Prevalence of Depression and Clinical Anxiety in Patients with Cardiovascular Disease

Pablo Luis Martino[1,*], Juan Pablo Mora-Penagos[2], Soraya Kerbage[3], Mauricio Alejandro Cervigni[4] and José Luis Bonet[5]

[1]*Laboratory of Cognition and Emotion, Faculty of Psychology, National University of Rosario, City of Rosario, Argentina*

[2]*Psychological area in Argentine Red Cross, City of Buenos Aires, Argentina*

[3]*Cardiovascular Rehabilitation Program, Favaloro Foundation, Argentina*

[4]*Laboratory of Cognition and Emotion, Faculty of Psychology, National University of Rosario, City of Rosario, Argentina*

[5]*Stress Center, Favaloro Foundation of Psychology and Medicine, Favaloro University, City of Buenos Aires, Argentina*

Abstract: Depression and Clinical Anxiety predict a worse prognosis for Cardiovascular Disease (CVD). Recent studies warn of high rates of clinical depression and anxiety in patients with CVD. The reported percentages range over a wide range. In order to provide new data on the prevalence of Depression and Clinical Anxiety in CVD, the psychological state of 70 Argentine adults attending a Cardiovascular Rehabilitation Program was surveyed. Two psychological scales were administered: the Beck Anxiety Inventory and the Beck Depression Inventory II. It was observed a 17.1% of participants with probable Major Depressive Disorder and a 27.1% with probable Clinical Anxiety. The results of the current study are in accordance with the percentages reported by previous studies. A significant number of patients presented comorbidity between Clinical Depression and Anxiety. No differences were found by gender. It is recommended that health professionals take into consideration the high prevalence of Clinical Depression and Anxiety in patients with CVD.

Keywords: Psychocardiology, Health Psychology, Cardiovascular Disease, Negative emotions, Psychopathology, Depression, Anxiety.

1. INTRODUCTION

1.1. Cardiovascular Disease and Negative Emotions

Cardiovascular Disease (CVD) is the main cause of death in the world. In 2013 almost a third of all deaths in the world were consequences of the CVD [1]. CVD is the result of the expression of a series of traditional risk factors, among them, diabetes, hypertension, hypercholesterolemia, smoking and obesity [2]. In the past decades there has been an increase in the interest on non traditional cardiovascular risk factors, assigning special importance to emotions. We must to remember that emotions are an ensemble of psychophysiological reaction of an experience during relevant situations from the adaptative point of view, for example menace episodes, changes, lost, success or harm [3]. Emotions are classified in two big groups, the positive and negative emotions, among these last ones, the reaction of anger, fear, anxiety, sadness and depression. Negative emotions are reactions which are characterized by an unpleasant affective experience that have high physiological activation [4]. It is important to clarify that even though negative emotions play an adaptative role, their imbalance, can result in psychopathology, for example the Depression and Clinical Anxiety. Additionally, Depression and Clinical Anxiety have an impact on the CVD favoring not only the outbreak of the first cardiac event [5, 6], but also causing a worst evolution of the CVD [7-9], in an independent way to the traditional cardiovascular risk factors.

2. Prevalence of Depression in the CVD

Depression or Major Depressive Disorder (MDD) is a mental disorder characterized, among other manifestations, by a noticeable decrease mood, loss of ability to feel pleasure, sleep problems, lack of concentration, eating disorders, psychomotor agitation or psychomotor slowness, feelings of despair, culpability and/or thoughts about death [10]. It is estimated that the patient with CVD is especially vulnerable to Depression. It was informed that between the 17% and 27% of the patients with Coronary Artery Disease (CAD) suffer MDD, and that an even larger percentage, show subsyndromal symptomatic depression [11]. A systematic review [12] informed that

*Address correspondence to this author at the CP2000, Riobamba 250 bis, Faculty of Psychology, National University of Rosario, City of Rosario, Argentina; Tel: 5493414819814; Fax: 5493414808523;
E-mail: p.martino@hotmail.com

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the 19.8% of the patients with Acute Myocardial Infarction (AMI) show MDD criteria (1 of every 5 patients), this has been shown after being evaluated through structured interviews, while the prevalence of significative depressive symptoms rise up to 31.3% (considering values ≥ 10 points in Beck's Depression Inventory). As seen, the Depression can be three times more frequent in patients who have experienced AMI in comparison with the general population [12]. At the same time, estimations of Depression in hospitalized patients for unstable angina, angioplasty, bypass surgery and valve surgery, are similar to patients with AMI, showing slightly elevated levels in patients with Congestive Heart Failure diagnosis [13, 14].

