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Published in:
Journal of Affective Disorders

Publication date:
2006

Document Version
Publisher's PDF, also known as Version of record

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):
Martens, E. J., Denollet, J., Pedersen, S. S., Scherders, M. J., Griez, E., Widdershoven, J. W., Szabó, B. M., & Appels, A. (2006). Relative lack of depressive cognitions in post-myocardial infarction depression. *Journal of Affective Disorders*, 94(1-3), 231-237.

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Research report

Relative lack of depressive cognitions in post-myocardial infarction depression ☆

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Received 10 February 2006; received in revised form 10 April 2006; accepted 12 April 2006

Available online 2 June 2006

Abstract

Background: Depression has been associated with adverse clinical events in myocardial infarction (MI) patients, but many questions about the nature of post-MI depression remain unanswered. We examined whether depressive cognitions characteristic of depression in psychiatric patients are also present in post-MI patients with major depression (MD).

Methods: Non-depressed ($n=40$) and depressed ($n=40$) post-MI patients, and psychiatric outpatients ($n=40$) treated for clinical depression, matched on age and sex, were interviewed using a structured clinical interview to diagnose DSM-IV MD. All patients also completed the Beck Depression Inventory (BDI) and the Beck Cognition Checklist-Depression subscale (CCL-D).

Results: Mean levels of depressive cognitions were considerably higher in depressed psychiatric patients compared with depressed post-MI patients (34.9 versus 28.0; $p=.013$), and higher in depressed post-MI patients compared with non-depressed post-MI patients (28.0 versus 17.8; $p<.0001$), adjusted for age, sex, educational level, and marital status. Younger age ($p=.024$), absence of a partner ($p=.016$) and depressed psychiatric status ($p=.016$) were independently associated with depressive cognitions. Psychiatric patients also had higher mean levels of depressive symptoms as compared to depressed post-MI patients (25.1 versus 17.8; $p=.001$).

Limitations: This study is based on a cross-sectional design.

Conclusions: The symptom presentation of MD in post-MI patients is both quantitatively and qualitatively different from that seen in psychiatric patients, suggesting that depressive symptoms in post-MI patients differ in content from those in psychiatric patients. These findings could have important consequences for the design and contents of therapeutic programs for treating depression in post-MI patients.

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Keywords: Depression; Depressive cognitions; Depressive symptoms; Major depression; Myocardial infarction

☆ Previous presentation: This work was presented at the annual meeting of the American Psychosomatic Society; March 3, 2005; Vancouver, Canada.

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1. Introduction

Depression is an emerging risk factor for the development of coronary artery disease (CAD) (Barrick, 1999; Rafanelli et al., 2005), and about one in five patients is affected by major depression (MD) following myocardial infarction (MI) (Carney et al., 1990). Both clinical depression and depressive symptoms have been associated with a two-fold increased risk of mortality, and increased morbidity and re-hospitalisation post-MI (Barefoot et al., 1996; Frasure-Smith et al., 1993; Frasure-Smith et al., 1995; Ladwig et al., 1994; Lespérance et al., 2002), although negative findings have been reported (Mayou et al., 2000; Sørensen et al., 2005). In turn, symptoms of depression moderate the benefits of cardiac rehabilitation, with depressed patients benefiting less from rehabilitation (Von Känel et al., 2005).

Despite a growing body of literature, many questions about the nature of depression in patients with CAD remain unanswered (Denollet et al., *in press*). In addition, the relative importance of the different components of depression in post-MI patients has not been investigated systematically. According to Barefoot et al. (2000), it is necessary to move beyond demonstrations of these effects to a more detailed understanding of the phenomenon of depression in CAD patients. This would likely lead to more optimal risk stratification in clinical practice and enhance secondary prevention in these patients (Coulehan et al., 1988), in particular in light of the recent mixed findings of the ENRICH and SADHART trials (Berkman et al., 2003; Glassman et al., 2002) that targeted depression. A reduction in depressive symptoms in these trials did not lead to enhanced survival, although improvements in quality of life were seen in the SADHART trial (Swenson et al., 2003).

