

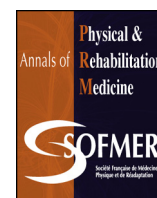


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Original article

Stress, anxiety and depression in heart disease patients: A major challenge for cardiac rehabilitation

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ARTICLE INFO

Article history:

Received 18 September 2016

Accepted 25 September 2016

Keywords:

Cardiac rehabilitation

Chronic stress

Anxiety disorder

Depression

ABSTRACT

Cardiovascular events and emotional disorders share a common epidemiology, thus suggesting fundamental pathways linking these different diseases. Growing evidence in the literature highlights the influence of psychological determinants in somatic diseases. A patient's socio-economic aspects, personality traits, health behavior and even biological pathways may contribute to the course of cardiovascular disease. Cardiac events often occur suddenly and the episode can be traumatic for people not prepared for such an event. In this review of the literature, the authors tackle the question of psychobiological mechanisms of stress, in a pathophysiological approach to fundamental pathways linking the brain to the heart. Various psychological, biological and genetic arguments are presented in support of the hypothesis that various etiological mechanisms may be involved. The authors finally deal with biological and psychological strategies in a context of cardiovascular disease. Indeed, in this context, cardiac rehabilitation, with its global approach, seems to be a good time to diagnose emotional disorders like anxiety and depression, and to help people to cope with stressful events. In this field, cardiac rehabilitation seems to be a crucial step in order to improve patients' outcomes, by helping them to understand the influence of psychobiological risk factors, and to build strategies in order to manage daily stress.

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1. Introduction – epidemiological features

There is a substantial amount of evidence in the literature underlining the impact of psychological determinants on the onset of heart disease. Depression, a disease with a very high psychosocial burden, also has a detrimental effect in terms of cardiovascular disease. Indeed, people suffering from depression are as twice as likely as the general population to develop myocardial infarction [1] and this cardiovascular comorbidity increases mortality in people with depression, even more than death by suicide [2]. Although the precise nature of the links between depression and coronary heart disease (CHD) have not yet been clearly established, these links are being highlighted more and more frequently, first of all from an epidemiological point of view and then with regard to the etiological and clinical aspects in patients with this worrying comorbidity. Quite recently, Eichstaedt et al. showed in a US county a robust positive relationship between

negative emotions (anger, hostility, boredom) expressed in twitter messages and cardiovascular deaths, thus strengthening the link between negative thinking and cardio-metabolic disorders [3]. A few years ago, the Interheart study reported the impact of psychic disease on coronary artery disease and the importance of psychosocial stress (a notion that includes depression), which was put in third place in the league table of risk factors (with an odds ratio of 2.67) for developing cardiovascular disease [4], after the apolipoprotein B/apolipoprotein A1 ratio and smoking but in front of diabetes, arterial hypertension and abdominal obesity. Negative emotional states therefore appear to be strongly associated with cardiovascular events. Because of these psychological, behavioral and biological relationships between the brain and heart, it seems important to consider the reality of these deleterious links before including specific strategies in rehabilitation programs in order to reduce adverse consequences in patients with cardiovascular disease.

2. Methods

In this review, relevant studies from 2000 to 2016 were selected and analyzed (Fig. 1). Medical subject heading (MeSH) terms

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“stress”, “anxiety”, “depression”, “personality”, “cardiovascular disease” and “rehabilitation” were used to perform key word searches of the PubMed database.

3. Results

Fig. 1 shows studies and results of the selection and screening process. In total, 201 papers were founded through PubMed database searches. After removing duplicates, 145 remained. Of these, 70 papers were reviewed and 31 were not related to research designs and were excluded. Thirty-nine studies remained and 11 articles were excluded because of methodological bias (e.g. inclusion/exclusion criteria, etc.). Then, 28 studies appeared to be suitable, in relation to stress, anxiety and depression in people with heart disease. Studies included showed the cardiovascular impact of either usual psychological stress or emotional disturbances like anxiety and depression. In addition, several studies illustrated the scientific rationale for anxiety/depression diagnosis in people with heart disease and the dramatical interest of stress management especially in cardiac rehabilitation.

