Anxiety and Cardiology: A Systematic Review

Bárbara Mazinini Pimentel[1], and Aline Cristina Antonechen[2]

[1] Hospital das Clínicas, Ribeirão Preto Medical School at University of São Paulo (Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo [USP]), Ribeirão Preto *Campus*, Ribeirão Preto, São Paulo, Brasil
[2] University of São Paulo (Universidade de São Paulo [USP]), Ribeirão Preto *Campus*, Ribeirão Preto, São Paulo, Brasil

Author Note

Bárbara M. Pimentel ⓘD https://orcid.org/0000-0003-4790-3787
Aline C. Antonechen ⓘD https://orcid.org/0000-0002-4704-4823
Correspondence concerning this article should be addressed to Bárbara Mazinini Pimentel, Aveni-da Bandeirantes, 3900, Ribeirão Preto, SP, Brazil. CEP 14040901. Email: barbaramazinini@gmail.com

Abstract

Heart diseases are potentially fatal pathologies considered a risk factor for anxiety disorders. This paper aims to present a systematic literature review on anxiety in cardiology. Five databases were selected: Scielo, PsycINFO, Web of Science, and PubMed. The descriptors "*cardiologia*" and "*ansiedade*" and their equivalents in English, "anxiety" and "cardiology" were used. The inclusion criteria were papers published in Portuguese, English, or Spanish between 2017 and 2021. Twenty-six studies were selected, and four topics stood out: socio-demographic profile, anxiety and cardiac rehabilitation, anxiety-related risk and protective factors, and anxiety and depression. The results indicate that healthy anxiety levels play a protective role in promoting patient self-care. However, maladaptive anxiety levels hinder patients from coping with the disease.

Keywords: cardiology, anxiety, behavioral medicine, heart defects congenital, systematic review

ANSIEDADE E CARDIOLOGIA: UMA REVISÃO SISTEMÁTICA

Resumo

Doenças cardíacas são patologias potencialmente fatais, consideradas fator de risco para desenvolvimento de quadros de ansiedade. O objetivo deste artigo é apresentar revisão sistemática da literatura científica sobre ansiedade em cardiologia. Foram selecionadas para investigação científica, as bases de dados: Scielo, PsycInfo, Web of Science e PubMed. Utilizaram-se os descritores "cardiologia" e "ansiedade" e seus correspondentes em inglês, anxiety and cardiology. Os artigos deveriam estar escritos em português, inglês ou espanhol e terem sido publicados entre 2017 e 2021. Foram selecionados 26 artigos para compor esta revisão sistemática. Quatro temáticas se sobressaíram: perfil sociodemográfico, ansiedade e reabilitação cardíaca, fatores de risco e fatores de proteção relacionados à ansiedade, e ansiedade e depressão. Com os resultados encontrados, concluiu-se que a ansiedade, quando experienciada em níveis saudáveis é considerada fator protetivo, favorecendo atenção e cuidado do paciente. No entanto, em níveis desadaptativos, torna-se prejudicial ao enfrentamento da doença.

Palavras-chave: cardiologia, ansiedade, medicina do comportamento, cardiopatias, revisão sistemática

ANSIEDAD Y CARDIOLOGÍA: REVISIÓN SISTEMÁTICA

Resumen

Las enfermedades cardiacas son patologías potencialmente mortales y consideradas como un factor de riesgo para los trastornos de ansiedad. El objetivo de este artículo es presentar una revisión sistemática de la literatura científica sobre la ansiedad en cardiología. Se seleccionaron cinco bases de datos: Scielo, PsycInfo, Web of Science y PubMed. Se utilizaron los descriptores "cardiología" y "ansiedad" y sus correspondientes en inglés. Los artículos deben estar escritos en portugués, inglés o español y haber sido publicados entre 2017 y 2021. Se seleccionaron 26 artículos para componer esta revisión sistemática. Se destacaron cuatro temas: perfil sociodemográfico, rehabilitación cardíaca, factores de riesgo/protección relacionados con la ansiedad, y, ansiedad y depresión. Se concluyó que la ansiedad, cuando se experimenta en niveles saludables, se considera un factor de protección que favorece la atención y el cuidado. Sin embargo, en niveles inadaptados, se vuelve perjudicial para el enfrentamiento de la enfermedad.

