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Brief Report

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Distinct distress symptom trajectories over three years are associated with baseline illness perceptions in individuals with coronary heart disease

Joseph Chilcot PhD¹, **Ester Lee** MSc¹, **Andre Tylee** MD FRCGP FRCPsych², **June Brown** PhD³, **John Weinman** PhD^{1,4}, **Matthew Hotopf** PhD FRCPsych FMedSci⁵, **Jorge E. Palacios** PhD⁶

¹Health Psychology Section, Psychology Department, Institute of Psychiatry, Psychology and Neuroscience, King's College London

²Health Service and Population Research Department, Institute of Psychiatry, Psychology and Neuroscience, King's College London

³ Psychology Department, Institute of Psychiatry, Psychology and Neuroscience, King's College London

⁴Institute of Pharmaceutical Science, King's College London, UK

⁵Psychological Medicine Department, Institute of Psychiatry, Psychology and Neuroscience, King's College London

⁶e-Mental Health Research Group. School of Psychology, Trinity College Dublin

Corresponding author: Joseph Chilcot, PhD. Health Psychology Section, Psychology Department, Institute of Psychiatry, Psychology and Neuroscience, King's College London 5th floor Bermondsey Wing, Guy's Campus, London Bridge, London SE1 9RT (corresponding author) joseph.chilcot@kcl.ac.uk

Running head: Illness perceptions and distress trajectories in CHD

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Conflicts of interest: None to declare

Abstract

Background: Depression and anxiety symptoms (termed distress) are common among coronary heart disease (CHD) patients and associated with poor outcomes. Illness perceptions predict distinct outcome trajectories in other long-term conditions, yet it is not known how they relate to distress trajectories in CHD.

Purpose: This study aimed to examine whether baseline illness perceptions are associated with distress symptom trajectories among primary care CHD patients.

Methods: This is a secondary analysis of 803 CHD patients from the UPBEAT-UK study, who completed the Hospital Anxiety and Depression Scale every six months for three years. Baseline assessments included the Brief Illness Perception Questionnaire. Using latent class growth analysis, Palacios, et al (2018) identified five distinct distress symptom trajectories ('stable low', 'chronic high', 'improving', 'worsening', and 'fluctuating') in this cohort. Adjusted multinomial logistic regression analyses were used to test the association between baseline illness perceptions and distress symptom trajectories.

Results: Compared with the stable low distress trajectory, stronger illness identity (OR = 1.31, $p < 0.01$), higher perceived consequences (OR = 1.47, $p < 0.01$), illness-related emotion (OR = 1.66, $p < 0.01$) and illness concerns (OR = 1.36, $p < 0.01$) increased the odds of having chronic high distress. Stronger illness coherence (OR = 0.89, $p < 0.05$), personal (OR = 0.77, $p < 0.01$) and treatment control (OR = 0.75, $p < 0.01$) reduced the odds of chronic high distress. Worsening distress symptoms were associated with weaker perceptions of treatment control, higher perceived consequences and greater illness related concerns and emotions.

Conclusions: Illness perceptions of CHD are associated with distress symptom trajectories. Therapeutically modifying unhelpful illness perceptions in CHD patients who experience high levels of distress could potentially improve mental health outcomes.

Key words: CHD; coronary heart disease; illness perceptions; distress; depression; anxiety

Introduction

It is well established that the prevalence of depression and anxiety disorders is higher among individuals with coronary heart disease (CHD) than that of the general population [1,2].

Depression and anxiety symptoms (termed here as distress) in CHD patients are associated

with adverse clinical outcomes and events [3], including poorer survival [4,5]. Recently, Palacios et al [6] prospectively evaluated distinct distress symptom trajectories in relation to disability and health-care costs in over 800 CHD patients from the UPBEAT-UK study [7]. Over a 3 year follow-up, they identified five distinct distress symptoms trajectories; ‘stable low’, ‘chronic high’, ‘improving’, ‘worsening’, and ‘fluctuating’ [6]. Those with chronic high levels of distress had the highest association with smoking, presence of chest pain and poorer mental and physical health. Moreover, compared to the low-stable distress group, chronic high and worsening distress symptoms were associated with significantly higher health-care costs. Distress trajectories were not associated with comorbidities, including diabetes and hypertension, a history of myocardial infarction (MI) or obesity.

