PREDICTORS OF POSTSURGICAL STRESS AMONG CARDIAC PATIENTS

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PREDICTORS OF POSTSURGICAL STRESS AMONG CARDIAC PATIENTS (Abstract).

Aim: To explore the role of stress vulnerability, dispositional optimism, fears of surgery and negative affective disposition in prediction of postsurgical stress among cardiac patients who underwent heart surgery. Material and methods: The sample included 60 cardiac patients (39 males and 21 females, aged 58.50±10.97 years). All patients completed two sets of standardized questionnaires. Before surgical intervention, stress vulnerability, dispositional optimism and negative affective disposition were measured with N6-Scale (from NEO Personality Inventory–Revised Form), Life Orientation Test-Revised Form and Mental Health Index-5, respectively. Fear of surgery among patients was measured with an 8-item questionnaire designed for the current study. After intervention, patients completed a short postsurgical data form along with the Perceived Stress Scale. Results: There was no significant difference in postsurgical stress between the female and male cardiac patients (t = 0.96; p = 0.34). A similar result was obtained when the presence/absence of postsurgical complications was considered as an independent variable (t = 1.30; p = 0.19). As expected, a higher level of postsurgical stress was associated with higher stress vulnerability, surgery-related fear, negative affective disposition, and with a lower dispositional optimism score. Moreover, stress vulnerability and negative affective disposition were significant predictors of postsurgical stress. Conclusions: Cardiac patients who are prone to stress and negative affective disposition are also at higher risk for postsurgical stress. On its turn, this psychological condition interferes with time and quality of postsurgical recovery. A careful assessment of psychological condition along with counseling before surgical intervention is needed in order to reduce the risk of postsurgical stress and improve medical recovery in cardiac patients. Keywords: CARDIAC PATIENTS, STRESS VULNERABILITY, DISPOSITIONAL OPTIMISM, FEAR OF SURGERY, NEGATIVE AFFECTIVE DISPOSITION, POSTSURGICAL STRESS

Surgery is a stressful life event which triggers many physiological, cognitive, and emotional responses among patients due to certain personality traits (i.e. dispositional optimism, emotional instability, confidence in the ability to control postsurgical course of the disease etc.), patient social network (i.e. the level of emotional and social support) or disease-associated clinical characteristics (1). The social, emotional, and cognitive consequences of a surgical intervention have also drawn the attention of professionals and researchers in medical care and social services. The psychological (pre- and post- surgical) state of patients is due to recurrent afflictions, post-surgery complications, mortality rate, and also certain recovery quality indicators (i.e. the
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psychological and physical well-being, or the outlook on quality of life) (2).

Usually, the pre-surgical stage of a cardiac intervention is stressful for the patient, as well as for his/her family (3), while recovery is physically and psychologically challenging. The research concerning patients undergoing stress before or during surgery revealed higher levels of anxiety and depression in those cases (1, 3). Nevertheless, the dysfunctional emotional reactivity of cardiac patients is one of the risk factors that explain the high level of post-operative mortality and morbidity (1), the longer postoperative hospital stay and physical recovery time, and the persistence of certain negative emotional states (3).

This research is focused on the variables associated with postoperative stress experienced by cardiac patients who underwent specific surgery. Thus, optimism is important for the postoperative course of cardiac patients. For the scholars this notion embodies the positive expectations (full of hope) a person experiences in a given situation (4). Optimistic stance tends to be a protective factor against functional deterioration and also a consistent indicator of the quality of life in patients with chronic afflictions (5, 6, 7, 8).

Another area of research that has generated numerous empirical clinical and health psychology studies is the relation between personality traits, stress, and health. Neuroticism/emotional instability is one of the most studied personality traits in relation with stress and/or other psychopathological manifestations, and also with adaptation to disease. This type of personality trait describes the general tendency of a person to experience negative emotions (anxiety, sadness, guilt, anger), irrational ideas, and difficulties in impulse control (9). The neurotic state tends to be one of the most important personality factors that determine the vulnerability of a person in stressful situations that influence the functions and adaptation strategies of a person (10).

On the other hand, given the complexity, extent, and risk (predictable and unpredictable complications) of heart surgery, it is natural that most cardiac patients to experience preoperative fear (cognitive preoccupations and unpleasant emotional reactions, accompanied by somatic-neural-vegetative reactions). There is a positive association between the level of preoperative fear and the risk of postoperative stress.

This article summarizes the results of a transversal study designed to explore the role of stress vulnerability (as expression of emotional instability), dispositional optimism, surgery-related fear, and negative affective stance in explaining the individual differences in the level of postoperative experienced by heart surgery patients. The practical applicability of this study consists in the identification of the predisposing individual traits (emotional and cognitive) which can explain the differences in postoperative medical and psychological outcomes between cardiac patients. These findings can be useful in preventive psychological counseling of patients about to undergo surgery and possibly experience a critical stress level.