Palabras clave: cardiología, ansiedad, medicina de la conducta, cardiopatías, revisión sistemática

Cardiovascular diseases (CVDs) account for one-third of deaths worldwide and are Brazil's leading cause of death (Oliveira, 2019; WHO, 2020). According to the Brazilian Society of Cardiology (SBC, 2021), the mortality rate from cardiovascular diseases in Brazil in 2018 was 172.8 per 100,000 inhabitants, with 395,700 deaths. Of these, 127,513 were due to ischemic heart disease, and 76,007 were due to other heart diseases. According to the Ministry of Health platform, DATASUS, there were 400,716 hospital admissions in 2019 due to cardiac complications and 173,037 deaths due to cardiac diseases. In 2021, there was a significant increase in hospitalizations related to cardiac complications, accounting for 507,796 hospitalizations in that year (Ministério da Saúde [DATASUS], 2022).

The discovery of heart disease usually occurs in the face of a sudden health event, such as Acute Coronary Syndrome (ACS). It destabilizes the patient's routine and threats his/her physical integrity. Hence, a physical disease affects mental health, and patients may experience anxiety, stress symptoms, and sorrow (Resende & Teixeira, 2017). The experience of illness that may become chronic is unique and influenced by each individual's life history, previous health experiences, and psycho-emotional characteristics. Emotional distress triggered by a health change may be related to a deficit in internal resources that would help one reframe and cope with the situations arising from becoming ill (Ávila & Remor, 2019).

When a person receives a diagnosis, s/he develops a cognitive and emotional representation of her/his health condition based on beliefs about the health/disease continuum; such a representation, called illness perception, influences behaviors concerning treatment adherence and the maintenance or modification of risky behaviors and lifestyle. Previous illness experiences and the coping strategies influence illness perception. Hence, how an individual perceives his/her health condition interferes with the prognosis of a disease, as it reflects how the patient responds to the threats his/her illness imposes (Resende & Teixeira, 2017). Some psychological indicators may influence illness perception and how an individual responds to disease. These include anxiogenic experiences and anxiety disorders. Anxiety is an adaptive mechanism that allows identifying threatening situations; however, when at exacerbated levels, anxiety may become pathological, making the individual experience constant fear and apprehension. An anxiety experience may cause physical symptoms, which cause physiological reactions and alter the cardiovascular system, possibly correlated with cardiac events (Ávila & Remor, 2019).

A scientific literature review consulting three databases between 1991 and 2013 to assess the association between anxiety and cardiovascular disease identified 37 papers. The main findings show that anxiety disorders increased the incidence risk of CVDs by 52%, regardless of other factors, possibly related to clogging the brain, heart, or peripheral arteries (Batelaan et al., 2016). Therefore, it appears that anxiety is a recurrent disorder in this population, justifying studies in the field.

The impact of anxiety on different aspects of heart disease is a topic widely studied in empirical research, with its effects being measured in the development of these pathologies,

subsequent care, and even rehospitalizations. A longitudinal study addressing 30,635 individuals without previous heart disease (56.8% of women aged 53.0±7.8 on average) found that individuals with high anxiety levels presented a higher risk of developing a cardiac condition within seven years, showing the relevance of these experiences in the health–disease continuum (Deschênes et al., 2020).

A study conducted with civil servants from six Brazilian capitals in different regions assessed the correlations between heart disease and diabetes, social determinants, and risk factors. Of the 721 participants reporting a heart disease diagnosis (45.5% women aged 58.7±8.8 on average), 60.2% (n=434) presented positive indicators for anxiety and depression; this result was three times higher than in the group without heart disease. The findings suggest the need for care for psychiatric comorbidities to assist patients with heart diseases better (Kemp et al., 2015).

