RELATIONSHIP BETWEEN PSYCHOSOCIAL FACTORS AND TREATMENT COMPLIANCE IN CARDIOVASCULAR REHABILITATION

Martino, Pablo Luis [1], Mora Penagos, Juan Pablo [2],
Audisio, Eduardo Oscar [3], Kerbage, Soraya [4], Barrios, Cristina [5],
Lirio, Carlos [6], Bonet, José Luis [7]

Authors’ affiliation:

[1] Doctor in Psychology. Faculty of Psychology, National University of Rosario, City of Rosario, Argentina; E-mail: p.martino@hotmail.com
[2] Magister in Psychoimmunoneuroendocrinology/ Psychological area in Argentine Red Cross, City of Buenos Aires, Argentina, E-mail: jmpenagos@outlook.com
[3] Doctor in Psychology. Faculty of Psychology, National University of Rosario, City of Rosario, Argentina; E-mail: eaudisio@unr.edu.ar
[4] Cardiologist/Sports medicine physician, Coordinator of the Cardiac Rehabilitation Program. Favaloro Foundation, Argentina; E-mail: skerbage@ffavaloro.org
[5] Nurse. Member of the Cardiac Rehabilitation Program. Favaloro Foundation, Argentina
[6] Physical education teacher. Member of the Cardiac Rehabilitation Program. Favaloro Foundation, Argentina
[7] Psychiatrist/Mental Stress Center, Favaloro Foundation, Argentina; E-mail: jbonet@ffavaloro.org

ABSTRACT

Aim: Psychosocial factors have an impact in cardiovascular disease. It is postulated that psychosocial alterations might reduce treatment compliance among coronary artery disease (CAD) patients, which leads to a worse prognosis of cardiovascular disease. The aim of our study was to analyze the relationship between psychosocial factors and treatment compliance in CAD patients attending cardiovascular rehabilitation programs.

Method: A descriptive (correlational) and cross-sectional study was designed. The sample included 70 adult patients, both males and females, attending the cardiovascular rehabilitation program at Favaloro Foundation, Buenos Aires, Argentina.

Four psychosocial instruments were administered for the assessment of anxiety (Beck Anxiety Inventory), depression (Beck II depression inventory), anger (STAXI-II) and functional capacity (Duke Activity Scale). Treatment compliance was defined in terms of attendance to cardiovascular rehabilitation sessions.
Results: Bivariate correlations revealed a positive association between the scores for anger control and treatment compliance, as well as a positive relationship between the scores for functional capacity and treatment compliance.

Conclusions: Psychosocial alterations correspond to a worse treatment compliance in cardiovascular rehabilitation programs. It is advisable for health care professionals to consider the psychosocial status of CAD patients on admission to rehabilitation programs.

KEY WORDS: psycho-cardiology, treatment compliance, cardiac rehabilitation, negative emotions, quality of life, anger control.

BRIEF SUMMARY

In this study, we analyzed the relationship between some psychosocial factors and treatment compliance in CAD patients attending a cardiovascular rehabilitation program. We observed that more difficulties to control anger and also a lower functional capacity were associated with reduced attendance to rehabilitation sessions.

1. INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of death worldwide. In 2013, almost a third of all the deaths in the world resulted from CVD (Global Burden of Disease Study, 2015). It has been reported that CVD result from the expression of a series of traditional risk factors, such as, diabetes, hypertension, hypercholesterolemia, smoking and obesity (Li et al., 2008). However, psychosocial factors such as anxiety, depression, anger and low functionality in daily life, among others, also contribute to an increased risk in the occurrence of the first cardiac event (Chida & Steptoe, 2009; Roest, Martens, de Jonge & Denollet, 2010; Rugulies, 2002) and/or a worse prognosis of cardiovascular pathology (Chida & Steptoe, 2009; Frasure-Smith, Lesperance & Talajic, 1995; Grodin, Hammadah, Fan, Hazen & Tang, 2015; Lesperance, Frasure-Smith, Talajic & Bourassa, 2002; Roest, Martens, Denollet & de Jonge, 2010), regardless of traditional risk factors.

Among the mechanisms accounting for a causal relationship between psychosocial alterations and CVD, several pathophysiological pathways, including alterations involving the hypothalamic-pituitary-adrenal neuroendocrine axis, adrenal sympathetic hyperactivity, increased inflammation and increased platelet activity have been postulated (Smith & Blumenthal, 2011).