1.3. Prevalence of Clinical Anxiety in the CVD

Clinical anxiety (or Anxiety disorder) is characterized by the presence of exacerbated fear, and a state of apprehension and concern that can seriously limit the daily life. Among the people with CVD, the Clinical Anxiety is common, even more than Depression [15]. Around a 20% of the patients with CAD present some Anxiety Disorder [16-19], being the generalized Anxiety Disorder the most frequent one, with a prevalence of even 12% [20]. At the same time, in those studies where it was informed the presence of anxiety symptoms with some degree of clinical relevance through self-report questionnaires, the values of prevalence climbed considerably. For example, 40% of the patients who suffer AMI, showed relevant anxiety symptoms [21], while among the patients with heart failure, those values can raise even to a higher percentage [22].

1.4. Depression and Clinical Anxiety in CVD. Differences between genders

The prevalence of Depression and Clinical Anxiety change regarding the gender. In regard, women show higher risk of Depression than men in a 2:1 proportion [23, 24], as well as a higher risk in Anxiety Disorders in any of its varieties, such as Generalized Anxiety Disorder, Social Phobia, Posttraumatic Stress Disorder, Specific Phobias, Panic Disorder and Obsessive Compulsive Disorder [25]. These differences among sexes endure in CVD patients.

Is important to explore gender differences in Clinical Depression and Anxiety after AMI, because we know previously that women would constitute a significant risk group. A meta analysis reported that the prevalence of MDD in the CVD is two times higher among female patients than among men [26]. At the same time, in regard to coronary event women show more anxiety than men [15]. As we can see, some researchers report that women are more anxious and depressed after an AMI, but other studies, could not find gender differences in Depression and Post AMI Anxiety.

The main objective of the present study consists in identify the prevalence of Depression and Clinical Anxiety in patients with CVD, with the intention of provide precision to the extensive and diffuse range of previously reported percentages.

As a secondary objective, it was to study differences of Depression and Clinical Anxiety between both sexes.

2. MATERIALS AND METHODS

2.1. Design

Descriptive and cross-sectional study.

2.2. Sample

The sample was formed by 70 adults of both sexes with CVD diagnosis, attendants of Cardiovascular Rehabilitation Program, University Hospital Favaloro Foundation, city of Buenos Aires, Argentina.

2.3. Evaluation Tools

2.3.1. Beck Depression Inventory - BDI II [27, 28]

BDI II is a tool of self report, which offers a measurement of the presence and severity of depression. It is formed by 21 indicative items of depression symptoms such as sadness, pleasure loss, failure feelings, guilt, crying, thought or desire of suicide and pessimism. These symptoms match the diagnostic criteria for the Depressive Disorders gathered up in the DSM-IV and ICD-10. Each item offer an answer options of Lickert scale of 4 points regarding the severity symptoms; being 0 a "depression absence", 1 a "mild depression", 2= "moderate depression" and 3= "severe depression". The final punctuation oscillates between a minimum of 0 and a maximum of 63 points. It is considered the higher punctuation as an indicative of higher depression. For its interpretation regarding gravity levels, it has been considered the cut off-point recommended by Sanz, Gutierrez, Gesteira and García-Vera [29]: from 0 to 13 points –minimum depression- ; from 14 to 18 -mild depression-; from 19 to 27 points -moderate depression-; and from 28 to 63 points –severe depression-. As an instrument of screening for the

detection of possible MDD, it has been suggested values equal or higher to 18 [30]. The test presents good internal consistency, showing a alpha coefficient of 0,87 and appropriate validity rates [28].

2.3.2. Beck Anxiety Inventory - BAI [31; 32]

BAI is an instrument of self report which offers a measure of the presence and severity of anxiety. It is formed by 21 indicative items of anxiety symptoms (such as shivering, nervousness, distress feelings, tachycardia, digestive pain and fear of losing control). Each item offers four options of answers in Lickert format in regard the severity of the symptoms, corresponding punctuation 0 to "minimum anxiety", 1 to "mild anxiety", 2 to "moderate anxiety" and 3 to "severe anxiety". The severity of anxiety depends of the total score of the addition of each item which forms de inventory. The final punctuation oscillates between a minimum of 0 and a maximum of 63 points. The higher punctuation represents higher anxiety level. For its interpretation as a qualitative variable it has been suggested the values of the original manual [31], assumed in the subsequent Spanish adaptation [32], for which from 0 to 7 points is indicative of a minimum level of anxiety; from 8 to 15 points (mild anxiety), from 16 to 25 points (moderate anxiety) and from 26 to 63 points (severe anxiety). At the same time, the BAI can be useful as an instrument of screening for the identification of persons with probable Anxiety Disorder, which are people with clinical Anxiety. For that it is suggested a punctuation equal or higher to 12 as indicative of Anxiety Disorder. The diagnostic performance tests report that this cut-off point predicts up to 81% de presence of Anxiety Disorders [33]. The tests have a high internal consistence and good rates of validation in clinical samples as well as in non clinical ones [32].