Another study investigated the relationship between anxiety, depression and rehospitalizations, and mortality among patients with heart failure. On average, 1,260 patients were assessed (63.8% men aged 63.57±13). Of these, 26.8% scored for anxiety and depression, and 26.1% only for anxiety. One year after the assessment, both disorders were considered risk factors, mainly for mortality (Alhurani et al., 2015). Another relevant finding in the scientific literature concerning anxiety and heart disease concerns other psychosocial factors possibly associated with anxiogenic experiences. A study recently conducted in China with 47,588 participants diagnosed with CVDs verified that like the general population, the main risk factors for mental conditions among these patients are being young, female, single, and having low income (Jia et al., 2021).

As the previous discussion shows, it is relevant to understand how anxiety among patients with heart diseases is described in the current scientific literature and what the main results are considering this psychological indicator. Considering the last literature review addressing the association between anxiety and cardiovascular diseases, which included papers published up to 2013, this study tracks more recent studies published in the previous five years. The results are expected to support the planning of interventions addressing this psychological component. Therefore, this paper aims to present a systematic literature review of studies measuring anxiety indicators in adult cardiac patients.

Method

The research design, characterized by a systematic literature review, corresponds to an investigation directed toward a research question, the objective of which is to compile available evidence identified through a search in the scientific literature of a given field (Galvão & Pereira, 2014). The first author performed the initial investigation in the databases. Next, the two authors independently read the papers selected, tabulated the data, and discussed the findings, reconciling potential disagreements.

Hence, a systematic review was performed from May 4th to July 28th, 2021, including a search in the databases and subsequent readings. Scielo, PsycINFO, Web of Science, and PUBMED databases covered Brazilian and international studies. The terms used in the systematic search in the Scielo database were "*ansiedade*" AND "*cardiologia*," and their English equivalents, "*anxiety*" AND "*cardiology*," were searched in the PsycINFO, Web of Science, and PUBMED databases. Considering the authors' proficiency in Portuguese, English, and Spanish, the papers should be written in any of these languages and published between 2017 and 2021. The scope of this review was limited to five years, prioritizing more up-to-date studies in the field.

The inclusion criteria were original papers addressing participants over 18 years of age whose variables concerned diagnosis or symptoms of anxiety and heart diseases. We decided not to determine any types of intervention or specific instruments for assessing anxiety. Review and instrument validation articles and studies considering anxiety only as a biological marker, not as a psychological variable, were excluded. Only papers published in scientific journals were considered, excluding other publications (grey literature), and studies found in more than one database were counted only once.

Based on the results obtained in the systematic search in the databases previously mentioned, the titles were initially read, and those studies that failed to meet the inclusion criteria were excluded. Next, the abstracts of the papers selected by their titles were analyzed. The studies, the abstracts of which indicated they were mini editorials, comments, or review articles, corresponded to instrument validation, did not assess anxiety as an independent construct, or focused on psychological disorders other than anxiety, were excluded.

Afterward, a table was created to systematize the data extracted from the papers. The first author completed the table, and the second author ratified it to ensure data reliability. The table lists the papers' title, authors, year of publication, country of origin, study design, number and gender of participants, the comorbidities assessed besides anxiety, assessment instruments used, whether the paper aimed at interventions, and main results. The results presented in this discussion focus on some variables, such as the study's setting, the participants' genders, and the results.

Results

A total of 568 papers were found in the databases previously described, and 564 remained after excluding duplicates. Another 61 articles were excluded during the analysis of the titles. Hence, 37 papers remained from the study of abstracts. Finally, after reading the full texts of these 37 papers, 11 failed to meet the inclusion criteria and were excluded: three focused on psychological aspects unrelated to anxiety as an independent construct, three referred to specific heart diseases, two focused on the assessment of depression, one study addressed a comparative analysis between instruments, another analyzed a particular tool, and one paper assessed a specific intervention. The flowchart (Figure 1) shows the selection process.