MATERIAL AND METHODS

Sixty cardiac patients, admitted and operated (October, 2010 - May, 2011) in the “Prof. Dr. I. M. Georgescu” Institute of Cardiovascular Diseases at Iasi were assessed before and after surgery. The 39 male and 21 female patients were aged between 24 and 76 years (M = 58.50 years; SD = 10.97 years). Over 75% of the patients had at least one cardiovascular disor-
der (high blood pressure, acute myocardial infarction, ischemic cardiomyopathy, coronary insufficiency, stroke), or other type of disorders (diabetes, prostate adenoma, chronic renal failure, plasmacytoma, gastric ulcer), treated over the past 5 years or on therapy. Almost half of the cardiac patients eligible and enrolled in this study underwent coronary bypass. Some of them also underwent other surgical procedure, such as: aortic prosthetic reconstruction, aneurysmectomy, mitral or tricuspid prosthetic reconstruction. The remaining patients underwent: aortic prosthetic reconstruction, mitral or mixed, subvalvular diaphragm resection, atrial myxomectomy, or surgical removal of an atrial septal defect. Surgeries were performed 1 to 28 days after admission (M = 7.40; SD = 5.37). On average, the patients required 15.45 days of postoperative hospital stay (SD = 0.01).

The patients completed two sets of standard questionnaires. The first set included five preoperative questionnaires (on average 5.11 days after admission; SD = 5.77), while the second set consisted in two questionnaires applied to the patients eight days after the surgery (SD = 3.15). Four of the questionnaires (scale N6 – stress vulnerability from NEO Personality Inventory – Revised Form/NEO PI-R, Life Orientation Test-Revised Form/LOT-R, Mental Health Index-5 Items Version/MHI-5, and Perceived Stress Scale/PSS) were taken from the literature, translated, and adapted to the purpose of this study. Three other questionnaires (socio-demographic data and medical history, scale for assessing surgery-related fear, and postoperative medical data) have been developed for this study. Stress vulnerability was measured according to the homonymous scale of NEO PI-R inventory (9). The instrument included eight items. The total score was obtained by summing the score of each item (range 0-32). A high score (range 0-24) was interpreted as high stress vulnerability. For our series of cardiac patients, the value of internal consistency was acceptable (α = 0.69). The level of dispositional optimism was assessed with LOT-R (11, 12). The instrument has 10 items, of which 4 are distractors. A high score (range 0-24) signifies a high level of predisposition to conceptualized optimism. For our series patients, α = 0.65. Surgery-related fear was assessed using an 8-item scale. The total score was obtained by summing the item scores (range 0-32). A high score was interpreted as a high level of concern regarding heart surgery. For our series of patients the value of internal consistency was acceptable (α = 0.67). The negative affective disposition experienced by our patients in the last month was assessed with MHI-5 (13). The instrument is part of the Medical Outcomes Study 36-item Short Form Health Survey and it includes 5 items. A high score (range 0-25) indicates a high level of the negative affective disposition. For our series of patients the value of internal consistency was 0.73.

Postoperatively, the patients completed a short modified version (10 items) of PSS (14). In the original version, the instrument has been developed to evaluate the degree to which individuals believe their life has been unpredictable, uncontrollable, and overloaded during the previous month (15). The assessed items are general in nature rather than focusing on specific events or experiences. In this study a high score (range 0-40) was interpreted as an indicator of a high postoperative stress. The value of the internal consistency was good (α = 0.82). More than 25% of the cardiac patients developed clinical complications due to unfavorable postoperative course. Two
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patients (1 man and 1 woman) died. Only one of them survived long enough to participate in postoperative assessment. Another patient (who survived) refused it. Thus, PSS scores were obtained from 58 of the 60 patients.

RESULTS

Over 50% of the investigated patients had a moderate postoperative stress score (15-24), 4 patients a moderate to high (score 25-27), and other 5 – a high or very high score (28-36).

There was a positive correlation between the level of postoperative stress and the levels of the stress vulnerability (as personal predisposition), surgery-related fear, and preoperative negative affective disposition, and a negative correlation with the dispositional optimism score (tab.I). In the patients who developed complications due to unfavorable postoperative course, the correlation between postoperative stress level and stress vulnerability (N = 17; r = 0.75; p = 0.001; two-tailed) was stronger than in the patients who did not experience postoperative complications (N = 41; r = 0.53; p < 0.001; two-tailed), but the difference was not significant (z r1-r2 = 1.22; p = 0.22; two-tailed).

