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Title: Emotional coping is a better predictor of cardiac prognosis than depression and anxiety

Running title: Emotional coping predicts cardiac prognosis

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Abstract

Objective: We compared, in a prospective study on patients with acute coronary syndrome, the predictive effect of a depression or anxiety diagnosis and of emotion-focused, problem-focused and dysfunctional coping strategies, as detected early after an acute event, on patients' left ventricular ejection fraction (LVEF), a reliable prognostic index of disease severity, at a three-month follow up.

Methods: Ninety consecutive patients following an acute coronary syndrome event (83.3% men; mean age 56.9 ± 8.9 years) were included in the study. Demographic and clinical characteristics, presence of depression and anxiety disorders (MINI), and active use of emotion-focused, problem-focused and dysfunctional coping strategies (Brief Cope) were assessed at the time of enrolment.

LVEF at a three-month follow up was used as the outcome measure. **Results:** The medical predictors of LVEF accounted for 10.6% of the variance of LVEF at follow up. Emotion-focused coping strategies significantly contributed for an additional 6.1%, while the presence of a depression and/or anxiety disorder was not a significant predictor of LVEF at follow up, nor were dysfunctional and problem-focused coping strategies. **Conclusion:** Emotion-focused coping strategies at the time of the cardiac event were the only reliable psychological predictor of disease severity at a three-month follow up. These findings hint to the possibility that variables such as emotional coping may be a fruitful target for psychological treatments directed at cardiac patients in primary care settings.

Keywords: acute coronary syndrome; cardiac rehabilitation; constructivism; depression; emotion-focused coping.

Abbreviations: ACS, acute coronary syndrome; BMI, body mass index; CABG, coronary artery bypass graft; DSM, diagnostic and statistical manual of mental disorders; ICD, international classification of diseases; LVEF, left ventricular ejection fraction; MINI, mini-international neuropsychiatric interview; NSTEMI, non-ST-elevation myocardial infarction; PCI, percutaneous coronary intervention; STEMI, ST elevation myocardial infarction.

Introduction

Psychological interventions for cardiac patients in primary care settings have to date mostly focused on depression and anxiety, selecting patients for treatment based on the type and intensity of the symptoms displayed [1, 2]. Outcome studies show that such symptom-based treatments consistently improve patients' quality of life, but their efficacy in improving also patients' heart condition is still far from conclusive [3, 4].

A general shortcoming of all symptom-based approaches is that they are not concerned with – and thus cannot address – the unique ways through which individuals attribute meaning to the events that happen to them. In contrast, constructive approaches emphasize the dynamic structure of human experience, and focus on the emotions, thoughts and behavioural strategies that lead an individual to develop a certain symptom, rather than on the symptom itself [5]. In other words, constructive approaches maintain that two individuals may display the very same psychological symptom (e.g., depression) following a cardiac event for quite different underlying reasons. For instance, a person may suffer primarily due to the belief that the event was determined by his own unhealthy behaviour (e.g., smoking), while another person may be mainly distressed by his helplessness in preventing and controlling the event. The crucial difference between these two individuals, in this view, does not rest on the nature or intensity of their depressive symptoms, but on their perception of personal control over the cardiac event, i.e. on their locus of control [6]. Similarly, the future course of the disease will more likely depend on the different strategies they will use to cope with the event, than on their symptomatology [7]. Consistent with this, it has been demonstrated that coping strategies following an acute cardiac event can influence psychological well-being, perceived quality of life and health-related behaviours [8, 9].

In particular, constructive approaches emphasize the role of emotions in shaping our perception and our explanation of ourselves and of the world, and in directing our thoughts and behaviours [5]. In the cardiological field, it has been suggested that emotional coping is especially

important and effective in the stressful and vulnerable time which follows discharge from hospital after an acute cardiac event [10]. When facing an unmodifiable event with lasting and potentially disabling consequences over one's body, emotion-focused strategies based on acceptance can be more relevant than problem-focused strategies aimed at directly modifying the situation, especially in the short term [11]. Indeed, effective emotion-focused coping has been related to higher functional capacity following open-heart surgery [12], but the influence of emotion-focused coping (and other forms of coping) over medical variables such as LVEF has still not been explored.