In the present study, we conducted a secondary analysis on this data [6] in order to evaluate whether patient’s perceptions of CHD were associated with these distress symptom trajectories. According to the Common Sense Model of self-regulation [8,9], illness perceptions are a set of cognitions surrounding an illness and its treatment that influence how patients respond to and cope with a health threat(s), which consequently contribute to health outcomes. A plethora of research has demonstrated associations between unhelpful illness perceptions and health outcomes [10], including worsening of disease progression [11,12], treatment non-adherence [13] and even mortality [14,15]. Furthermore, illness perceptions have been shown to be related to distinct patient-reported outcome trajectories (e.g. quality of life and depression symptoms) in individuals with long-term physical conditions [16,17], yet it is not known how they relate to distress trajectories in CHD patients. Accordingly, this study aimed to examine whether baseline illness perceptions are associated with depression and anxiety (distress) symptom trajectories among primary care patients with CHD, after controlling for demographic and cardiac related factors.

Methods

This is a secondary analysis utilising the distress trajectories identified by Palacios et al [6], which used data from a large cohort of CHD patients recruited into the UPBEAT-UK study [18]. Full study details are reported in these respective publications [6,18]. In summary, 803 patients with a confirmed diagnosis of CHD were recruited from 16 general practice surgeries in south east London. Patients completed the Hospital Anxiety Depression Scale (HADS) at baseline (time of recruitment into the study) and then every six months for three years. Illness perceptions of CHD were measured using the Brief illness perception questionnaire [19]. Eight items measured beliefs about CHD, scored on a Likert scale from 0 (not at all) to 10 (extremely) including perceptions of, *illness Identity, Consequences, Timeline, Personal Control, Treatment Control, Illness Coherence, Illness Concern* and *Illness Related Emotions*. Other baseline measures did include the Clinical Interview Schedule - Revised (CIS-R) [20], Rose Angina Questionnaire [21] and quality of life (12-item Short Form Survey; SF-12) [22].

Here we utilized the five distress trajectories ('stable low' [n=558], 'chronic high' [n=55], 'improving' [n=15], 'worsening' [n=64], and 'fluctuating' [n=111]) as identified by Palacios et al [6] using Latent Class Growth Analysis (LCGA). A total HADS score was used to measure distress as evidenced by a meta-confirmatory factor analysis showing that the measure is sufficiently unidimensional to justify the use a total score [23]. The probabilities of each individual belonging to each of the latent classes were calculated using maximum posterior probabilities. The associations between illness perceptions and class membership was evaluated using multinomial logistic regression, with estimated bootstrapped standard errors (500 resamples). Models were adjusted for the following covariates; age, sex, non-white ethnicity, 12 or more years of education, current smoker and chest pain. These variables were selected as covariates since they were all significantly associated with group membership in the original analysis [6]. In addition, we also adjusted for marital/cohabitation status

(married/cohabiting vs. single/non-cohabiting), physical component quality of life score and cardiac related factors (history of MI, heart failure and a history of any cardiac intervention).

Results

The CHD sample was mostly male (69.9%), white (87.3%), and retired (77.7%), with a mean age of 70.6 years (s.d= 10.9). 149 of 803 (18.6%) met criteria for a depressive or anxiety disorder according to the CIS-R at the baseline assessment. The average time since CHD diagnosis was 10.4 (s.d=7.9) years. Current reports of chest pain were prevalent in 356 (44.3%) of patients and 339 (42.2%) had a documented history of MI. 418 (52.1%) had a history of a previous cardiac intervention. A full summary of baseline characteristics is presented elsewhere [18].

