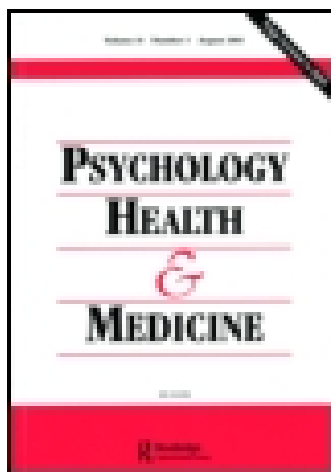


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Type of treatment of cardiac disorders – quality of life and heart-focused anxiety: The mediating role of illness perceptions

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The aim of the present research was to investigate the impact of illness perceptions on quality of life and heart-focused anxiety, in patients with cardiovascular disease ($N = 106$) admitted in the hospital, undergoing medication or who had undergone surgery. The influence of the type of treatment on the heart-focused anxiety and on the quality of life was mediated by illness perceptions. Consequently, patients who have undergone cardiac surgery have a better quality of life and lower levels of heart-focused anxiety than those relying only on medication to treat their illness.

Keywords: cardiovascular disease; illness perceptions; quality of life; heart-focused anxiety; surgery

Cardiovascular disorders are noted as the number one cause of death worldwide. The number of people who die from cardiovascular disorders is higher than the number of people who die from other causes (The World Health Report, 2003). A recent health report (The World Health Report, 2013) refers to cardiovascular disease as a major non-communicable disease and a global public health issue, the first cause of death of non-communicable disease. In order to provide the best psychological intervention for cardiac patients who had undergone surgery or undertake medication to treat their illness, it is important to ascertain whether their illness perceptions affect the quality of life or heart-focused anxiety.

Illness representations contain five attributes: the identity of the problem, with the associated symptoms and their labels, the cause of the illness such as lifestyle, heredity, or a pathogenic agent, time line (acute or chronic disorders), perceived consequences, and the perceived controllability of the illness (Baumann, Zimmerman, & Leventhal, 1989). This last attribute has an important role in developing one's coping mechanism and procedures. Illness perception affects patients' treatment adherence: when they have faith in the effectiveness of the treatment, they are more likely to adhere to the medical prescriptions, whereas if patients mistrust the effectiveness of the treatment, their adherence behavior will be poor. In this respect, the common sense model (Leventhal, Diefenbach, & Leventhal, 1992) explains the way people adapt to the threat of their illness, through two independent processing systems that compose the self-regulative system. The objective one pertains to the cognitive processing of the illness, including its coping procedures and evaluative processes. The second processing system is emotional, dealing with the emotions instigated by illness and the coping procedures aimed at

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managing these emotions. In order to develop coping mechanisms for their illness, individuals use information from various sources (medical personnel, personal or vicarious experience) to label their symptoms, then try different health behaviors and evaluate their effectiveness. Illness perceptions may influence other outcomes, such as quality of life and cardiac anxiety.

Quality of life has been defined as the subjective life satisfaction with a set of important life domains (Meijer, Koeter, Sprangers, & Schene, 2009). It is described in relation to several domains: physical functioning, emotional status, cognitive performance, social functioning, general perceptions of health and well-being, and disease-specific symptoms (Blumenthal & Mark, 1994). Quality of life is a variable concept, which changes through the influence of different life situations (Rodríguez, Picabia, & San Gregorio, 2002). The way people perceive and respond to illness has a significant influence on their quality of life (Petrie & Weinman, 2006). Specifically, studies that examined the illness perceptions as a whole construct concluded that negative illness perceptions predict a poor quality of life (Cherrington, Moser, Lennie, & Kennedy, 2004). A consistent association between illness perception and quality of life was found at the six-month evaluation after diagnosis (French, Lewin, Watson, & Thompson, 2005), as well as at the two-year evaluation (Frosthalm et al., 2007). Also, illness identity and beliefs about treatment are significant predictors of the physical health-related quality of life 1 year after diagnosis (Lane, Langman, Lip, & Nouwen, 2009) and of the psychosocial aspects of health-related quality of life (Sawicki, Sellers, & Robinson, 2011). Negative illness perceptions are associated with anxiety and depression (Foxwell, Morley, & Frizelle, 2013) and have a significant influence on mental and physical functioning (Paschalides et al., 2004).

Quality of life is a valued outcome in cardiovascular disorders, with some studies concluding that it can be a predictor of mortality (Rumsfeld et al., 1999). Previous studies show that illness beliefs are an important factor of quality of life in cardiac patients (Foxwell et al., 2013), and that they can predict depression and disability in cardiac disorders (Grace et al., 2005; Juergens, Seekatz, Moosdorf, Petrie, & Rief, 2010).