In the present study we compared, in a sample of patients with acute coronary syndrome (ACS), the predictive effect of a depression or anxiety diagnosis and of emotion-focused, problem-focused and dysfunctional coping strategies, as detected early after an acute event, on patients' left ventricular ejection fraction (LVEF), a reliable prognostic index of disease severity, at a three-month follow up [13]. Our hypothesis is that emotion-focused coping strategies might be a more significant predictor of LVEF than both: i) a depression or anxiety diagnosis; and ii) other forms of coping.

Method

Subjects. 98 consecutive patients admitted to the Coronary Care Unit of the San Giovanni Battista Hospital of Turin following an acute coronary syndrome event were enrolled in the study within a week from the event. 18 additional patients were not enrolled because they were older than 75 years of age, had concurrent pathologies affecting short- and medium-term prognosis (such as serious infection, cancer or significant organ dysfunction), had a history of stroke or psychotic illness, or did not speak Italian fluently. Of the 98 patients enrolled in the study, seven had to be excluded because it was not possible to administer the MINI and/or the Brief Cope to them before their discharge from the hospital, and one patient had to be excluded because he could not participate to the follow up. Thus, 90 patients (83.3% men; mean age 56.9 ± 8.9 years; mean education 10.4 ± 4.1

years) were ultimately included in the study. All the patients were New York Heart Association functional class I. 82.2% of them were discharged with an acute myocardial infarction diagnosis (50.0% STEMI, 32.2% NSTEMI), and 17.8% with an unstable angina diagnosis. 17.8% of the patients had diabetes, 65.6% hypertension, 53.3% dyslipidemia, 12.2% BMI \geq 30 kg/m², 51.1% were smokers, and 20.0% had a history of ACS events or PCI/CABG treatments. Mean LVEF at baseline was 53.7% \pm 7.9%, and at the three-month follow up 54.7% \pm 6.8%. All patients received standard treatment according to existing guidelines. The study and its consent procedures were approved by the Ethics Committee of the San Giovanni Battista Hospital of Turin. A written informed consent was obtained from each study patient.

Procedure and instruments. Demographic and clinical characteristics, presence of depression and anxiety disorders, and active use of emotion-focused, problem-focused and dysfunctional coping strategies were assessed at the time of enrolment. LVEF at a three-month follow up, determined by two-dimensional echocardiography using the area-length method, was used as the outcome measure. The categorical presence of a depression (current major depressive episode or dysthymia) and/or anxiety (panic disorder, phobias, post-traumatic stress disorder and generalized anxiety disorder) disorder was assessed with the Mini-International Neuropsychiatric Interview (MINI), a widely used structured interview compatible with the ICD and DSM criteria, which shows excellent inter-rater reliability (all kappa values above .70, with 70% of them .90 or above) [14]. The MINI was administered by a trained interviewer. Emotion-focused, problem-focused, and dysfunctional coping strategies were evaluated with the Brief-Cope, a 28-item self rating measure instrument [15], which was developed as a revised, shortened measure of the 60 item COPE questionnaire [16]. The items of the questionnaire are rated on a 0 ('not at all') to 3 ('a lot') point scale according to how much they pertain to the person, and are combined to form 14 subscales of coping reactions. The alpha reliabilities of the scales for the population of 294 participants involved in the validation study ranged from .50 to .90, with only three falling below

.60 [15]. Such subscales can be grouped in emotion-focused coping strategies (acceptance, emotional support, humour, positive reframing, religion), problem-focused coping strategies (active coping, instrumental support, planning), and dysfunctional coping strategies (behavioural disengagement, denial, self-distraction, self-blame, substance abuse, venting) [17]. Internal consistencies for emotion-focused, problem-focused, and dysfunctional subscales are good (respectively, 0.72, 0.84, 0.75) [18].