Figure 1

Flowchart of the selection process in the databases consulted for this systematic review on anxiety and cardiology.
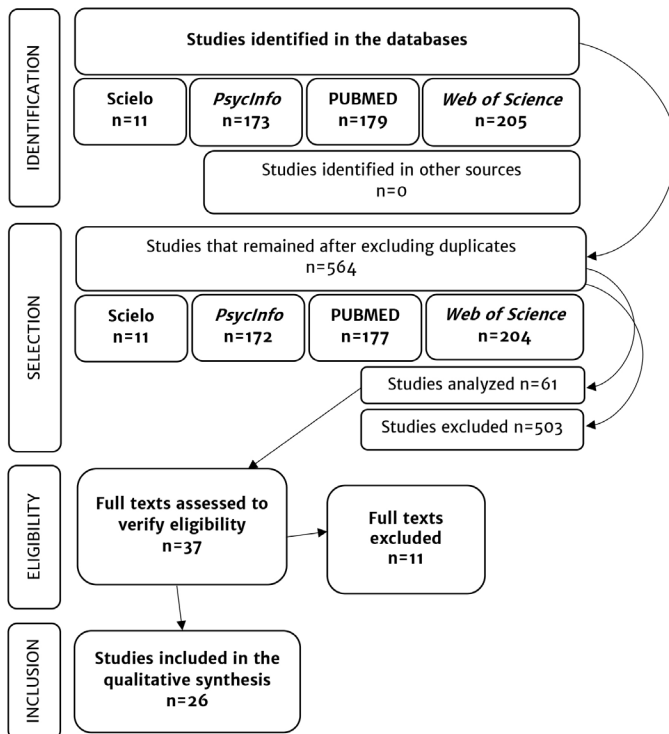
Of the 26 studies selected to compose this systematic review, ten were found in PsycINFO, 12 in Web of Science, two in PUBMED, and two in Scielo. Most studies (eight) were published in 2019, followed by 2018 and 2020 with seven studies each and 2017 with four. No studies were published in 2021. Regarding the papers' country of origin, 13 studies were developed with populations from European countries. Only four studies were selected from the American continent; two were performed in the United States, and the remaining in South America (Argentina and Brazil). Notably, although a specific database including Latin American studies was consulted, few studies were identified in this continent.

Regarding the methodological design, among the studies included in this systematic review, 15 were quantitative studies, 12 were cross-sectional, and three were longitudinal studies. Four were randomized trials, and four were observational studies, including one retrospective, one cross-sectional, and one prospective. There was also a descriptive-analytical study, a retrospective case-control, and a prospective cohort study.

The initial reading identified a predominance of male participants composing the study samples; only three studies (Ivanovs et al., 2018; Elamragy et al., 2019; Rafsanjani et al., 2020) reported a more significant number of female participants, as described in Table 1. Five studies (Kim et al., 2017; Benderly et al., 2018; Hung et al., 2019; Figueiredo et al., 2020; Flugelman et al., 2020) did not describe their samples according to the number of women and men; hence, Table 1 only presents the total (n) sample. Hung et al. (2019) addressed the most significant sample (n=31,271), while Flugelman et al. (2020) addressed the smallest.

Table 1

Summary of results found in articles selected for this systematic review on cardiology and anxiety.