Unadjusted and adjusted odds ratios (with 95% confidence intervals) for each illness perception in relation to distress group membership are shown in table 1. Compared with the stable low distress trajectory, stronger illness identity (adjusted odds ratio [OR] = 1.31, $p < 0.01$), higher perceived illness consequences (OR = 1.47, $p < 0.01$), greater illness-related emotion (OR= 1.66, $p < 0.01$) and more illness concerns (OR=1.36, $p < 0.01$) significantly increased the odds of having chronic high distress in adjusted models. Furthermore, stronger perceptions of personal control (OR= 0.77, $p < 0.01$), treatment control (OR= 0.75, $p < 0.01$) and illness coherence (OR=0.89, $p < 0.05$) were associated with reduced odds of chronic high distress, compared with the stable low trajectory. Put another way, a one point increase in either personal control or treatment control (i.e. higher control) reduced the odds of being in the chronic high distress group by approximately 25%, compared with the stable low group. With the exception of illness-coherence, these same illness perceptions had similar associations with fluctuating symptoms (as compared to the low stable trajectory). Worsening distress symptoms were associated with greater illness identity, higher perceived consequences, illness-related

emotion and illness concerns, compared with the stable low trajectory (table 1). Stronger perceptions of treatment control reduced the odds of the worsening distress symptoms (OR=0.89, $p<0.05$) in adjusted models. Only high illness related emotion was associated with an improvement in distress symptoms (OR=1.41, $p<0.01$).

Discussion

To our knowledge this is the first study to evaluate the associations between illness perceptions and distinct distress trajectories in CHD. Our findings suggest that stronger illness identity, greater illness concerns, higher perceived illness consequences and emotions, in addition to lower illness coherence and weaker beliefs surrounding the controllability of CHD, was associated with chronic high levels of distress, as compared against the low stable distress trajectory group. With the exception of illness-coherence, these same illness perceptions had similar associations with fluctuating distress symptoms. Importantly, these associations appeared relatively independent of cardiac related factors and physical quality of life. These findings are in line with past research in other long-term conditions [16], showing that long-term poor patient reported outcome trajectories are related to patients' personal beliefs surrounding their illness and treatment. According to the Common Sense Model [8,9], such unhelpful illness cognitions would be associated with more adverse coping procedures and self-regulatory behaviours, which in turn would be associated with poor health outcomes. Perceptions of control appear to be particularly protective against distress albeit causality cannot be directly inferred. A recent meta-analysis of the CSM across several conditions found that perceived control was related to a variety of outcomes, including distress [10]. This relationship was partially mediated by problem-focused coping and cognitive reappraisal. We also found that stronger illness coherence was protective against high levels of distress, which supports past findings in other long-term conditions [17,24]. Metanalytic evidence suggests

that illness coherence has indirect effects upon outcomes mediated by avoidance and emotional venting [10]. Whilst such mechanistic evidence provides a plausible explanation for the findings here, we cannot rule out the role of a trait-like general affective variable underpinning both illness perceptions and distress.

These findings may have clinical implications for improving distress outcomes in CHD patients. Our main findings shown that unhelpful illness perceptions are associated with chronic high and fluctuating symptoms of distress over time, as compared to low stable symptoms. The differences in scores between the chronic high and fluctuating trajectories with the low stable trajectory, is clinically meaningful [25]. Given that illness perceptions appear to differentiate these distinct distress trajectories and that they are modifiable, interventions designed to alter unhelpful illness perceptions may have utility for improving distress in this setting. Studies in other conditions have shown that such interventions have benefited patient outcomes [26] including recovery following myocardial infraction [27,28].

As outlined elsewhere [6], the study has a number of limitations which need to be considered, including a lack of objective clinical measures of heart disease and the small number of patients in the ‘improving’ distress group. With regards to the latter, this small number reduced the precision of the estimates, as evidenced by wide confidence intervals and may explain why the majority of illness perceptions were not associated with an improvement in distress symptoms overtime after adjustment for the specified covariates. Greater baseline illness-related distress was associated with improving symptoms, however given the sample size this effect is likely to be unreliable, or possibly reflects a regression towards the mean in this group. Why so few patients improved is intriguing. It might be because the most suitable management of these patients remains unclear with current approaches to support patients not optimal. For example, collaborative care has been shown to benefit depression symptoms in CHD [29]. A collaborative care model that includes psychoeducation and addresses unhelp

illness perceptions and maladaptive coping may have benefits for improving distress in these patients.