2.4. Procedure for the Recollection of Data

During 2013 and 2014 coronary patients which assisted the Cardiovascular Rehabilitation Program University Hospital Favaloro Foundation were contacted. After joining the program, each patient was interviewed and asked for their voluntary participation in the investigation. The characteristics of the study were explained as well as the implication of their involvement in it. After informing the consent, two psychological scales were administrated: the BAI and the BDI II. On the other hand, through the access to clinical records, it was found information of sociodemographic variables and of traditional cardiovascular risk factors.

2.5. Data Analysis

The data was filled and processed through a computerized program. It was obtained the statistical descriptive for the sociodemographic (sex and age) variables, traditional cardiovascular risk factors, depression and anxiety. In regard to the quantitative variables it were obtained scales of central tendencies and dispersion, while for the qualitative variables (categorical) it were obtain percentages and frequencies. With the intent of defining the differences of Depression and Clinical Anxiety prevalence for each sex, there were applied mean comparisons. For which, it was analyzed the normality distribution of the punctuation of the BAI and BDI II in men and women. Considering that the punctuations were not normally distributed, it was chosen to compare medians through the application of a non parametric test (Mann Whitney U test). At the same time there were analyzed possible associations between Depression and Clinical Anxiety through contingency tables and chi squared tests. The level of significance was defined in a value of <0.05

3. RESULTS

In the Table **1** can be seen the descriptive statistical for age, sex, and presence or absence of arterial hypertension, dyslipidemia, smoking and diabetes.

Table 1: Characteristics of the Sample. Sociodemographic Variables and Traditional Cardiovascular Risk Factors

	Gender		Age	AH		DSL		SMK		DBT	
	women	men		No	Yes	No	Yes	No	Yes	No	Yes
%	15.7	84.3		45.7	54.3	41.4	58.6	97.1	2.9	78.6	21.4
Mean			60.1								
SD			10.1								

AH=Arterial Hypertension;
DSL=Dyslipidemia;
SMK=Smoking;
DBT=Diabetes.

Table 2: Beck Depression Inventory and Beck Anxiety Inventory in Patients with CVD

	%	Mean	SD	Minimum	Maximum
BDI II Raw Score		8.53	7.15	0	30
Minimum	75.7%				
Mild	12.9%				
Moderated	10%				
Severe	1.4%				
≥18 points	17.1%				
BAI Raw Score		8.49	9.25	0	43
Minimum	58.6%				
Mild Moderated Severe	21.4% 12.9% 7.1%				
≥12 points	27.1%				

Table 3: Clinical Depression and Anxiety. Contingency Table

		Depression		
		Without Depression	With Depression	Total
Anxiety	Without Clinical Anxiety	47	4	51
	With Clinical Anxiety	11	8	19
Total		58	12	70

Table 4: Association between Depression and Clinical Anxiety. Chi-Squared Tests

	Value	gl	Asymptotic Significance (Bilateral)	Exact Significance (Bilateral)	Exact Sig. (Unilateral)
Chi-squared de Pearson	11.440(b)	1	0.001		
Correction for continuity	9.155	1	0.002		
Reason for verosimilitude	10.234	1	0.001		
Exact statistics of Fisher				0.002	0.002
Linear association by linear	11.277	1	0.001		
Number of valid cases	70				

a Calculated only for a table of 2x2.

b 1 boxes (25.0%) have an expected frequency of less than 5. The minimum expected frequency is 3.26.

In the Table **2** are shown the raw scores of BDI II and of BAI, as well as their severity levels. Furthermore it can be seen the percentages depending on the cut-off point compatibles with Depression (BDI II ≥18) and Clinical Anxiety (BAI ≥ 12).

Regarding Table **3**, the presence of Depression in the CVD, would correspond with the presence of Clinical Anxiety. In the Table **4** be confirm a significant association between Depression and Clinical Anxiety.

As can be seen in Table **5**, no differences were found in the scores of Depression and Anxiety between women and men.

Table 5: Mann Whitney U Test. Comparison of Raw Scores of Depression and Anxiety in Patients with CVD by Gender

	Depression	Anxiety
U de Mann-Whitney	322,000	226,000
W de Wilcoxon	388,000	1996,000
Z	-0.040	-1,596
Asymptotic Significance (bilateral)	0.968	0.111

a Grouping variable: Gender.