Also, it is hypothesized that after a diagnosis of CVD, the presence or persistence of psychosocial alterations (increased anxiety, depression, anger or low functional capacity) might lead to poorer treatment compliance, and consequently a worse evolution of cardiovascular pathology (Smith & Blumenthal, 2011). McGrady, McGinnis, Badenhop, Bentle & Rajput (2009) found that depression, anxiety and lower quality of life were associated to a higher rate of abandonment of cardiac rehabilitation programs; whereas in another cross-sectional study of ambulatory coronary patients, de-
pression was associated with a lack of adherence to pharmacological treatment (Gehi, Haas, Pipkin & Whooley, 2005). In the same line, Bauer et al. (2012) reported that remission of depression in a group of CAD hospitalized patients had a favorable impact in compliance with medical therapy.

Research conducted to understand the relationship between psychosocial factors and treatment compliance in CAD patients is still limited. The aim of this study was to analyze the relationship between some psychosocial factors and treatment compliance in CAD patients attending rehabilitation programs.

2. MATERIALS AND METHODS

2.1. Sample

The sample included 70 CAD adult patients attending the cardiovascular rehabilitation program at Favaloro Foundation, Buenos Aires, Argentina.

2.2. Design

Descriptive, correlational and cross-sectional study.

2.3. Variables. Operationalization

a. Psychosocial factors

The measures of anxiety, depression, anger (state, trait, external expression, internal expression, external control and internal control) and functional capacity in daily life were recorded as raw scores in 4 psychosocial scales (See Psychosocial Assessment Instruments).

b. Treatment compliance

Treatment compliance was defined as the attendance record of CAD patients to the sessions of the cardiovascular rehabilitation program at Favaloro Foundation (minimum attendance=0 and maximum attendance=16).

c. Socio-demographic variables and traditional cardiovascular risk factors

For a better characterization of the sample, age (in years), gender (M/F) and the presence or absence of hypertension, dyslipidemia, smoking and diabetes were recorded.

2.4. Instruments for psychosocial assessment


It is a self-reporting instrument providing a measurement of the presence or absence of anxiety. It includes 21 items indicative of symptoms of anxiety, such as tremor, nervousness, numbness, choking sensation, tachycardia, digestive disorders, fear to lose control, among others. Each item provides four answers in Lickert format (from 0 to 3) depending on the severity of the anxiety symptoms, as follows: 0 means "absence of symptoms"; 1, “mild symptomatology”; 2, "moderate symptomatology”; 3, "severe symptomatology". The severity of anxiety depends on the total score resulting from the addition of each of the items in the inventory. The final score ranges from 0 to as high as 63. A higher score represents more
severe anxiety. The test has high internal consistency with a Cronbach’s alpha ranging from 0.88 to 0.92, and with good value rates both in clinical and non clinical samples (Beck & Steer, 2011).

b. **Beck II Depression Inventory** (Beck, Steer & Brown, 1996; Sanz, Perdigón, & Vázquez, 2003)

It is a self-reporting instrument providing a measurement of the presence and severity of depression. It includes 21 items indicative of depression symptoms such as sadness, loss of pleasure, feelings of failure, guilt, crying, suicidal thoughts or wishes, pessimism, among others. These symptoms correspond to the diagnostic criteria included in DSM-IV and CIE-10. Each item provides optional answers in a 4-score Likert scale depending on the severity of symptoms as follows: 0 “absence”, 1 “mild”, 2 “moderate” and 3 “severe”. The final score ranges from 0 to as high as 63. A higher score is indicative of more severe depression. The test has good internal consistency, an alpha coefficient of 0.87 and adequate value rates (Sanz, Perdigón, & Vázquez, 2003).

c. **State–trait Anger Expression Inventory (STAXI II)** (Miguel-Tobal, Cano-Vindel, Casado & Spielberger, 2001; Spielberger, 1999)

It is a self-reporting instrument assessing different aspects of anger: status, trait, expression and control. It includes 49 items with four options for Likert-type answers: “almost never”, “sometimes”, “often” and “almost always”. This instrument provides a total of 6 scales: anger state, anger trait, anger external expression, anger internal expression, anger external control and anger internal control. Table 1 includes the reactions of each of the scales used and a description of the factors under study. From the psychometric point of view a test-retest correlation of 0.71 and a Cronbach’s alpha reliability coefficient of 0.89 for the anger state scale, 0.82 for the anger trait, and 0.69 for anger expression were recorded (Miguel-Tobal, Cano-Vindel, Casado & Spielberger, 2001).