Negative illness beliefs were also found to be associated with heart-focused anxiety (Eifert, Hodson, Tracey, Seville, & Gunawardane, 1996). Generally, anxiety is frequent among cardiac disorders (Härter, Conway, & Merikangas, 2003), and it increases the risk of adverse (unfavorable) outcomes (Aikens, Wagner, Lickerman, Chin, & Smith, 1998; Frasure-Smith et al., 2002). Cardiac anxiety or heart-focused anxiety is a specific fear of cardiac-related stimuli and sensations because of their expected negative consequences (Eifert, 1992). Its intensity does not necessarily match the actual severity of illness (Muschalla, Glatz, & Linden, 2014), some studies revealing low associations between anxiety and objective indicators of somatic morbidity (Linden & Muschalla, 2010). When someone experiences heart-focused anxiety, he/she may be mistaking the symptoms. Moreover, studies show that even physicians frequently fail to recognize a panic or an anxiety disorder in their patients, which can lead to a poor case management (Meyer, Hussein, Lange, & Herrmann-Lingen, 2013), while others conclude that the rate of a correct diagnosis is about 50% (Aikens et al., 1998).

Studies suggest that an important factor of illness representations in cardiac patients could be the type of treatment that they have undergone for their condition: surgery vs. medication. Individuals with cardiovascular disorders who had undergone surgery have more positive illness perceptions than those who have been taking medicine to treat their illness (Hirani, Hirani, Pugsley, & Newman, 2006), due, in part, to the differences in patients' beliefs about the two types of treatments (Hirani, Patterson, & Newman, 2008).

The aforementioned effects of illness representations on heart-focused anxiety and quality of life were documented both in surgical (Juergens et al., 2010) and non-surgical patients (Foxwell et al., 2013; Grace et al., 2005). Yet, the differences in illness perception between the two categories of patients or its potential mediating effect on the associations between the type of treatment and these two psychological outcomes have not yet been investigated.

The purpose of the present research was to investigate the possible mediating role of cardiac patients' illness representations in the relationships between treatment (surgical vs. non-surgical), on one hand, and heart-focused anxiety, respectively, quality of life, on the other. We hypothesized that patients who have undergone cardiac surgery would perceive their illness as less negative and, as a result, would experience lower heart-focused anxiety and a higher quality of life.

Method

Sample

The sample includes 106 patients (57 men and 49 women). Seventy-four patients had undergone at least one cardiac surgery and were admitted to the Cardiovascular Surgery Unit of a large hospital in Iasi, Romania. Thirty-two patients had been diagnosed as cardiac patients, but had no cardiac surgical history; they were admitted to the Cardiology Unit of the same hospital.

Instruments

Quality of life was assessed by the Minnesota Living with Heart Failure Questionnaire (MLHFQ) (Rector, Kubo, & Cohn, 1987; as cited in Rector & Cohn, 1992), a widely used disease specific quality of life questionnaire for heart failure. The MLHFQ assesses the effects of heart failure and treatments on the key physical, emotional, social, and mental dimensions of quality of life. The 21 items are rated on a six-point response scale (from 0-no impact to 5-severe impact). Respondents are asked to rate the degree to which each heart failure-related impairment has prevented them from living as they wanted during the previous month (Acceptability and Psychometric properties of MLHFQ). Higher scores indicate a poorer quality of life.

To assess illness perception, the brief version of the Illness Perception Questionnaire (Brief IPQ, Broadbent, Petrie, Main, & Weinman, 2006) was administered, which provides a rapid assessment of illness perceptions, particularly helpful in ill populations. Each of its eight items, rated on a 10-point response scale, assesses one dimension of illness perceptions (consequences, time line, personal control, treatment control, identity, coherence, concern, and emotional representation). Higher scores reflect a more threatening view of the illness.

Heart-focused anxiety was assessed with heart-focused anxiety questionnaire (Eifert et al., 2000) which consists of 18 items on three subscales (fear, avoidance, and attention). Respondents rate each item on a five-point scale, from 0 (never) to 4 (always). The CAQ has a demonstrated good convergent validity, as indexed by zero-order correlations with established psychiatric measures (HFA before and after cardiac surgery).

Procedure

The study procedures were approved by the relevant Institutional Review Board. After being fully explained the nature of the research study, participants gave their consent and completed the questionnaires, in the order described in the previous section, in their hospital room. In the case of the participants who had undergone cardiac surgery, the questionnaires were administered at least two weeks after their procedure. The mean (SD) days elapsed from their surgery was 19 (2). The assessment took about 20 minutes.