The clinical presentation of depression in medical patients may be less severe and symptoms more atypical compared with symptoms found in depressed psychiatric samples (Clark et al., 1998). Typical symptoms of depression in psychiatric patients, such as low self-esteem, guilt and suicidal ideation, are generally uncommon in CAD patients, with less typical symptoms, such as anxiety and irritability, being more prevalent (Fava et al., 1996). In addition, it is not known whether negative cognitions characteristic of depression in psychiatric patients are present in depressed post-MI patients. According to the cognitive theory of Beck et al. (1979), these depressive cognitions include negative views of the self, current experiences, and the future. Like all theories of depression, the cognitive theory was formulated and tested primarily in younger, psychiatric, and treatment-seeking people

rather than in older, frequently subthreshold depressed, post-MI patients (Davidson et al., 2004). Furthermore, it is possible that the somatic manifestations of depression such as fatigue, weight loss and insomnia are interpreted as reflections of the medical condition and its treatment. According to Katon (1987), too often patients' physical complaints are treated as symptomatic of CAD, with the underlying depression being left untreated.

The aim of the current study was to examine the extent to which depressive cognitions are characteristic of post-MI depression. In a matched case–control design, we compared depressed and non-depressed post-MI patients with depressed psychiatric patients on levels of depressive cognitions.

2. Methods

2.1. Patient population and design

The study was conducted at the Maastricht University Hospital and three teaching hospitals (Catharina Hospital, Eindhoven; St. Elisabeth Hospital, Tilburg; and Tweesteden Hospital, Tilburg) between December 2000 and June 2004. The study was approved by the medical ethics committees of the participating hospitals. The study was conducted in accordance with the Helsinki Declaration, and all patients provided written informed consent.

Non-depressed ($n=40$) and depressed patients ($n=40$) with acute MI admitted to the coronary care unit, and psychiatric outpatients ($n=40$) treated for clinical depression in the psychiatry unit, were matched on age and sex. Inclusion criteria were age between 30 and 80 years, hospitalization due to MI (MI patients), or being treated for clinical depression (psychiatric patients). Exclusion criteria were significant cognitive impairments (e.g. dementia) and severe comorbidities (e.g. cancer for post-MI patients and psychosis for psychiatric patients).

For the diagnosis of MI, patients must have had troponin I levels more than twice the upper limit, with typical ischemic symptoms (e.g. chest pain) lasting for more than 10 min or ECG evidence of ST segment elevation or new pathological Q-waves. All MI patients were interviewed two months post-MI (mean (SD)=63 (16.3)). Psychiatric outpatients were interviewed in the psychiatry unit during treatment for clinical depression.

Patients were evaluated carefully by a trained psychologist using the Structured Clinical Interview for DSM-IV Axis I disorders (SCID) (First et al., 1997) or the Composite International Diagnostic Interview (CIDI) for DSM-IV (WHO, 1990). Also obtained were demographic variables, and responses on two self-report depression measures.

2.2. Assessment

2.2.1. Diagnosis of depression

A diagnosis of DSM-IV current major depressive disorder (APA, 1994) was assessed by a standardized structured interview. The SCID was used to diagnose the patients in the Maastricht University Hospital, while the CIDI was used in the three other hospitals. Although the CIDI may underdiagnose disorders compared with the SCID (Beals et al., 2004), it performs well as a research instrument to diagnose MD in medically ill patients (Booth et al., 1998). In addition, both the SCID and CIDI are widely known instruments for assessing MD and have been used in studies of MI patients (van den Brink et al., 2002; Strik et al., 2004). According to the DSM-IV, a diagnosis of MD requires the presence of at least one core symptom (depressed mood or loss of interest), persisting for at least two weeks and accompanied by at least four of the following additional symptoms: changes in appetite or weight; sleep difficulties; fatigue; psychomotor agitation or retardation; difficulty concentrating; feelings of guilt or worthlessness or thoughts of death or suicide. In addition, these symptoms must lead to significant functional impairment and represent a change from previous functioning.