3.1. The cardiovascular impact of stress in usual conditions

There is more and more evidence of the impact of psychological factors on the onset of somatic diseases in general and cardiovascular disease in particular. In the field of psychobiological theory, which tries to explain the link between the brain, cognition, emotion and body, stress theory is a credible way to model this psychosomatic enigma. The stress response appears to play a

central role in the interface between the brain, feelings, behavior and biological effects. The old concept of stress by Hans Selye has moved forward, because of progress in medical sciences and psychology. Indeed, as Hans Selye used to say, stress is life, and the brain and body must constantly adapt in order to respond to various stimuli [5]. The effect of multiple stimulations makes the body respond in biological, cognitive and emotional ways. The stress response involves the central activation of brain systems responsible for the analysis of the environment. This response is important and appears not to be deleterious, as it promotes a physiological balance in response to classic and normal environmental stressors. However, in the case of chronic and mainly psychosocial stressors, the allostatic system may be overwhelmed with hyperactivation of the hypothalamic–pituitary–adrenal axis and the autonomic nervous system with dysregulation of blood pressure and cortisol levels [6]. In addition, an immunoinflammatory response occurs with the production of inflammatory cytokines [7]. If this phenomenon lasts for a long time because of chronic adversity (work or social stress, for instance), the pathophysiological effects can lead to metabolic disturbances (glucose and lipid dysregulation), metabolic syndrome and cardiovascular disease [8] (Fig. 2). Then, psychological factors like perceived stress, coping style, personality traits, or social support might modulate the stress response.

3.1.1. Perceived stress

The reaction to stress is not an automatic process directly associated with the environment or stressors, but stress occurs in a transactional way between the environment and the subject

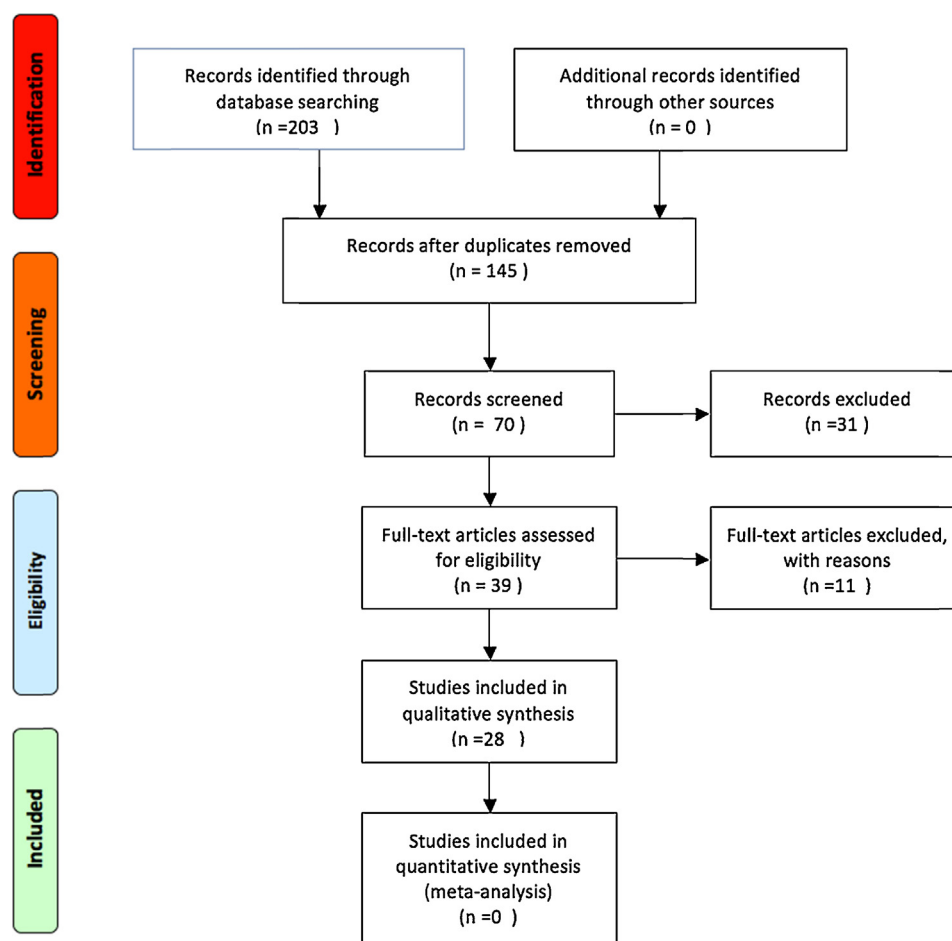


Fig. 1. Flow diagram of results of selection process.

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