Statistical analysis

First, the associations between variables in the two presumed mediational models were calculated, through bivariate correlations between the three questionnaire-based variables (illness representations, heart-focused anxiety, and quality of life) and *t*-test comparisons between the two treatment groups on these variables. Then, in accordance with Baron and Kenny (1986), the mediation hypothesis was tested through a series of regression analysis. The relationship between the presumed predictor (treatment) and mediator (illness representations) was first examined in this analysis. The second pair of regressions focused on the effect of treatment on the two outcome variables (heart-focused anxiety and quality of life). The third pair of regressions examined the relationship between treatment and heart-focused anxiety, respectively, quality of life, with illness representations included in each model. Concerning illness representations, the Brief IPQ sum score, computed after reversing the control and coherence scales, was entered in all analysis, as applied elsewhere (Cherrington et al., 2004; Juergens et al., 2010). All regression models also included age and gender as demographic covariates. The significance of each mediational model was examined through post hoc probing using Sobel tests (Preacher & Hayes, 2004).

Results

The demographic and clinical characteristics are presented in Table 1. First, in order for the mediation to be assumed, the mediator should be related to both the predictor and the outcome in the affected relationship (Baron & Kenny, 1986). Significant associations were found between the variables in each mediational model; the non-surgical patients display higher levels of heart-focused anxiety ($t(104) = 4.07$; $p < .01$), a lower quality of

Table 1. Demographic and clinical characteristics of the sample.

Characteristic	Mean (\pm SD) or <i>n</i> (%)
Age	56 (\pm 14)
Male	57 (54)
Marital status (married)	84 (79)
Hypertension	87 (82)
Diabetes	21 (20)
Smoker	18 (17)
Cardiac surgery	
Angioplasty	35 (33)
Coronary bypass surgery	23 (22)
Aortic valve replacement surgery	16 (15)

life ($t(104) = 4.52$; $p < .01$), and more negative illness representations ($t(104) = 2.56$; $p < .05$) than patients who had undergone heart surgery. The overall illness representations were significantly correlated both to heart-focused anxiety ($r = .49$; $p < .001$) and to quality of life ($r = .64$; $p < .001$). More negative illness representations were linked to greater anxiety and lower quality of life.

The first regression analysis included treatment and covariates as predictors, and overall illness representations as the dependent variable. The regression model was significant: $F(3, 102) = 11.60$, $p < .001$. All three predictors were found to be significant: treatment ($\beta = .36$, $p < .001$), gender ($\beta = -.26$, $p < .01$, with male participants displaying more negative representations), and age ($\beta = .25$, $p < .01$).

The subsequent pair of regression analysis included heart-focused anxiety as dependent variable. The first model, with treatment and covariates as predictors, was marginally significant: $F(3, 102) = 2.63$, $p = .05$. Only treatment was found to be a significant predictor ($\beta = .24$, $p < .05$). The second model included treatment, covariates, and illness representations as predictors; it was significant: $F(4, 101) = 8.36$, $p < .001$, with illness representations being the only significant predictor ($\beta = .49$, $p < .001$). Thus, when adding illness representations in the model predicting heart-focused anxiety, treatment was found to be non-significant as a predictor ($\beta = .06$, $p = .49$). This first mediation model is represented in Figure 1.

The next pair of regression models focused on quality of life as a dependent variable. First, the model including treatment and covariates as predictors was significant: $F(3, 102) = 11.22$, $p < .001$. The significant predictors were treatment ($\beta = .37$, $p < .001$) and age ($\beta = .28$, $p < .01$), older ages being associated with lower levels of quality of life. Second, the model including treatment, covariates, and illness representations as predictors was significant $F(4, 101) = 22.00$, $p < .001$. Both illness representations ($\beta = .54$, $p < .001$) and treatment ($\beta = .18$, $p < .05$) were significant predictors of quality of life. The second mediation model, with quality of life as dependent variable, is represented in Figure 2.

Mediation is indicated by the reduction of the effect of the predictor on the dependent variable when the mediator is included in the model (Baron & Kenny, 1986). In the cases of each of the two outcomes (heart-focused anxiety and quality of life), when both treatment and illness representations were included in the model, the effects of treatment (as indicated by β) were reduced. The Sobel test, used for the post hoc examination of the models, indicates that illness representations represent significant mediators of the influence of treatment both on heart-focused anxiety ($z = 3.98$, $p < .001$) and on quality of life ($z = 3.62$, $p < .001$).

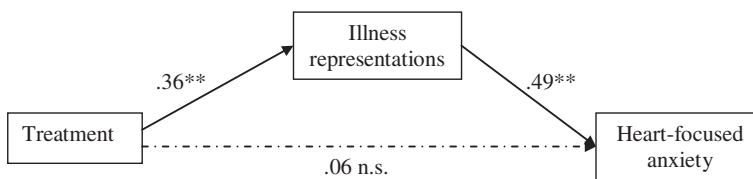


Figure 1. The mediational model with heart-focused anxiety as dependent variable. Note: ** $p < 0.001$; n.s. not significant.