2.2.2. Symptoms of depression

The Beck Depression Inventory (BDI) is a 21-item self-report measure developed to assess the presence and severity of depressive symptoms. Each item is rated on a 0 to 3 scale. A total score is obtained by summing together all the items. The cognitive/affective subscale score was calculated by summing together items 1–13, while the remaining items were summed to obtain the somatic subscale (Beck and Steer, 1993). The BDI is a reliable and well-validated measure of depressive symptomatology (Beck et al., 1988; Furlanetto et al., 2005; Welch et al., 1990), and has been recommended for the assessment of psychosocial risk factors in CAD (Albus et al., 2004). A BDI total score ≥ 10 is indicative of at least mild to moderate symptoms of depression and has been associated with poor prognosis in MI patients (Frasure-Smith et al., 1995; Frasure-Smith et al., 1999; Grace et al., 2004; Lespérance et al., 2002).

2.2.3. Depressive cognitions

The 26-item Cognition Checklist (CCL) was developed by Beck et al. to assess the frequency of automatic thoughts or cognitions relevant to anxiety (12 items) and depression (14 items) (Beck et al., 1987). In the present study, we only assessed depressive cognitions (CCL-D). These items reflect negative thoughts about one's self,

past experiences, and future expectations (Steer et al., 1994). The following items illustrate the content of the CCL-D subscale: "I don't deserve to be loved", "I am a social failure", "I am worthless", "I am not worthy of people's attention or affection". The CCL-D items are rated on a 5-point scale, ranging from "never" (1) to "always" (5), with a score range of 14–70. A total score for the CCL-D is obtained by summing the ratings for the 14 items. Steer et al. have reported extensive validity and reliability data on the CCL, with Cronbach's alpha of .93 (Steer et al., 1994).

2.3. Definition of non-depressed versus depressed status

All patients were evaluated by means of a standardized structured interview. Post-MI patients were classified as non-depressed if they had a BDI score of < 10 and no diagnosis of MD. Depressed status in post-MI and psychiatric patients was determined by a diagnosis of MD using the CIDI or the SCID.

2.4. Statistical analysis

The χ^2 test and analysis of variance (ANOVA) were used to examine differences in baseline characteristics between the non-depressed and depressed post-MI patients and depressed psychiatric patients. The mean level of depressive cognitions was examined by ANOVA (GLM) with a post hoc Bonferroni test. Multiple linear regression analysis was used to examine to which extent depressive cognitions are present in depressed post-MI patients as compared to depressed psychiatric patients. In all analyses we adjusted for age, sex, marital status, and educational level. All statistical analyses were performed using SPSS 12.0.1 for Windows.

Table 1
Demographic characteristics of post-MI patients and psychiatric patients

	Post-MI patients without MD (n=40)	Post-MI patients with MD (n=40)	Psychiatric patients with MD (n=40)	p
Age, mean $\pm$ SD	54.6 $\pm$ 4.4	56.1 $\pm$ 9.0	53.8 $\pm$ 9.5	.406
Female sex, n(%)	15 (38)	12 (30)	18 (45)	.383
Marital status				
Partner, n(%)	36 (90)	24 (63)	28 (70)	.018
Educational level				
High, n (%)	21 (53)	15 (41)	24 (60)	.229

3. Results

Matching on gender and age was successful, as we found no differences between the three groups on gender and age (Table 1). However, non-depressed post-MI patients were more likely to have a partner than the depressed post-MI ($p=.005$) and psychiatric patients ($p=.026$). No other statistically significant differences were found between the groups on baseline characteristics.

3.1. Depressive cognitions in post-MI versus psychiatric patients

Levels of depressive cognitions stratified by group are presented in Fig. 1. Post-MI patients without depressive symptoms and post-MI patients with clinical depression differed significantly in mean CCL-D scores (17.8 versus 28.0; $p<.0001$). Importantly, depressed psychiatric patients reported significantly higher mean levels of depressive cognitions as compared to post-MI patients with clinical depression (34.9 versus 28.0; $p=.013$), adjusting for age, sex, educational level, and marital status.

