



Review

Listening to the heart: A meta-analysis of cognitive behavior therapy impact on the heart rate of patients with anxiety disorders



Raquel Gonçalves^{a,*}, Helga Rodrigues^a, Felipe Novaes^b, Javier Arbol^c, Eliane Volchan^d, Evandro Silva Freire Coutinho^e, Ivan Figueira^a, Paula Ventura^{a,b}

^a Institute of Psychiatry, Universidade Federal do Rio de Janeiro, Brazil

^b Institute of Psychology, Universidade Federal do Rio de Janeiro, Brazil

^c Brain, Mind and Behavior Research Center, University of Granada, Spain

^d Institute of Biophysics Carlos Chagas Filho, Universidade Federal do Rio de Janeiro, Brazil

^e Oswaldo Cruz Foundation, Escola Nacional de Saúde Pública, Brazil

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ABSTRACT

Introduction: The future of psychotherapy relies on the dialog with the basic science, being the identification of psychotherapeutic biomarkers of efficacy a core necessity. Heart rate (HR) is one of the most studied psychophysiological parameters in anxiety disorders.

Methods: To investigate the impact of cognitive behavior therapy (CBT) on the HR of patients with anxiety disorders, we conducted a meta-analysis and systematic review. Electronic searches were conducted in the ISI/Web of Knowledge, PsychINFO and PubMed/MEDLINE for studies which evaluated HR at least once before and after CBT. Keywords related to anxiety disorders, HR and CBT were used in the search.

Results: 474 studies, of which 47 were selected for the systematic review and 8 for the meta-analysis, were identified. The results provide evidence that CBT significantly decreases the HR of posttraumatic stress disorder patients. In social phobia, obsessive-compulsive disorder and acute stress disorder, the results point in the same direction, although it is still early to attribute the decrease in HR to CBT. In specific phobias, traditional exposure therapy showed greater effect size than exposure with distractors or without psycho-education.

Limitations: Most of the randomized trials have not been conducted in accordance with rigorous methodological quality criteria.

Conclusions: Standardization in the methods used and in treatment protocols, as well as investigations in groups of patients with low physiological reactivity, are necessary in order to reach better conclusions. Notwithstanding these limitations, HR is beginning to emerge as a potential biomarker of efficacy in anxiety disorders.

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* Correspondence to: Universidade Federal do Rio de Janeiro, Av Venceslau Brás, 71 - Botafogo, Rio de Janeiro, RJ, Brazil, ZIP CODE: 22290-140.
Tel.: +55 21 994920590.

E-mail address: mgoncalves.raquel@gmail.com (R. Gonçalves).

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1. Introduction

Cognitive-behavioral therapy (CBT), particularly exposure therapy, is considered a first-line treatment for prevalent and often disabling anxiety disorders (Ressler and Mayberg, 2007; Otte, 2011). The treatment involves gradually confronting the feared stimuli in the absence of danger, which generates new learning and consequent extinction of conditioned fear (Konorski, 1967).

The increasing incorporation of biomarkers in psychiatry in an attempt to enhance diagnosis and treatments has generated numerous studies investigating the neurobiological, physiological and neuroendocrine bases of anxiety disorders (Singh and Rose, 2009). Neural circuits of extinction of fear conditioning have been proposed and supported in various disorders (Graham and Milad, 2011; Milad and Quirk, 2012). Psychophysiological parameters – especially heart rate – are among the most studied biomarkers in these disorders (Pittig et al., 2013) and have the advantage of being easily measurable.

The identification of CBT biomarkers of efficacy is therefore a priority. The advantages of identification include the ability: (1) to prove the efficacy of CBT in a more objective manner; (2) to improve interventions through more precise understanding of the CBT mechanisms of action, helping to prevent relapse more consistently and benefit resistant patients (Rodriguez et al., 1999; Mineka et al., 1999; Mystkowski et al., 2002); (3) to precisely select the type of treatment best suited for each patient by understanding the difference between the CBT's and the medication's mechanisms of action. Identifying biomarkers of treatment can promote advances in adapting techniques to better target the underlying biological mechanisms.

Some published reviews observe brain CBT markers of efficacy, which usually involve the regulation of the activation of amygdala, insula, thalamus, the medial prefrontal cortex and hippocampus (Almeida et al., 2013; Porto et al., 2009). However, there are few studies that investigate the impact of CBT on cardiovascular parameters in anxiety disorders. The objective of this meta-analysis and systematic review was to investigate the impact of cognitive-behavioral techniques on heart rate in patients with anxiety disorders.

2. Methods

2.1. Criteria for considering studies for this review

2.1.1. Types of studies

Any study that measured heart rate at least once before and after treatment with CBT in an anxiety disorder described in DSM IV, such as post-traumatic stress disorder, acute stress disorder, panic disorder with and without agoraphobia, generalized anxiety disorder, obsessive–compulsive disorder, social anxiety disorder, and specific phobia, were selected for this review.

Studies were excluded if they met any of the following exclusion criteria: used other psychotherapeutic approaches or did not use any treatment, theoretical articles, reviews, psychophysiological parameters were not used to assess the effectiveness of therapy, used healthy subjects or patients with subclinical diagnosis, used group therapy, animal studies, case studies including less than 10 subjects (Pincus et al., 1993), studies in pediatric/adolescent patients, questionnaire validation studies, articles that did not present results, articles written in languages other than English, Portuguese or Spanish, articles that presented results of psychotherapeutic intervention and medication simultaneously which made it difficult to distinguish CBT and medication effects.

2.1.2. Types of participants and interventions

The study only included participants who met the full criteria for any of the anxiety disorders mentioned above. The treatment used had to be individual rather than in groups, CBT based and have at least one exposure technique.

2.1.3. Types of outcome measures

In addition to the psychometric parameter, the study should measure heart rate before and after intervention with CBT. Heart rate could be extracted at rest or during symptom evocation.

2.1.4. Databases and search strategy

An electronic search of the literature was conducted in ISI/Web of Knowledge, PsychINFO and PubMed/MEDLINE databases in May 2013. The search included all years. We considered articles in English,

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