<table>
<thead>
<tr>
<th>Scale</th>
<th>Definition</th>
<th>Reagent examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger State</td>
<td>Intensity of the anger feelings in a certain moment (it reflects the anger state of the assessed person in the moment of the evaluation)</td>
<td>“I am furious”; “I feel annoyed”; “I would hit someone”; “I would hit the wall”; “I want to break something”</td>
</tr>
<tr>
<td>Anger Trait</td>
<td>Tendency or disposition to experience anger states</td>
<td>“I have an irritated character”; “I am a heated person”; “I am bothered when I do something correctly and nobody notice it”</td>
</tr>
<tr>
<td>External expression of anger</td>
<td>Tendency to express anger to other persons or objects in their environment. Inadequate form to express anger.</td>
<td>“I express my anger”; “I make ironic comments about others”; “For example, I slam the door”; “I argue with people”, “I say stupid things”, “I lose patience”.</td>
</tr>
</tbody>
</table>

Table 1. Scales of the STAXI 2
**Internal expression of anger**

Tendency to experience but not express anger. The individual tries to control anger (repress). It is an inadequate form to express anger.

“What I feel, I keep to myself”; “I’m burning inside; it doesn’t show, though”; “I bear grudges, but I don’t tell anybody”; “I’m more angry than I admit”; “I get angry more than people imagine”; “I avoid what makes me angry”.

**External control of anger**

Control of anger feelings avoiding their manifestation in front of other persons or objects of the environment

“I control my temper”; “I keep calm”; “I control my behavior”; “I can control myself and not lose control”; “I control my feelings of anger”; “I control my impulses to express feelings of anger”.

**Internal control of anger**

Control of the suppressed anger feelings through appeasement and moderation in annoying situations

“I take a deep breath and relax”; “I count up to ten”; “I try to distract myself until the anger goes away”.

d. **Duke Activity Status Index** (Hlatky, 1989)

It is a heteroadministered questionnaire including 12 items to assess functional capacity in daily life in patients with cardiovascular conditions. It explores the skills of CAD patients in relation to activities of daily self care, hygiene, mobility, housework, recreation and sexual functions. Each item represents a daily activity and is given a numerical value according to the metabolic rate for that activity. The final score depends on the score of each item included in the instrument, the raw scores range between 0 and 58.2.

The instrument provides only one score and has no dimensions. Higher scores indicate better functional capacity. Duke Activity Status Index provided acceptable reliability and validity measurements in the Spanish population (Alonso et al., 1997).

2.5. **Procedure for data collection**

In 2013 and 2014 CAD patients attending the cardiovascular department at Favaloro Foundation were contacted. After joining the rehabilitation program, each patient was interviewed and consent for voluntary participation was obtained.

The general characteristics of the study were explained. After obtaining the informed consents signed by the participants, 4 psycho-social assessment instruments were given. Also, once the rehabilitation program finished, the attendance records were obtained for each patient.

2.6. **Data Analysis**

Data were loaded and processed using a computerized program. Descriptive statistics were obtained, percentages or means, according to the scale of measurement of the variables. The normal distribution of the psychosocial factors and treatment compliance were explored using the Kolmogorov
Smirnov (K-S) test. Then, analysis of bivariate correlations was conducted.

The absence of a normal distribution in treatment compliance determined in all cases the analysis of bivariate correlations by the Spearman’s non parametric technique. The value of significance adopted was <0.05. It should be mentioned that the data related to anger and corresponding dimensions (anger state, anger trait, anger external expression, anger internal expression, anger external control and anger internal control) were obtained based on the answers of 52 participants only, because it was not possible to administer the STAXI 2 instrument to all the participants in the sample (n = 70).

However, the rest of the variables (anxiety, depression, functional capacity) were obtained from the total number of participants in the sample (n = 70).

3. RESULTS

Table 2 includes the statistics for age, gender, traditional cardiovascular risk factors (smoking, diabetes, dyslipidemia and hypertension) and treatment compliance. Table 3 includes the raw scores for anxiety, depression, anger state, anger trait, anger external expression, anger internal expression, anger external control, anger internal control and functional capacity in daily life.

Table 2. Socio-demographic variables, traditional cardiovascular risk factors and treatment compliance

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age</th>
<th>HTN</th>
<th>DLP</th>
<th>Smoking</th>
<th>DM</th>
<th>TC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12.21</td>
</tr>
<tr>
<td>%</td>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.5</td>
</tr>
</tbody>
</table>

HTN=hypertension; DLP=dyslipidemia; DM=diabetes mellitus; TC=treatment compliance (attendance to the cardiovascular rehabilitation program).

Table 3. Scores for psychosocial factors

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANX</td>
<td>8.49</td>
<td>9.25</td>
<td>0</td>
<td>43</td>
</tr>
<tr>
<td>DEP</td>
<td>8.53</td>
<td>7.15</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>AE</td>
<td>.12</td>
<td>.471</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>AT</td>
<td>3.87</td>
<td>7.1</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>AEE</td>
<td>.79</td>
<td>5.18</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>AIE</td>
<td>.21</td>
<td>4.5</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>AEC</td>
<td>14.27</td>
<td>4.61</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>AIC</td>
<td>13.4</td>
<td>6.42</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>FC</td>
<td>23.66</td>
<td>12.38</td>
<td>7.25</td>
<td>58.2</td>
</tr>
</tbody>
</table>

ANX=anxiety; DEP=depression; AE=anger state; AT=anger trait; AEE=anger external expression; AIE=anger internal expression; AEC=anger external control; AIC=anger internal control; FC=functional capacity
Table 4 shows a positive and statistically significant association between the anger external control and treatment compliance (Rho Spearman=.367; p=.007), as well between the anger internal control and treatment compliance (Rho Spearman=.306; p=.027).