Author	Country	Population (n)	Method	Instruments used to assess anxiety	Results
Aggelopoulou, Z. et al., 2017	Greece	231 (M = 135 / F = 96)	Observational study	State–Trait Anxiety Inventory (STAI)	Patients with HF and anxiety symptoms more frequently experienced depressive symptoms.
Habibovic, M. et al., 2017	Netherlands	249 (M = 204 / F = 45)	Multicenter randomized trial	Generalized Anxiety Disorder Scale (GAD–7)	Patients with anxiety and depressive symptoms before ICD were more vulnerable to developing post–ICD PTSD than patients without these symptoms.
Kim, S.–D. et al., 2017	Republic of Korea	828	Longitudinal quantitative study	Hospital Anxiety and Depression Scale (HADS)	Anxiety was less prevalent among patients without depressive symptoms or with minor depressive disorder compared to patients with major depressive disorder.
Liang, F. et al., 2017	China	318 (M = 244 / F = 134)	Randomized clinical trial	Self–Rating Anxiety Scale (SAS)	Multi–professional care better impacted cardiac prognosis and QofL of patients with anxiety disorder.
Benderly, M. et al., 2018	Israel	8.334	Observational retrospective study	Clinical Assessment	Patients with anxiety were older and more likely to be women with lower socioeconomic status and comorbidities.
Cerezo, G. H. et al., 2018	Argentina	1.035 (M = 573 / F = 462)	Cross–sectional quantitative study	HADS	Anxiety symptoms were prevalent among women and in patients below 60.
Coccamo, F. et al., 2018	Italy	157 (M = 125 / F = 32)	Cross–sectional quantitative study	State–Trait Anxiety Inventory–Forma Y (STAI–Y)	Participation in a CR program had a positive impact on anxiety levels.
Ivanovs, R. et al., 2018	East European	1.569 (M = 486 / F = 1083)	Cross–sectional quantitative study	GAD–7 and Mini International Neuropsychiatric Interview (M.I.N.I.)	Anxiety disorder was associated with decreased cardiovascular mortality, playing a protective role in the prognosis.
Olsen, S. J. et al., 2018	Norway	775 (M = 583 / F = 192)	Observational prospective study	HADS	Being a man and older was associated with a lower risk of developing anxiety symptoms. Patients who participated in a CR program showed increased levels of anxiety.
Serpytis, P. et al., 2018	Lithuania	160 (M = 101 / F = 59)	Cross–sectional quantitative study	HADS	Women were at greater risk of developing anxiety disorder among patients with AMI.

Table 1

Summary of results found in articles selected for this systematic review on cardiology and anxiety.

Author	Country	Population (n)	Method	Instruments used to assess anxiety	Results
Smeijers, L. et al., 2018	USA	2.176 (M = 1541 / F = 635)	Cross-sectional quantitative study	State-Trait Personality Inventory (STPI)	Being a woman, below 65, and having a low educational level was associated with higher anxiety levels among those with AMI.
Allabadi, H. et al., 2019	Palestine	1.022 (M = 750 / F = 272)	Cross-sectional quantitative study	Depression Anxiety Stress Scale-42 (DASS-42)	Anxiety symptoms were prevalent among women, those with lower educational levels, unemployed, and homemakers.
Akgul, E., 2019	Turkey	362 (M = 246 / F = 116)	Cross-sectional quantitative study	Beck Anxiety Inventory (BAI)	Patients below 65 presented higher anxiety levels.
Berg, S. K. et al., 2019	Denmark	88 (M = 58 / F = 30)	Randomized clinical trial	HADS and Structured Clinical Interview for DSM Disorders (SCID)	Anxiety symptoms before an ICD may influence the development or intensification of anxiety post-ICD.
Berge, T. et al., 2019	Norway	232 (M = 161 / F = 71)	Cross-sectional quantitative study	Generalized Anxiety Disorder Scale-2 (GAD-2), and HADS	Anxiety symptoms were reported by 25% of patients with heart disease.
Elamragy, A. A. et al., 2019	Egypt	100 (M = 43 / F = 57)	Cross-sectional observational study	BAI	Moderate and severe anxiety is more common in patients with slow coronary flow, and the severity of anxiety correlates with slow coronary flow.
Hung, M.-Y. et al., 2019	Taiwan	31.271	Retrospective case-control study	Clinical assessment	Patients below 60 presented a prevalence of anxiety before the cardiac event.
Meyer, M. L. et al., 2019	Germany	997 (M = 847 / F = 150)	Prospective cohort study	HADS	Older women were at a higher risk of presenting anxiety symptoms.
Molavynejad, S. et al., 2019	Iran	251 (M = 137 / F = 114)	Descriptive analytical study	State-Trait Anxiety Inventory (STAI)	Being a woman and older was associated with higher anxiety levels. Having an active social network was a protective factor for managing anxiety.
Berg, S. K. et al., 2020	Denmark	88 (M = 58 / F = 30)	Randomized trial	HADS, BAI, and Hamilton Anxiety Scale (HAM-A)	The group that received CBT showed a clinically and statistically significant decrease in anxiety levels.
Coccamo, F. et al., 2020	Italy	67 (M = 47 / F = 20)	Cross-sectional quantitative study	HADS	Patients who participated in the CR program showed decreased anxiety levels.
Figueiredo, J. H. C. et al., 2020	Brazil	99	Cross-sectional quantitative study	HADS	Anxiety at reduced levels may influence the perception of the severity of the disease and, consequently, promote treatment adherence.
Flugelman, M. Y. et al., 2020	Israel	64	Cross-sectional quantitative study	Trait Anxiety Inventory (STAI)	Having a good relationship with the health team and trusting the professionals were protective factors in managing anxiety symptoms.