Fig. 1. Depressive cognitions in post-MI patients and psychiatric patients, stratified by absence of depressive symptoms as indicated by BDI < 10 and by diagnosis of major depression. Mean CCL-D score $\pm$ standard deviation are presented within each bar. Standard errors and p values are displayed. CCL-D: 14-item self-report measure assessing cognitions characteristic of depression. Depressive symptoms: decreased levels of depressive symptoms as indicated by BDI score < 10. Major depression: diagnosis of major depression by means of a structured diagnostic clinical interview.

Table 2

Predictors of depressive cognitions in depressed psychiatric patients as compared to depressed post-MI patients

	Regression model	
	Beta	p
Age	-.255	.024
Sex	.074	.524
Marital status		
Partner vs. no partner	.260	.016
Educational level		
Higher vs. lower education	-.138	.218
Disease status		
MI ^a vs. psychiatric ^b	.272	.016

^a Post-MI patients with a clinical diagnosis of major depression according to DSM-IV criteria.

^b Psychiatric patients with a clinical diagnosis of major depression according to DSM-IV criteria.

3.2. Independent predictors of depressive cognitions

A multiple linear regression analysis entering age, sex, marital status, educational level, and depressed disease status revealed that younger age, absence of a partner, and depressed psychiatric status were independently associated with depressive cognitions (Table 2). An adjusted R^2 of .185 ($F(5, 71)=4.445$, $p=.001$) indicated that 19% of the variance of the CCL-D scores was explained by the variables included in the tested model.

Fig. 2. Depressive symptoms in post-MI patients and psychiatric patients with a diagnosis of major depression. BDI: 21-item self-report measure assessing depressive symptoms. Major depression: diagnosis of major depression by means of a standardized structured interview.

3.3. Depressive symptoms in post-MI versus psychiatric patients

Examining the level of depressive symptoms in the two MD groups revealed that depressed psychiatric patients had higher mean levels of depressive symptoms as compared to depressed post-MI patients (25.1 versus 17.8; $p=.001$), indicating that psychiatric patients are more severely depressed (Fig. 2).

In order to further investigate the nature of depressive symptoms in depressed post-MI patients compared with psychiatric patients, we divided the scores on the BDI into cognitive/affective symptoms and somatic symptoms. The cognitive/affective symptoms of depression were more prevalent in depressed psychiatric patients as compared to depressed post-MI patients (mean=15.4 versus 9.8; $p<.0001$). However, there was no statistically significant difference in somatic symptoms between depressed post-MI and psychiatric patients (mean=9.7 versus 8.0; $p=.127$).

4. Discussion

To our knowledge, this study is the first to investigate the presence of depressive cognitions in post-MI patients with a diagnosis of MD. A significant difference in depressive cognitions was found between post-MI and psychiatric patients, with depressive cognitions being less prevalent in post-MI patients with clinical depression as compared to depressed psychiatric patients. In addition, post-MI patients with MD had significantly more depressive cognitions as compared to post-MI patients without MD, confirming the validity of the CCL-D in cardiac patients. Psychiatric disease status was an independent predictor of depressive cognitions, adjusting for all baseline characteristics.

This finding is consistent with those of Clark et al. (1998) who also found that psychiatric inpatients had more depressive cognitions than patients with somatic disease. Their study also used the CCL-D to assess depressive cognitions and compared depressed psychiatric inpatients and medical patients (including CAD patients) with a normal control group. Others have also reported a difference in the nature of depressive symptoms between depressed psychiatric and depressed CAD patients, with depressive symptoms in CAD patients being more atypical compared to symptoms seen in psychiatric patients (Fava et al., 1996; Freedland et al., 1992). Symptoms of depression typically seen in psychiatric patients, including low self-esteem, guilt and suicidal ideation, are often replaced by less typical symptoms such as anxiety and irritability in depressed

CAD patients (Fava et al., 1996). CAD patients tend to normalize their depression and attribute symptoms of depression to their heart disease. This makes it less likely for them to consider emotional causes for their complaints (Lespérance and Frasere-Smith, 2000).

