the Beck Depression Inventory (BDI). Data were collected during visits on weekdays and times (morning, afternoon and evening).

The first stage, in preoperative, was composed of an interview to assess the clinical and socio-demographic profile, followed by the application of the Beck Depression Inventory (BDI). In the second stage of postoperative, at the sixth month, BDI was applied by telephone.

A unique score for each question on the SF-36 was used to evaluate the results, which were transformed into a scale from zero to one hundred, whose low numerical score (less than 50) reflected poor health perception, while a high numerical score (greater than or equal to 50) showed a good awareness of preserved health [20].

For the assessment of depressive symptoms the nosologic criteria used for the Portuguese version were those from the ICD-10 [21] and diagnosis by [21] DSM-IV. In the 1993 edition, different cut-off points have been suggested to assess the intensity of depressive symptoms in depressed psychiatric diagnoses: 09 degree minimum; 10-16, mild; 17-29, moderate; 30-63, severe [21].

The variables: gender, age in years, self-reported color (white, brown and black), marital status (single, married, stable, separated and widowed), education (illiterate, literate, elementary school, middle school, and higher family income, considered the current minimum wage of R$ 545,00 according to the Ministry of Labour and Employment [22].

It was also investigated the self-reported current or previous practice of smoking and drinking.

For preparation of the database we used Office Excel 2010. Data were expressed as frequencies (absolute and relative) for categorical variables and mean and standard deviation for continuous variables.

To compare the BDI score before and after, with the population being its own control, we applied the Wilcoxon test for paired samples. To verify the association from the frequency distribution of the categories of BDI score in relation to sociodemographic variables and lifestyle, we applied the ChiSquare test. To verify the relationship between the average of SF-36 compared to the BDI score, ANOVA test was used for parametric variables and Kruskal Wallis test for nonparametric variables, and later was applied post hoc Bonferroni.

Variables were diagnosed as normal by the Shapiro Wilk test. We used Stata® statistical software (version 12). For the interpretation of the statistical results in all tables and tests the level of significance was alpha lower than 0.05.

The study was approved by the Research Ethics Committee of the University Hospital of the Federal University of Maranhão, in the session of the day 19/02/2010 (No. 005 311/20090), meeting the fundamental and complementary requirements of Resolution 196/96 according the National Council of Health/MH under Opinion No. 112/09 and the CEP Registration No. 237/09.

RESULTS

This study included the evaluation of 57 patients, of which 22 assessed (38.60%) were aged 60-69 years. There was a predominance of men in the sample, 39 (68.42%), individuals who declared themselves browns, 26 (45.61%), literate, 16 (28.07%) married, 30 (52.63%) and monthly income less than minimum wage, 31 (54.39%) (Table 1).

By analyzing the distribution of the BDI in zero-six times (Table 2), it was noted increased six months after revascularization in the frequency of individuals with mild depressive symptoms (score 10 - 16), 15 (26.32%) at time 0 to 17 (29.82%) and moderate depressive symptoms (score 17 to 29), seven (12.28%) before and 10 (17.54%) after. In the categories of individuals with minimal depressive symptoms

Table 1. Characterization sample of subjects undergoing CABG at different time points. São Luís - MA, 2013.

Sociodemographic variables	n	%
Sex		
Male	39	68.42
Female	18	31.58
Age (years)		
40 to 49	11	19.30
50 to 59	18	31.58
60 to 69	22	38.60
70 to 79	6	10.53
Self-reported race		
Caucasian	16	28.07
Brown	26	45.61
Black	15	26.32
Education		
Illiterate	11	19.30
Literate	16	28.07
Fundamental	14	24.56
Average	10	17.54
Upper	6	10.53
Marital status		
Single	6	10.53
Married	30	52.63
Stable	12	21.03
Widower	8	14.04
Separate	1	1.75
Income		
<1 salary	31	54.39
1 to 2 wages	19	33.33
2 to 3 wages	3	5.26
3 to 4 wages	4	7.75
Total	57	100

Table 2. Frequencies of distribution of depressive symptoms using the test Wilcoxon in patients undergoing coronary artery bypass grafting at different time points. São Luís - MA, 2013.

BDI score	Frequency evaluated according Moments assessment (months)		*P* value
	0	6	0 x 6
0 to 9[1]	32 (56.14)	28 (49.12)	0.1666
10 to 16[2]	15 (26.32)	17 (29.82)	
17 to 29[3]	7 (12.28)	10 (17.54)	
30 to 63[4]	3 (5.26)	2 (3.51)	
Total	57 (100)	57 (100)	

[1]Minimum degree; [2]Mild; [3]Moderate; [4]Severe.

Table 3. Association through the Chi-Square between depressive symptoms, gender, age, lifestyle, and comorbidities. São Luís - MA, 2013.