Table 1

Summary of results found in articles selected for this systematic review on cardiology and anxiety.

Author	Country	Population (n)	Method	Instruments used to assess anxiety	Results
Hohls, J. K. et al., 2020	Germany	1.007 (M = 804 / F = 203)	Cross-sectional quantitative study	Cardiac Anxiety Questionnaire (CAQ)	CA symptomatology can be adaptive for adopting healthy and protective behaviors to deal with heart disease.
Rafsanjani, M. H. A. P. et al., 2020	Iran	296 (M = 128 / F = 168)	Cross-sectional study	BAI	Patients with ICD present higher anxiety levels compared to the control group and those with a pacemaker.
Wedegärtner, S. M. et al., 2020	Germany	107 (M = 94 / F = 13)	Cross-sectional quantitative study	CAQ and HADS	CA – attention and avoidance components – may characterize a risk factor associated with worse QofL and higher general anxiety levels (assessed by HADS).

M = males; F = females; HF=heart failure; ICD = Implantable cardioverter-defibrillator; PTSD = Posttraumatic Stress Disorder; QofL = quality of life; CR = Cardiac Rehabilitation; AMI = Acute Myocardial Infarction; CBT = Cognitive Behavioral Therapy; CA = cardiac anxiety

After reading the papers, four categories were identified, and explain the topics found: (1) socio-demographic profile and its relationship with anxiety; (2) anxiety and rehabilitation; (3) anxiety-related risk factors and protective factors; and (4) anxiety and depression. Each category is described in detail below.

Socio-demographic profile and its relationship with anxiety

Gender, age, socioeconomic level, social support network availability, marital status, and employment were reported as factors influencing anxiety symptoms in heart disease patients. Eight papers considered the variable "sex" (Benderly et al., 2018; Cerezo et al., 2018; Olsen et al., 2018; Serpytis et al., 2018; Smeijers et al., 2018; Allabadi et al., 2019; Meyer et al., 2019; Molavynejad et al., 2019); seven of which (Benderly et al., 2018; Cerezo et al., 2018; Serpytis et al., 2018; Smeijers et al., 2018; Allabadi et al., 2019; Meyer et al., 2019; Molavynejad et al., 2019) reported a higher prevalence of anxiety symptoms among women. Olsen et al. (2018) note that men are at lower risk than women for developing anxiety disorders.

The studies by Cerezo et al. (2018), Olsen et al. (2018), Smeijers et al. (2018), Akgul (2019), and Hung et al. (2019) showed that age inversely correlates with the development of anxiety, that is, higher levels of anxiety were identified among younger participants. However, three studies (Benderly et al., 2018; Meyer et al., 2019; Molavynejad et al., 2019) report that elderly patients may also experience significant anxiety symptoms. Specifically, Smeijers et al. (2018) concluded that young patients who underwent an Acute Myocardial Infarction (AMI) presented high rates of anxiety at moments immediately before the cardiac event, while older patients experienced fewer emotional triggers temporally associated with AMI.