Examining the level of depressive symptoms in depressed post-MI and psychiatric patients also revealed that psychiatric patients had higher levels of depressive symptoms, indicating that psychiatric patients are more severely depressed. Cognitive/affective symptoms of depression were more prevalent in the depressed psychiatric patients as compared to post-MI patients with MD. Conversely, depressed post-MI patients tended to report more current somatic symptoms of depression than depressed psychiatric patients, although this difference was not statistically significant. Overall, these findings indicate that the symptom presentation of MD in post-MI patients is both quantitatively and qualitatively different from that seen in psychiatric patients. In addition, these results confirm the notion that depressive symptoms reported by post-MI patients may differ in content from those reported by psychiatric patients, at least in terms of cognitive/affective symptoms.

Two recent studies, also using the BDI to assess depressive symptomatology, have shown differential effects of somatic and cognitive symptoms of depression on medical comorbidity and prognosis in post-MI patients (De Jonge et al., 2006; Watkins et al., 2003). Watkins et al. (2003), found that somatic and cognitive symptoms of depression were significantly related to medical comorbidity, but the variance explained by the cognitive symptoms was less than 1%. Other research showed that cognitive/affective symptoms of depression were not related to cardiovascular prognosis and only marginally related to health status, whereas somatic/affective symptoms were significantly related to health status and prognosis (De Jonge et al., 2006). In comparison, Barefoot et al. (2000), reported negative affect but not somatic symptoms to be predictive of mortality in CAD patients.

It has been suggested that the results of the ENRICHD trial, targeting depression in MI patients by means of cognitive-behavioral therapy (CBT), might have been influenced by the duration and timing of the intervention (Berkman et al., 2003) and demographic characteristics of the participants (Schneiderman et al., 2004). The findings of the present study suggest that the results of the ENRICHD study may also have been influenced by the mode of treatment. Given the fact that depressive cognitions were less prevalent in post-MI patients, it is possible that CBT is not the treatment of choice for some depressed post-MI patients.

Taken together, these results show that it is important not only to identify the nature of depressive symptomatology in post-MI patients, but also those symptoms that are most toxic in terms of predicting morbidity and mortality in these patients (Doyle et al., 2006). Hence, knowledge of the characteristic features of depression in post-MI patients has both theoretical and clinical significance. It may help clarify the etiology of the disorder, guide the training of physicians in diagnosing the disorder in clinical practice, and help clinicians target their treatment procedures more precisely (Coulehan et al., 1988). In addition, a better understanding of the syndrome of depression in post-MI patients is crucial to modify the depression mortality link by means of therapy, be it psychological, pharmacological, or a combination thereof.

Given the preliminary nature of this study, the findings need to be interpreted with some caution. First, the study was cross-sectional and does not allow for the determination of cause and effect. Second, the sample size was relatively small. Third, the use of two different standardized structured interviews may have influenced our results. Fourth, we had no information on severity of MI and length of treatment for depression in the psychiatric patients.

Despite these limitations, the present study also has a number of strengths. We used a structured clinical interview to assess MD in post-MI and psychiatric patients, patients were matched on age and sex, and we used a standardized measure of depressive cognitions and depressive symptoms. The BDI has been shown to predict adverse prognosis in post-MI patients (Frasure-Smith et al., 1995; Lespérance et al., 2002).

In conclusion, the results of this preliminary study show that the nature of depression in post-MI patients differs from depression seen in psychiatric patients, and that these differences are both quantitatively and qualitatively different. Further research into the nature of depression in post-MI patients is warranted together with the investigation of which depressive symptoms are most toxic in terms of predicting adverse health outcomes. These findings would have important consequences for the design and contents of therapeutic programs for treating depression in post-MI patients.

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