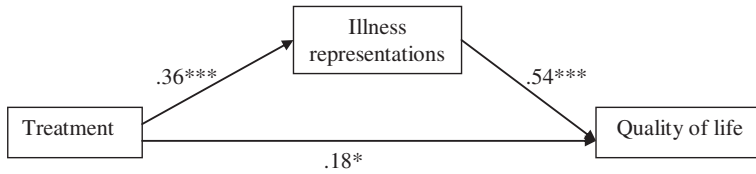


Figure 2. The mediational model with quality of life as dependent variable.
 Note: * $p < 0.05$; ** $p < 0.001$.

Discussion

The aim of the present study was to examine the potential mediating effect of illness representations in the relationships between the type of treatment cardiac patients have received (surgery vs. medication) and their quality of life and cardiac anxiety. The results confirmed the mediational role of illness representations.

The psychological consequences of surgery have been highlighted by previous research (O'Hara, Ghoneim, Hinrichs, Mehta, & Wright, 1989), which suggests patients become less anxious after surgery and that medical factors may play only an indirect role in this respect. Similarly, patients who had undergone cardiac surgery report a better quality of life 3 months after surgery (Juergens et al., 2010), while a review of the consequences of coronary artery disease surgery (Mayou, 1986) concludes that it improves patients' mental state and emotional states. The influence of the type of treatment on the two specific psychological outcomes (heart-focused anxiety and quality of life), indicated by our results, was also found in previous studies (Eifert et al., 1996).

Other studies showed that illness representations are associated with anxiety, quality of life, and depression (Foxwell et al., 2013). In the heart disease population, previous research showed that negative illness perceptions of cardiovascular disease are associated with poor quality of life and depressive symptomatology both in patients undertaking medication (Foxwell et al., 2013) and in patients who had undergone surgery (Yaraghchi, Rezaei, Mandegar, & Bagherian, 2012).

In our study, the relationship between the type of treatment and the two psychological outcomes was found to be mediated by illness representations. Specifically, patients who are taking medication perceived their illness more negatively, as having greater impact on their life and emotions, and as being more difficult to control than those who have undergone cardiac surgery. Furthermore, these negative illness perceptions lead to higher heart-focused anxiety and poorer quality of life. Other studies on cardiovascular disease patients revealed several relationships that are mediated by illness representations, such as the influence of between illness severity on depression (Greco et al., 2013), respectively, on health and life satisfaction (Meijer et al., 2009). Similarly, higher levels of anxiety are associated with negative illness perceptions in asthma sufferers, which further lead to greater asthma symptoms (McGrady et al., 2010).

Surgery is one of life experiences that have extremely salient psychological consequences. On the positive side, it offers patients the promise of relief from their disturbing symptoms, the increased ability to function, or at least the promise of survival (O'Hara et al., 1989). In many cases, it raises patients' hopes for rapid healing, consequently improving illness perceptions. In contrast, patients relying solely on medication perceive their illness as having a greater impact on their lives. In a study (Hirani et al., 2006) that analyzed the illness perceptions of patients with coronary artery disease who

had either undergone revascularization surgical treatments or were taking medication, the medication group was found to perceive their condition as significantly more long lasting than the revascularization groups. Patients saw the revascularization treatments as providing a cure for the condition, whilst the decision to begin ongoing medication may have been seen to be reflective of a more enduring condition.

Furthermore, the differences in illness representations between surgical and non-surgical (medication only) patients generate significant variations in quality of life and cardiac anxiety (Foxwell et al., 2013; Yaraghchi et al., 2012). As a result, the patients who have undergone cardiac surgery have a better quality of life and lower levels of heart-focused anxiety than those relying only on medication to treat their illness.

There are several limitations to this study. First, the small sample size limits statistical power and the reliability of the associations that were found. Studies in larger patient groups are needed in order to assess the accuracy of drawings. The small number of participants has also interfered with the control of the possible confounding variables. For instance, the sample is composed of patients with various types of heart disease; similarly, patients that had undergone different cardiac surgical procedures were merged as one group. Further studies that would analyze the relationships between illness representations, heart-focused anxiety, and quality of life in patients with specific types of heart disease and cardiac procedures are warranted. Future research could also examine the possibility that previous or comorbid illnesses may confound the relationships detected in our study. Other limitations of the present research are the fact that it relied on self-report data, and its cross-sectional and correlational nature, which limits the validity of causal inferences.

Chronic illness places a considerable burden on the individual and can have a significant impact on his quality of life. As our study and others suggest, the disruptive effects of illness and its treatments are mediated by the way patients perceive their medical condition. Since illness representations are highly influential in determining outcomes and accommodation in various medical conditions (Leventhal et al., 1997; Petrie & Weinman, 1997), further studies should investigate which psychological interventions on negative illness perception are effective in reducing cardiac anxiety and improving quality of life in both short and long term.

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