A further limitation was the reliance on self-reported distress. It is possible that some patients in the largest trajectory group “low-stable,” reported low levels of distress as a consequence of denial. Other approaches to rate patient distress (such as informant ratings) may be less susceptible to this limitation.

In conclusion we have shown that baseline illness perceptions are associated with distinct distress symptom trajectories among patients with CHD. Therapeutically modifying unhelpful illness perceptions in CHD patients who experience high levels of distress could potentially lead to improved mental health outcomes and should be the focus of future studies.

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Illness perceptions and distress trajectories in CHD

Table 1: Associations between illness perceptions and distress trajectory classes

Illness perception domain	Trajectory Class							
	<i>Chronic high</i> (n=55)		<i>Improving</i> (n=15)		<i>Worsening</i> (n=64)		<i>Fluctuating</i> (n=111)	
	Unadjusted OR (95% CI)	Adjusted ^b OR (95% CI)	Unadjusted OR (95% CI)	Adjusted ^b OR (95% CI)	Unadjusted OR (95% CI)	Adjusted ^b OR (95% CI)	Unadjusted OR (95% CI)	Adjusted ^b OR (95% CI)
Illness identity	1.44 (1.32, 1.60)**	1.31 (1.18, 1.51)**	1.31 (1.04, 1.65)**	1.30 (0.87, 2.50)	1.33 (1.20, 1.47)**	1.20 (1.05, 1.39)**	1.20 (1.11, 1.30)**	1.13 (1.02, 1.25)*
Timeline	1.11 (1.02, 1.30)*	1.10 (0.97, 1.37)	0.92 (0.83, 1.04)	0.86 (0.52, 1.17)	1.07 (0.84, 1.20)	1.07 (0.97, 1.24)	1.03 (0.97, 1.10)	1.02 (0.95, 1.11)
Consequences	1.47 (1.37, 1.62)**	1.47 (1.31, 1.74)**	1.28 (1.03, 1.57)*	1.29 (0.94, 2.42)	1.35 (1.23, 1.50)**	1.30 (1.17, 1.49)**	1.20 (1.10, 1.28)**	1.10 (1.00, 1.21)*
Personal control	0.80 (0.73, 0.86)**	0.77 (0.66, 0.85)**	0.93 (0.81, 1.07)	0.89 (0.68, 1.11)	0.95 (0.89, 1.03)	0.97 (0.88, 1.08)	0.91 (0.86, 0.96)**	0.91 (0.84, 0.98)*
Treatment control	0.76 (0.69, 0.83)**	0.75 (0.65, 0.83)**	0.90 (0.75, 1.24)	0.92 (0.69, 2.40)	0.91 (0.81, 1.02)	0.89 (0.77, 0.99)*	0.82 (0.76, 0.89)**	0.84 (0.75, 0.91)**
Coherence	0.90 (0.82, 0.99)*	0.89 (0.79, 0.95)*	0.90 (0.77, 1.14)	0.91 (0.68, 1.50)	0.91 (0.84, 0.99)*	0.92 (0.83, 1.03)	0.90 (0.84, 0.97)**	0.95 (0.87, 1.05)
Illness-related emotion	1.63 (1.49, 1.85)**	1.66 (1.48, 2.01)**	1.44 (1.22, 1.76)**	1.41 (1.11, 2.50)**	1.39 (1.27, 1.52)**	1.32 (1.19, 1.51)**	1.34 (1.25, 1.44)**	1.30 (1.21, 1.43)**
Illness concern	1.36 (1.24, 1.51)**	1.36 (1.24, 1.56)**	1.25 (1.06, 1.50)**	1.17 (0.90, 1.85)	1.27 (1.18, 1.38)**	1.21 (1.10, 1.35)**	1.17 (1.10, 1.25)**	1.13 (1.04, 1.23)**

OR: odds ratio

CI: confidence interval

Reference class: stable low(n=558). Bootstrapped estimates show (**p<0.01; *p<0.05)

^badjusted for age, sex, marital/cohabitation status, non-white ethnicity, 12 or more years of education, current smoker, chest pain, physical component quality of life score, history of MI, heart failure and a history of any cardiac intervention