4. DISCUSSIONS

We have strong evidence that Depression and Clinical Anxiety contribute to CVD in different ways, but their important role in the prevention, diagnosis and treatment is often underestimated or ignored, despite that paradoxically having effective psychopharmacological and behavioral treatments for these conditions. In this context, it is important to have actualized and more precise data about the prevalence in Depression and Clinical Anxiety in such kind of patients.

Regarding Depression, is important to remind that its prevalence in the CVD was previously informed within a large oscillating rank between the 17% and the 30% [11-14]. In the present work, the 17.1% of the CVD patients showed Depression scores compatible with the MDD. We define as probable presence of MDD, the obtainment of equal or superior scores to 18 points of the BDI II, according to the recommendations of Sanz, Navarro and Vazquez [30]. When comparing the obtained Depression percentages in the actual study (17.1%) with the obtained results by previous investigations, our prevalence values are located in the expected rank of variability (between the 17% and the 30%), to be more exact in its inferior limit. If we compare our data with works that have also used the BDI II, it is shown a considerable difference. Following the systematic revision of Thombs [12] those works that adopted the BDI II, obtained a 31.3% of Depression. These values are superior to our results. We propose that the main difference lies in the fact that these studies were focused in the detection of depressive symptoms with some minimum degree of clinical relevance (values ≥ to the 10 point of Beck). On the other hand, our cut-off point was of ≥ 18 points of Beck, increasing the probability of measuring MDD. Precisely the differences in the cut-off point of Beck between the actual work and previous studies would help to understand the different Depression prevalence informed.

On the other hand, it is well known that women show more Depression and Clinical Anxiety than men [23, 24]. That asymmetry, would maintain in the CVD, suggesting as well a higher presence of MDD and Anxiety Disorders in women in regard to men [15, 26]. Nevertheless, the results of our study didn't show differences regarding sexes.

We will first take into account that the sample women low percentage (15,7%; n=11) could be masking the differences reported by previous studies, but is needed to consider other possibilities that are intervening.

The two main findings of this article are the high prevalence of Depression and Anxiety, and the loss of the asymmetry observed in women with CVD prevalence.

In order to explain the possible origins for both situations, is useful to consider two DSM V categories [34]. Both psychological conditions would be framed in the "Depressive Disorder Due to Another Medical Condition" or Anxiety Disorder Due to Another Medical Condition" categories.

This diagnosis describes a significant disturbance in the mood or anxiety directly related to a medical condition capable of producing those, as long as the symptoms are not included in other categories of Mood or Anxiety Disorders. In this case, the psychopathological symptoms would be result of the physiological effects of the CVD itself, like the cerebral or physical (neuroendocrine, metabolic, symphatetic, or immune) dysregulation that accompany some cardiac pathologies, especially cerebrovascular diseases.

Another possibility to consider is that Depression and Anxiety in patients with CVD falls in "Adjustment Disorder" DSM V category. In the Adajustment Disorders the emotional and / or behavioral symptoms emerge in response to an identifiable psychological stressor, and this deserves a mention in the context of CVD. The symptoms must be developed within 3 months after the onset of the stress factors and must be resolved within 6 months of the termination of the stressor. Here, the stress triggered by the cardiac event would be responsible for depression and anxiety in this population.

Returning to the data collected in the present study, it has been shown a high correspondence between Depression and Anxiety, that is, both mental sufferings be present at the same time. This comorbidity is no surprise, since it has been hugely documented in scientific literature, but our results contribute to the confirmation of comorbidity between Depression and the Clinical Anxiety in population with CVD.

As for methodological limitations of the study, its worth to clarify that the BAI and BDI II did not were designed for the diagnosis of Anxiety Disorders and MDD. However, the information provided by the referred instruments, can help to identify Anxiety Disorders and/or MDD, although with posterior

diagnosis confirmation through structured interviews. Definitely, it must be clear that the percentages of Depression and Clinical Anxiety prevalence informed in the present investigation, are the result of a screening and not from strict clinical procedures.

CONCLUSIONS

Depression and the Clinical Anxiety are frequent mental diseases in patients with CVD. However, the percentages of the prevalence are not clear, since in previous studies the values oscillate within a wide range. After administrating two psychological scales to individuals with CVD, we have detected a 27,1% of participants with probable Clinical Anxiety and a 17.1% of participants with probable Major Depressive Disorder. Depression y Clinical Anxiety were presented in comorbidity. Other important issue is the prevalence of these psychopathologies in women with CVD, because we haven't find differences between both sexes. It is suggested to the health professionals involved in the CVD treatment to be careful of the emotional state of their patients.

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