Statistical Analysis. Simple regression analyses were conducted to assess the relation between the study outcome (LVEF at follow up) and the psychological predictor variables (depression and/or anxiety diagnosis; emotion-focused coping; problem-focused coping; dysfunctional coping). A hierarchical multiple linear regression analysis was then performed with LVEF as the dependent variable. STEMI infarction, hypertension, and smoking, which have been identified by the literature as reliable medical predictors of LVEF [19, 20, 21], were entered together in the first block of the analysis. In the following blocks, the variables of interest were entered: presence of a depression and/or anxiety disorder (block 2), use of dysfunctional coping strategies (block 3), use of problem-focused coping strategies (block 4), and finally use of emotion-focused coping strategies (block 5). The order in which the blocks of predictors were entered in the regression model was meant to identify the specific influence of emotion-focused coping on LVEF after controlling for all the other factors possibly affecting the dependent variable. In particular, we wanted to assess the influence of emotion-focused coping after controlling not only for depression and anxiety, but also for the other types of coping strategies.

Results

30.0% of the patients showed at least one depressive or anxiety disorder: more specifically, 5.6% of the patients showed one or more depressive disorders, 18.8% showed one or more anxiety disorders, and 5.6% showed comorbidity of depressive and anxiety disorders. Mean scores for the

emotion-focused, problem-focused and dysfunctional coping scales were, respectively, $1.5 \pm .5$, $1.4 \pm .5$, and $.8 \pm .5$.

Simple regression analyses showed that, among these psychological variables, only for emotion-focused coping there was a significant unadjusted association with LVEF ($r^2 = .091$, $p = .004$; for depression/anxiety diagnosis $r^2 = .025$, $p = .138$; for problem-focused coping $r^2 = .038$, $p = .066$; for dysfunctional coping $r^2 = .002$, $p = .672$).

The results of the hierarchical multiple linear regression analysis are reported in Table 1. The medical predictors of LVEF (STEMI infarction, hypertension, and smoking) accounted for 10.6% of the variance of LVEF at follow up. Emotion-focused coping strategies significantly contributed for an additional 6.1%, revealing that individuals who were higher on emotion-focused coping showed higher LVEF at three months. Instead, the presence of a depression and/or anxiety disorder was not a significant predictor of LVEF at follow up (1.8%), nor were dysfunctional (<0.1%) and problem-focused coping strategies (2.5%). The condition index never exceeded 11.0 and the variance inflation factor never exceeded 1.6, suggesting that multicollinearity between our predictor variables was low [22].

Discussion

In this sample of ACS patients, emotion-focused coping strategies at the time of the cardiac event were a reliable predictor of disease severity at a three-month follow up, while depression and anxiety did not produce a significant change in R^2 . These findings should be interpreted cautiously due to the small sample size, but they are consistent with previous work showing that coping strategies and disease-related beliefs play an important role in health behaviours and disease adjustment [23, 24]. By showing that patients' coping strategies after a cardiac event are more strictly associated with future disease severity than expressed symptomatology, they support the

emphasis of the constructive perspective on the different modalities that individuals use to make sense of the events that happen to them and to deal with these events [5]..

Also, the finding that emotion-focused coping was a better predictor of cardiac functioning than the other forms of coping is in line with the constructivist view that emotions play a crucial role in the way we attribute meaning to life experience [5]. More research is needed to uncover the mechanisms which mediate the association between emotion-focused coping and LVEF, but one possibility is that coping strategies oriented toward emotional regulation contribute to successfully manage negative emotions and therefore to better moderate the activation of the sympathetic nervous system and of the hypothalamic-pituitary-adrenal axis, resulting in a reduced cardiovascular reactivity to stress [25].

A possible implication of our results is that interventions based not solely on patients' symptoms of psychological distress, but also on their idiosyncratic representation of themselves and of the world may be of greater benefit in reaching a more complex and flexible adaptation to the cardiac condition and in fostering the behavioural change needed for a better recovery. One way to improve emotional coping strategies in patients who recently suffered a cardiac event is to increase their emotional awareness, i.e. their ability to observe their emotions (also in relation to the cardiac event) in a non-evaluative, accepting manner, in order to promote more efficient recovery from stressful situations [26, 27]. Future studies will need to confirm the efficacy of psychological treatments based on a constructive approach, and to disentangle the possible causal relationships between explicative and descriptive (symptomatological) variables in patients with heart disease.

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