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Psychiatric–Medical Comorbidity

The Psychiatric–Medical Comorbidity section will focus on the prevalence and impact of psychiatric disorders in patients with chronic medical illness as well as the prevalence and impact of medical disorders in patients with chronic psychiatric illness.

Persistent and fluctuating anxiety levels in the 18 months following acute myocardial infarction: the role of personality☆,☆☆

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ABSTRACT

Objective: To identify the varying courses of anxiety symptoms in the first 18 months after a myocardial infarction (MI) and to examine the importance of personality in determining elevated anxiety.
Methods: Four hundred eighty-six MI patients completed the State-Trait Anxiety Inventory during hospitalization and at 2-, 12- and 18-months post-MI. At baseline, patients also completed the DS14 Type D personality scale, Anxiety Sensitivity Index and Beck Depression Inventory, and clinical and sociodemographic information was collected.
Results: Growth mixture modeling analysis identified four anxiety trajectories. The majority of patients reported stable anxiety scores over time, indicative of either persistent high (17%) or low (71%) anxiety. Patients in the other two smaller groups initially reported moderate levels of anxiety that fluctuated during follow-up. Type D personality [odds ratio (OR)=5.34; 95% confidence interval (CI): 2.26–12.63], negative affectivity (OR=3.24; 95% CI: 1.29–8.14) and anxiety sensitivity (OR=3.35; 95% CI: 1.69–6.62) were the most prominent determinants of persistent high anxiety, independent of depression, sociodemographic and clinical factors.
Conclusions: The course of anxiety in the first 18 months after MI is relatively stable for the majority of patients. Patients with Type D personality, negative affectivity and anxiety sensitivity are at an increased risk for persisting elevated anxiety and should be identified and offered appropriate treatment.

1. Introduction

In recent years, there has been an increased interest in the study of anxiety as a risk factor for poor health outcomes in patients with acute myocardial infarction (MI). Anxiety is prevalent in post-MI patients, with prevalence rates ranging from 20 to 60% and has been associated with impaired quality of life, poor adherence to cardiac rehabilitation and an increased risk of new cardiovascular events or mortality [1–5]. The general approach to studying anxiety in the context of MI has been to examine prevalence rates or changes in mean anxiety scores over time. However, such an approach may mask subgroups of patients with varying anxiety trajectories.

To date, only one study has explored the course of anxiety in a sample of MI patients [6]. Van Beek et al. assessed cardiac anxiety in 194 patients and identified four trajectories: three patient groups had stable anxiety levels during the first year after MI, indicative of high (8%), intermediate (45%) and low (30%) levels of anxiety; the fourth group (17%) reported high levels of anxiety that decreased over time [6]. However, this study used the Cardiac Anxiety Questionnaire, which measures specific fears about heart disease and not general anxiety symptoms. In addition, the study was conducted in a relatively small sample, with only 15 patients in the stable high anxious group. Hence, it was impossible to conduct multivariable analyses to examine the independent determinants of high (cardiac) anxiety.

It is particularly important to get insight into the characteristics of patients with persistent high anxiety levels, as this might lead to lower quality of life and poor cardiac prognosis [7]. Previous research has proposed several associates of elevated anxiety levels after an acute cardiac event, including demographic, clinical and psychological factors [6,8–10]. Regarding psychological factors, these studies have mainly focused on the association between anxiety and other psychological states like depression and loneliness, while the importance of personality traits like the "distressed" (Type D) personality and anxiety sensitivity is poorly understood. Better knowledge in this area is essential for the timely identification of patients at risk for long-lasting distress after MI who may warrant additional treatment for secondary prevention.

Hence, the objectives of the current prospective cohort study were (a) to identify the trajectories of general anxiety symptoms in the first

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18 months after hospitalization for acute MI and (b) to examine the relative importance of individual differences in personality (i.e., Type D and anxiety sensitivity) in determining high anxiety levels, after adjustment for depression and sociodemographic and clinical risk factors.

2. Methods

2.1. Study design and participants

Between May 2003 and June 2006, patients hospitalized for acute MI were included from four hospitals in the Netherlands (Catharina Hospital, Eindhoven; St. Elisabeth Hospital, Tilburg; TweeSteden Hospital, Tilburg; St. Anna Hospital, Geldrop). MI was defined according to the following criteria: Troponin I levels more than twice the upper limit, with typical ischemic symptoms (e.g., chest pain), lasting more than 10 min or electrocardiogram evidence of ST segment elevation or new pathological Q-waves. Patients with significant cognitive impairments (e.g., dementia) or severe comorbidities (e.g., cancer) were excluded. Patients completed a battery of self-reported questionnaires during initial hospitalization for MI (baseline) and at 2-, 12- and 18 months post-MI. Demographic and clinical variables were obtained from the medical records or through purpose-designed questions. The research protocol was approved by the medical ethics committees of the participating hospitals, and the study was conducted in accordance with the Helsinki Declaration. After complete description of the study to the patients, informed consent was obtained.