Regarding socioeconomic level, the studies show that the intensity of anxiety symptoms is greater among participants with a lower educational level (Allabadi et al., 2019), lower

socioeconomic status (Benderly et al., 2018), unemployed (Allabadi et al., 2019; Molavynejad et al., 2019), homemakers (Allabadi et al., 2019; Molavynejad et al., 2019) and retirees (Molavynejad et al., 2019). Furthermore, Coccamo et al. (2020) identified that having a satisfactory support network associated with marital status and employment was a protective factor for managing anxiety after a cardiac event.

Anxiety and cardiac rehabilitation

Three papers (Coccamo et al., 2018; Olsen et al., 2018; Coccamo et al., 2020) addressed cardiac rehabilitation programs and their relationship with anxiety symptoms. Coccamo et al. (2018) performed pre- and post-test analyses and verified that participating in cardiac rehabilitation programs favored decreased anxiety levels. Emphasis was given to multidisciplinary interventions focusing on changing patients' beliefs and perceptions associated with heart disease to promote the patients' autonomy and increase knowledge about the disease.

On the other hand, the other two studies concluded that rehabilitation programs might increase anxiety levels. Coccamo et al. (2020) identified an increase in the scores obtained in the HADS in the posttest among patients attending rehabilitation interventions. They considered that such an increase might be related to increased knowledge the individuals acquired about their health condition, leading to a perception that they needed to change their lifestyles for better treatment adherence. According to Olsen et al. (2018), cardiac rehabilitation programs may be a risk factor for developing anxiety or intensifying previous symptoms. There was a 32% increase in the prevalence of anxiety after participating in a rehabilitation program for three years compared to patients who did not participate. Additionally, the patients who opted to participate in rehabilitation already presented more significant levels of anxiety than those not interested in the program.

Anxiety-related risk factors and protective factors

Figueiredo et al. (2020) show a relationship between anxiety levels, quality of life, and treatment adherence. Patients with heart failure and reduced anxiety levels had a distorted perception of the severity of their health condition, tending to adhere less to their treatment. However, the authors above note that healthy anxiety levels lead to more adaptive coping, positively impacting quality of life.

In line with the previous study, Ivanovs et al. (2018) concluded that anxiety disorder might play a preventive role throughout heart disease, considering that it favored self-care behaviors and greater caution in risky situations. On the other hand, Hung et al. (2019) highlighted that having a history of anxiety before the cardiac event was prevalent among the studied sample, compared to a history of depression, suggesting that anxiety may be a risk factor for developing heart disease.

Two studies (Hohls et al., 2020 & Wedegärtner et al., 2020) assessed the influence of cardiac anxiety on the adoption of healthy behaviors and the quality of life of patients with heart

disease. Cardiac stress is considered a protective factor for monitoring cardiac function with adequate frequency and engaging in the physical exercises prescribed by the health team. Likewise, it favors seeking medical care early (Hohls et al., 2020). However, when at dysfunctional levels, cardiac anxiety may lead to avoidance behaviors when facing risk-free everyday situations, social isolation, and harmful hypervigilance. In this context, cardiac stress becomes a risk factor, worsening one's quality of life (Wedegärtner et al., 2020).

More specifically, three articles (Habibovic et al., 2017; Berg et al., 2019; Rafsanjani et al., 2020) evaluated patients with ICD. According to Berg et al. (2019), the individual with psychological vulnerability before the ICD may develop or intensify anxiety symptoms when facing the new condition imposed by the implant. Disorders such as panic, generalized anxiety, or posttraumatic stress may develop. After an ICD, patients with heart disease presented moderate to high anxiety levels (Rafsanjani et al., 2020). Additionally, younger patients with Type D Personality traits and a diagnosis of anxiety or depression were more vulnerable to developing post-traumatic stress disorder after an ICD (Habibovic et al., 2017).