TABLE I

Correlations between the measured variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>M ± SD</th>
<th>Correlations with the level of postoperative stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Postoperative stress</td>
<td>17.50 ± 6.11</td>
<td>-</td>
</tr>
<tr>
<td>2. Stress vulnerability</td>
<td>10.90 ± 3.93</td>
<td>0.57 ***</td>
</tr>
<tr>
<td>3. Dispositional optimism</td>
<td>13.70 ± 2.96</td>
<td>- 0.38 **</td>
</tr>
<tr>
<td>4. Surgery-related fear</td>
<td>13.10 ± 3.29</td>
<td>0.47 ***</td>
</tr>
<tr>
<td>5. Negative affective disposition (preoperative)</td>
<td>10.35 ± 4.33</td>
<td>0.45 ***</td>
</tr>
<tr>
<td>6. Age</td>
<td>58.50 ± 10.97</td>
<td>- 0.13</td>
</tr>
<tr>
<td>7. Preoperative hospital stay (number of days)</td>
<td>7.40 ± 5.37</td>
<td>- 0.06</td>
</tr>
<tr>
<td>8. Postoperative hospital stay (number of days)</td>
<td>15.45 ± 10.87</td>
<td>- 0.04</td>
</tr>
</tbody>
</table>

** p < 0.01; *** p < 0.001

The correlations between postoperative stress level and patients’ age, duration of pre- and postoperative hospital stay were not statistically significant.

The difference in PSS scores between female and male patients were not statistically significant (women/18.52 ± 5.53; men/18.52 ± 5.53; t = 0.96; p = 0.34; two-tailed). Also, the complications due to unfavorable postoperative course had an insignificant influence on postoperative stress (patients with complications/19.11 ± 7.13; patients without complications /16.82 ± 5.59; t = 1.30; p = 0.19; two-tailed).

However, the patients who developed postoperative complications presented a slightly higher level of stress. The difference between the average score of patients on treatment for diagnosed conditions (N = 46; 17.52 ± 6.34), and patients not on treatment (N = 11; 17.72 ± 5.53) was not high enough to be significant (t = - 0.09; p = 0.92; two-tailed).

Stress vulnerability, dispositional optimism, surgery-related fear, and negative affective disposition were all taken into account as independent variables of linear regression model, where the dependent
variable (the criterion) was the level of postoperative stress. The coefficient of multiple correlation was statistically significant (R = 0.66; F = 10.47; p < 0.001; two-tailed). Together with the constant, the independent variables accounted for about 40% of the variation in postoperative stress score distribution, but only stress vulnerability and negative affective disposition were significant predictors (Table II). The score of stress vulnerability accounted for 13.1% of postoperative stress variation, while the negative affective disposition score 5.1%.

**TABLE II**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>r²sp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress vulnerability</td>
<td>0.67</td>
<td>0.19</td>
<td>0.42 **</td>
<td>0.131</td>
</tr>
<tr>
<td>Dispositional optimism</td>
<td>-0.12</td>
<td>0.25</td>
<td>-0.06</td>
<td>0.002</td>
</tr>
<tr>
<td>Surgery-related fear</td>
<td>0.21</td>
<td>0.26</td>
<td>0.11</td>
<td>0.007</td>
</tr>
<tr>
<td>Negative affective disposition</td>
<td>0.38</td>
<td>0.17</td>
<td>0.26 *</td>
<td>0.051</td>
</tr>
</tbody>
</table>

p < 0.05; ** p < 0.01 (two-tailed)

**DISCUSSION**

Scientists unanimously agree that surgery is a stressful factor for those directly involved (the patients), as well as for their family and friends (1, 3, 16, 17). Our correlational data of dispositional optimism and concerns about surgical outcome are all in agreement with those reported by other studies on the mental health and perception of the quality of life among cardiac patients undergoing heart surgery life (5, 7).

In this study the scores of stress vulnerability and negative affective disposition were positive predictors of the level of postoperative stress experienced by cardiac patients. As an aspect of neurosis, stress vulnerability is characteristic to people feeling unable to cope with difficulties, and who are prone to experience helplessness and being emotionally dependent of others (9). Such people are liable to exhibit dysfunctional ways of coping, and difficult recoveries after stressful experiences. On the other hand, the negative affective disposition (i.e. depressive symptoms) is rather common among patients awaiting heart surgery (17, 18, 19).

In a future study we want to continue the analysis of the factors that could explain the patient differences with respect to the psychological and medical indicators of recovery after heart surgery. This would be possible by including other variables, such as: predisposition for anxiety, postsurgical expectancies, perceived self-efficiency, coping abilities (and style) for stressful situations, trust in future and emotional and social support from family.

**CONCLUSIONS**

Even though the literature emphasizes the importance of preparing a patient for surgery to help them deal with problems resulting from hospital stay, surgery itself, convalescence, rehabilitation period, and increase their resilience to stress (20), many of the medical professionals do not regard this action as an essential part of a comprehensive and integrative medical act (16). In these circumstances it is not surprising that poor psychological status experienced pre-surgically by patients is significantly associated with difficulties of postoperative recovery, this fact emphasizing the importance of psychological factors in the dynamics of medical treatment.
Knowledge by the medical staff of the individual traits of cardiac patients and implementation of specialized pre-and postoperative counseling can help increase resilience to stress and thereby improve the indicators of medical rehabilitation.

REFERENCES