Variables	Total	BDI Score				*P* value
	n (%)	0-9	10-16	17-29	30-63	
Sex						0.003
Male	39 (68.42)	13 (46.43)	15 (88.24)	10 (100)	1 (50)	
Female	18 (31.58)	15 (53.57)	2 (11.76)	—	1 (50)	
Age (years)						0.958
42-52	11 (19.29)	5 (17.86)	3 (17.65)	2 (20)	1 (50)	
53-63	18 (31.58)	8 (28.57)	6 (35.29)	3 (30)	1 (50)	
64-74	22 (38.58)	11 (39.29)	7 (41.18)	4 (40)	—	
75 to 85	6 (10.55)	4 (14.29)	1 (5.88)	1 (10)	—	
Lifestyle						0.026
Smoking	35 (61.40)	12 (42.86)	13 (76.47)	9 (90)	1 (50)	
Alcoholism	30 (52.63)	13 (46.43)	12 (70.59)	4 (40)	1 (50)	
Comorbidity						0.479
SH[1]	45 (78.94)	23 (81.14)	11 (64.71)	9 (90)	2 (100)	
DM[2]	27 (47.36)	12 (42.86)	8 (47.06)	5 (50)	2 (100)	
TOTAL	57.00 (100)	28 (49.12)	17 (29.82)	10 (17.54)	2 (3.51)	

1 - Systemic Hypertension; 2 - diabetes mellitus.

(score 0 – 9) and severe (score 30-63) there was reduction, 32 (56 14%) to 28 (49 12%) and three (5.26%) to two (3.51%), respectively (Table 2). Were not found for these associations statistically significant differences ($P>0.05$).

We noted in Table 3 the association between symptoms of depression, gender, age, quality of life, lifestyle and comorbidities. With regard to gender we could verify that women prevailed with a minimal degree of the BDI, 15 (53.57%) and men prevailed in the mild and moderate, 15 (88.24%) and 10 100.00%), respectively. With respect to severe, there was one individual (50.00%) for each gender ($P=0.003$).

The age group 64 – 74 years is more common in minimal BDI degrees, 11 (39.29%), mild, 7 (41.18%) and moderate, 4 (40.00%). For ages ranging from 42 to 52 years old versus 53 to 63 years old prevailed with severe grade one (50.00%) each ($P=0.958$).

Smokers accounted for 12 (42.86%), 13 (76.47%), nine (90.00%) and one (50.00%), respectively of minimum degree, mild, moderate and severe BDI ($P=0.026$). Drinkers accounted for 13 (46.43%), 12 (70.59%), four (40.00%) and one (50.00%) respectively of the score ranges of minimal, mild, moderate and severe BDI ($P=0.026$).

Among hypertensive we noted that 23 (81.14%), 11 (64.71%), nine (90.00%) and two (100.00%) comprised, respectively, the minimum degree, mild, moderate and severe depressive symptoms. As diabetics accounted for 12 (42.86%) minimum degree, 8 (47.06%) mild, 5 (50.00%) moderate and 2 (100.00%) severe ($P=0.479$).

In the analysis of the association between the BDI and the quality of life (QOL), it was noted that the score for functional capacity ranged from 7.50±10.60 to 71,78±26,43, with statistical significance between categories of symptoms depression: minimal, moderate and severe (P=0.0001). The physical domain of the SF-36 showed variation of 7.35 ± 24.62 to 24.10 ± 39.95 ($P=0.3327$), being the minimum degree of depressive symptoms in the category with the lowest score. The pain domain ranged from 42.75±23.78 to 67.64±26.41 in the association between categories of symptoms of minimal and moderate depression ($P=0.0258$).

On health aspect there was variation of 32.50±10.60 to 64.28±19.17 ($P=0.0315$). The vitality ranged from 27.50±3,53 to 71.14 ± 17.63 with all tracks association between symptoms of depression. The social domain was 25.00 ± 35.35 to 82.50

Table 4. Analysis of variance (ANOVA) between the BDI score and quality of life of patients undergoing myocardial revascularization. São Luís - MA, 2013.

Variables		CF	FIS	DOR	SAUD	VITAL	SOC	EMO	MEN
BDI									
0 – 9[1]	M*	71.78[a]	24.10	67.64[a]	64.28	71.14[a]	82.50[a]	64.58[a]	67.85
	Sd**	26.43	39.95	26.41	19.17	17.63	19.44	43.48	19.61
10 – 16[2]	M	51.76	7.35	52.47	52.76	55.88[a]	64.70	21.56[a]	60.47
	Sd	30.81	24.62	20.97	16.33	12.02	21.75	38.98	11.12
17 – 29[3]	M	32.00[a]	12.50	42.75[a]	56.50	52.00[a]	56.25[a]	16.66[a]	63.40
	Sd	20.43	21.24	23.78	13.99	13.78	28.41	32.39	7.89
30 – 63[4]	M	7.50[a]	—	43.5	32.50	27.50[a]	25.00[a]	16.66	32.00
	Sd	10.60		3.53	10.60	3.53	35.35	23.56	0.00
F		8.26	1.16	3.35	3.17	9.03	7.24	6.02	3.65
P value		0.0001	0.3327	0.0258	0.0315	0.0001	0.0004	0.0013	0.0131