Anxiety and depression

Four studies (Aggelopoulou et al., 2017; Kim et al., 2017; Cerezo et al., 2018; Allabadi et al., 2019) highlighted the relationship between anxiety and depression in the population with heart disease. As for gender, Cerezo et al. (2018) identified that male patients more frequently presented prevalent depressive symptoms associated with anxiety than women. The worsening quality of life and emotional health were observed among patients with anxiety and depression as comorbidities. Additionally, a history of anxiety symptoms before the diagnosis of heart disease was considered a predictor for developing depressive symptoms during the disease (Aggelopoulou et al., 2017; Allabadi et al., 2019).

The results obtained by Kim et al. (2017) showed a significant positive association between a history of major depressive disorder and anxiety. In the longitudinal follow-up of patients, the persistence of depressive symptoms during the disease was observed in cases of comorbid anxiety and depression. Additionally, the onset of a depressive episode within one year after the cardiac event was observed in patients with underlying anxiety. The conclusion was that anxiety before the cardiac event was correlated with the persistence of underlying depressive disorder and the incidence of the first depressive episode.

<div align="center">**Discussion**</div>

The articles identified in this literature review provide an excerpt about anxiety studies in cardiology between 2017 and 2020. The variation in anxiety levels according to gender and socioeconomic conditions is well established in the literature. In this sense and considering the relevance of highlighting original findings from the studies selected, we chose to focus on the discussion (1) of the relationship between anxiety and participation in cardiac rehabilitation

programs, (2) of the implications resulting from the presence of comorbidities anxiety disorders, and (3) the importance of multidisciplinary care for heart disease patients.

Anxiety was higher among patients participating in cardiac rehabilitation programs. More excellent knowledge about the disease may lead patients with an anxious profile to experience hypervigilance and maladaptive concerns about the need to change habits (Coccamo et al., 2020), such as believing they cannot have a healthier lifestyle. In this sense, the assistance provided by psychologists throughout the cardiac rehabilitation program is essential for interventions when a patient faces dysfunctional cognitions and behaviors. According to the Diagnostic and Statistical Manual of Mental Disorders – DSM-5 (American Psychiatric Association [APA], 2014), anxiety is the emotional response related to the anticipation of a future threat; hence, the hypothesis is that when patients participate in these rehabilitation programs, they attempt to control the signs and symptoms of heart disease in advance, based on the more excellent knowledge they acquire.

It is worth noting that psychiatric comorbidities combined with anxiety disorders, such as depressive disorder, raise the alarm about potential harm to the mental health and general quality of life of patients with heart disease (Aggelopoulou et al., 2017; Kim et al., 2017; Allabadi et al., 2017; Allabadi et al. al., 2019). Therefore, monitoring these patients' mental health favors the management of psycho-emotional distress associated with heart disease, enabling individuals to develop adaptive coping.

At the same time, anxiety may also be an essential protective resource as it influences one's perception of the severity of the disease and adherence to healthy behaviors and guidelines provided by the health team. When at adaptive levels, that is, at levels that keep the patient vigilant to identify signs associated with heart disease, anxiety favors an early search for medical assistance and support engagement in lifestyle changes (Figueiredo et al., 2020; Ivanovs et al., 2018). However, the multidisciplinary team, the family, and the support network closest to the patient must be able to identify when mental health disorders are damaging the quality of life, such as social isolation, constant fear of worsening the disease, and anhedonia.

Given the results presented and subsequent discussion, this systematic literature review allowed the identification of significant indicators of the relationship between anxiety and heart disease. Notably, improving multidisciplinary interventions aimed at this patient is necessary to offer integral and quality care. The importance of reconciling physical health care with mental health care is also highlighted since the psychological repercussions of a chronic illness influence how one copes with disease and, consequently, his/her quality of life.

Despite the contributions of this systematic review, there are some limitations. First, only two authors performed it, preventing a double-masked strategy from being adopted throughout the review process. Additionally, four databases were selected, which, although they covered part of the Brazilian and international literature, may not include all publications from the studied period. Hence, we suggest investigations in other databases considering other variables of interest.

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