Also, a positive and statistically significant association was seen between functional capacity in daily life and treatment compliance (Rho Spearman=.280; p=.019). The rest of the psychosocial variables (depression, anxiety, anger state, anger trait, external expression of anger, internal expression of anger) were not significantly associated with treatment compliance.

| Table 4. Bivariate correlations between psychosocial factors and treatment compliance |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| TC= treatment compliance; ANX=anxiety; DEP=depression; AE=anger state; AT= anger trait; AEE=anger external expression; AIE=anger internal expression; AEC=anger external control; AIC=anger internal control; FC=functional capacity |
| ANX  | DEP  | AE   | AT   | AEE  | AIE  | AEC  | AIC  | FC   |
| .147 | .007 | -.263 | -.064 | -.012 | .154 | .367** | .306* | .280* |

4. DISCUSSION

Psychosocial factors such as anxiety, depression, anger and a low functional capacity in daily life, among others, predict a poorer prognosis of cardiovascular disease (Chida & Steptoe, 2009; Frasure-Smith et al., 1995; Grodin et al., 2015; Lesperance et al., 2002; Roest et al., 2010), regardless of traditional cardiovascular risk factors like dyslipidemia, hypertension, diabetes, smoking and a sedentary lifestyle. One of the mechanisms explaining why negative emotions and other social factors contribute to a worse cardiovascular prognosis is associated with the fact that psychosocial alterations might hinder treatment compliance in patients with CAD (Smith & Blumenthal, 2011).

Consequently, we have analyzed the relationship between some psychosocial factors and treatment compliance in a cardiovascular rehabilitation program. The results of our study provide evidence in favor of such relationships. In the first place, we found a positive association between the anger control (internal as external) and treatment compliance in a cardiovascular rehabilitation program. That is, coronary patients who were not able to fully control their anger feelings had the lowest attendance rate for rehabilitation sessions. We understand that difficulties to control the anger might create a profile of CAD patient who is less tolerant to the indications and treatment schemes necessary for cardiovascular rehabilitation, a situation that might translate into a higher non-compliance rate.

In the second place, we found a positive association between functional capacity and treatment compliance in the cardiovascular rehabilitation program. That is to say that those coronary patients with more difficul-
ties for the resolution of tasks of daily life presented less concurrence to the rehabilitation sessions. It might be stated that the low functional capacity in daily life might objectively hinder attendance to rehabilitation programs. For example, some patients experience some problems as they depend on others for transportation and mobility. From the subjective point of view, the lack of autonomy and independence might translate into less enthusiasm or optimism as for the expected therapeutic benefits, discouraging their commitment to the rehabilitation program.

We consider that the results obtained in our investigation might be useful for cardiovascular rehabilitation services. Considering that psychosocial disorders are associated to lower treatment compliance, it is advisable to intervene in the psychosocial status of CAD patients at the time of admission to rehabilitation programs, in order to improve their quality of life and also reduce non-attendance. It is convenient to pay special attention and identify patients with a deficit in their control of the expression of anger and with low functional capacity in daily life. In such cases, it will be useful to use cognitive-behavioral interventions to improve the anger control. In the case of patients with low functional capacity health care professionals at the rehabilitation service should contact individuals in the patient’s social network (wife, children, friends) and request their collaboration during cardiovascular rehabilitation to encourage and facilitate the patient’s attendance to the rehabilitation sessions.

Finally, as opposed to previous studies (Bauer et al., 2012; Gehi et al., 2005; McGrady et al., 2009) we did not find significant associations between anxiety and treatment compliance, or between depression and treatment compliance. It is supposed that the limited variability in the scores for anxiety and depression among the participants in our sample might account for the absence of significant relationships.

5. CONCLUSIONS

Alterations in psychosocial factors contribute to poorer treatment compliance in cardiovascular rehabilitation programs. The results of this investigation show that less control of the anger in coronary patients as well as lower functional capacity in daily life contribute to higher non-attendance to rehabilitation sessions.

Health care professionals involved in cardiovascular rehabilitation are advised to consider the psychosocial status of CAD patients when starting cardiovascular rehabilitation, with special emphasis on the detection of difficulties in the management of anger and/or low functional capacity in activities of daily living.

6. REFERENCES