*[a] Equal letters within the same column indicate differences between the means; *Mean; **Standard Deviation; [1]Minimum degree; [2]Mild; [3]Moderate; [4]Severe.*
(CF) Functional Capacity; (FIS) Physical Appearance; (DOR) Pain; (SAUD) General Health; (VITAL) Vitality, (SOCIAL) Social Aspect; (EMO) Emotional Appearance; (MENTAL) Mental Health

± 19.44, with an association between depressive symptoms of minimum, moderate and severe degrees (*P*=0.0004). The emotional field of the SF-36 ranged from 16.66±32.39 to 64.58±43.48. But the mental aspect ranged from 32.00±0.00 to 67.85±19.61 (*P*=0.0131).

DISCUSSION

The data in Table 1 reveal similarities with the previously available in the literature for patients undergoing coronary artery bypass grafting, where there is a higher prevalence of males, older and under education and underprivileged [23,24]. However, there was disagreement as to the prevalence of brown found in this study, other author [24] reports higher frequencies of caucasians. This last finding should be considered carefully, since Brazil is the country of extreme racial diversity, since each region may be influenced by a colonizing population.

In studies [23] involving depression before and after myocardial revascularization, it was noted outcomes similar to those found in this study, as described in Table 2. The survey showed a reduction in the frequency of individuals with BDI scores representative of minimal symptoms of depression (score 0 – 9) and an increase in the frequencies of any categories of depressive symptoms than or equal to mild (score greater than or equal to 10), 46 (79.30%) vs. 42 (76.40%) and 12 (20.70%) vs. 13 (23.60%), respectively. Moreover, research performed in Cuiabá (MT), Brazil, comparing the quality of life of men and women after coronary artery bypass grafting, noted significant reductions in BDI scores after 180 days of the event, without, however, find statistical significance.

In the association between coronary artery disease (CAD) and depression has been reported as high prevalence (14.00 to 60.00%) [25].

In a study [23] involving depression as a risk factor for early and late morbidity after revascularization, it was verified preoperatively higher frequency of depressive symptoms (20.70%). In hospital discharge this frequency still increased (23.60%) and three months after discharge the level of depression symptoms reduced to 9.8%.

Study [24] also reported lower levels of depressive symptoms in women compared to men after revascularization, as described in Table 3. In another study it was noted [26] higher prevalence of men with BDI scores greater than or equal to 10 (symptoms of mild depression to severe).

The use of tobacco differs in other studies [23], and it was found a high prevalence of smokers, 22 (20.00%) in other [27] study was found a largest number of smokers with some level of depressive symptoms (BDI score ≥ 10).

The number of diabetic patients in this study was different from those in research [23] with an objective similar to ours, where 19 (32.80%) had comorbidity. Diabetes research in São Paulo (Brazil), showed discrete frequency (less than 11.00%) among individuals with depressive symptoms, and hypertension has reached approximately 50.00% between them.

In study [26] performed in the state of São Paulo, Brazil between 2006 and 2008, it was noted an inverse association between depression score and domains: functional, physical, pain, health, vitality, social, emotional and mental health of a score of quality of life after CABG, differing from the findings reported in Table 4. The data refer that after revascularization quality of life tends to be improved and thus depression there seems to be less significant.

Thus, the quality of life in health practices reveals the need

to insert new concepts in relation to the illness and treatment, showing that the impact of new treatments and health care should be assessed in the field of influence on the quality of life among the chronic diseases [27].

Thus, we note that the presence of symptoms of depression has been linked as a worsening factor on the quality of life of these patients; initially the best quality of life is suggested as a strong influence for a lower frequency of depression in this postoperative group [28].

CONCLUSION

We observed a high prevalence of depressive symptoms among those assessed.

There was a reduction in the prevalence rates of depression symptoms after six months of myocardial revascularization without, however, any statistically significant association.

Men seem to have the worst scores of depression (BDI) and there was an association between the improvement of quality of life scores and depressive symptoms.

Thus, future studies are needed with longer follow-up after the surgical event. Being relevant reflection on the improvement in quality of life of patients, considering the aspects of clinical variability, comorbidities, and the physical and emotional aspects, seeking to know the patient's perception about interventions, designed as effective and definitive.

Author's roles & responsibilities	
JKVRS	Authorship and data analysis
JAFN	Advisor and reviewer
RMLS	Copyediting
VLXCC	Literature review and data analysis
FMAMS	Data collection
AFLTH	Paper review
ELCS	Data collection
LMCBR	Data collection

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