2.2. Measures

2.2.1. Demographic and clinical characteristics

Demographic variables included age, gender, marital status, education level and employment status. Clinical variables included cardiac history [MI, percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG) prior to the index MI], left ventricular ejection fraction (LVEF), multivessel disease, anterior location of the index MI, invasive (CABG/PCI) versus conservative treatment for index MI, systolic and diastolic blood pressure (BP) at time of admission for index MI, hypercholesterolemia (total cholesterol >6.50 mmol/L), hypertension (systolic BP>140 mmHg, diastolic BP>90 mmHg), somatic comorbidities [arthritis, diabetes, renal insufficiency, chronic obstructive pulmonary disease (COPD)], smoking status, body mass index (BMI) and participation in cardiac rehabilitation after the index MI. In addition, the following medications prescribed to the patient at discharge were collected: beta-blockers, angiotensin converting enzyme (ACE) inhibitors, anticoagulants, statins, diuretics, aspirin and selective serotonin reuptake inhibitors (SSRIs).

2.2.2. Anxiety symptoms

At four time points, symptoms of anxiety were assessed using the State Trait Anxiety Inventory (STAI) [11]. The STAI is a self-report measure consisting of two 20-item scales developed to measure the level of general state and trait anxiety. In the current study, we used the State scale of the STAI to assess fluctuating levels of anxiety. Items are rated on a 4-point Likert-scale from 1 (*not at all*) to 4 (*very much so*), with a higher score indicating a higher level of anxiety (score range: 20–80). A score of ≥40 is indicative of clinical levels of anxiety [12]. The STAI has been demonstrated to have adequate validity and reliability, with Cronbach's alpha ranging from 0.87 to 0.92 [13]. Cronbach's alpha in this study ranged from 0.94 to 0.95 at the four time points.

2.2.3. Type D personality

Type D personality is defined as the tendency to experience negative emotions across time and situations paired with the inhibition of these emotions and has been consistently related to higher levels of emotional distress in cardiovascular patients [14]. At baseline, patients completed the 14-item Type D scale (DS14) to assess Type D personality. The DS14 consists of two 7-item subscales: negative affectivity (NA) (e.g., "I often feel unhappy") and social inhibition (SI) (e.g., "I am a closed kind of person") [15]. Items are answered on a 5-point Likert scale ranging from 0 (*false*) to 4 (*true*), with total scores ranging from 0 to 28 for both subscales. To examine the differential predictive value of the components of Type D, we divided the patients into four groups: (a) score <10 on both subscales; (b) score ≥10 on the NA subscale only; (c) score ≥10 on the SI subscale only; (d) score ≥10 on both subscales (Type D) [16]. The DS14 is a valid and reliable scale with Cronbach's alpha of 0.88 and 0.86 for the NA and SI subscales, respectively [15]. In the current study, these alpha values were 0.87 and 0.86. The DS14 is a stable measure of Type D personality over an 18-month period, and scores are not affected by cardiac disease severity [17].

2.2.4. Anxiety sensitivity

At baseline, the Anxiety Sensitivity Index (ASI) was used to assess anxiety sensitivity, which refers to the fear of anxiety-related sensations based on beliefs that these sensations will have harmful consequences such as illness or additional anxiety [18]. It is important to distinguish anxiety sensitivity from state anxiety, with the latter referring to the frequency of occurrence of anxiety symptoms. Anxiety sensitivity has been related to high levels of distress and lower quality of life in other cardiac patient groups [19,20] but was not yet investigated in MI patients. The ASI questionnaire comprises 16 items that tap into concerns of anxiety-related sensations (e.g., "When I notice that my heart is beating rapidly, I worry that I might have a heart attack." and "It scares me when I feel faint."). Respondents indicate their strength of endorsement for each item on a 5-point Likert scale that ranges from 0 (*very little*) to 4 (*very much*). Total scores can range from 0 to 64, with higher scores reflecting greater sensitivity and fear of anxiety symptoms. The ASI has proven to have a good reliability and validity as a measure of anxiety sensitivity [21]. In our study, the reliability of the ASI was also good, with a Cronbach's alpha of 0.91. Since there is no standardized cut-off for the ASI, we used a median split (i.e., ASI >10) to dichotomize ASI scores [20].

2.2.5. Depressive symptoms as potential confounders

To examine whether Type D and anxiety sensitivity traits have additive predictive value in terms of anxiety post-MI, we also controlled for the potential confounding effect of depressive symptoms at baseline. The Beck Depression Inventory (BDI) is a 21-item self-report questionnaire designed to assess the presence and severity of depressive symptoms [22]. Each item is rated on a 0–3 scale, and a total score is obtained by adding up all item scores, with a higher score indicating more severe depression. A BDI score of ≥10 is indicative of at least mild to moderate symptoms of depression and has been linked to an increased risk for poor prognosis in cardiac patients [23]. The BDI is a reliable and well-validated measure of depressive symptoms with a Cronbach's alpha of 0.81 in nonpsychiatric samples [24]. The Cronbach's alpha in the current sample was 0.82.

2.3. Statistical analyses

Growth mixture modeling (GMM) with the STAI score as outcome was used to identify classes of patients with similar course trajectories on the STAI. In GMM, individual variation on anxiety within classes is allowed and is represented by random effects (Mplus User's Manual, chapter 8, www.statmodel.com). Robust Maximum likelihood estimation (MLR) was used to estimate model parameters. Because MLR was used, all patients with at least the baseline measurement and one other STAI measurement during follow-up could be included in the GMM analyses (using the Mplus mixture missing functionality). Each analysis was run with 250 initial random starts and 50 final stage optimizations to avoid local solutions. Analyses started with a one class model, and the number of classes was expanded until the best model fit was found. Model fit was determined using different sources. First,