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Effects of caffeine on individuals with anxiety disorders: an integrative review

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Abstract. Caffeine is one of the most widely consumed psychoactive substances worldwide, present in beverages such as coffee, tea, soft drinks, and energy drinks. Its main effect is the stimulation of the central nervous system, promoting increased alertness and reduced fatigue. However, its impacts on mental health, especially in individuals with anxiety disorders (who are predisposed), still raise questions. This study aimed to analyze, through an integrative literature review, the effects of caffeine consumption in individuals with anxiety disorders, comparing them to the effects observed in people without this condition, as well as results with differences in dose, sociocultural and genetic factors. The research was conducted using secondary sources available in the PubMed, SciELO, and Google Scholar databases, considering publications between 2015 and 2025, mainly research and studies. The results pointed to a possible relationship between high caffeine consumption and the worsening of anxiety symptoms, such as irritability, insomnia, tachycardia, and restlessness, suggesting the importance of individualized clinical guidance regarding the use of the substance. The study aims to contribute to the conscious use of caffeine and expand knowledge about its effects in more sensitive populations.
Keywords: Caffeine; Symptoms; Anxiety disorders; Panic; Depression.

Introduction

Caffeine is a widely consumed psychoactive substance present in numerous everyday beverages and foods, including coffee, teas, soft drinks, energy drinks, and chocolate. Its primary effect is central nervous system stimulation, promoting increased alertness and reducing the perception of fatigue. However, despite its well-established beneficial effects, its impact on mental health particularly among individuals with anxiety disorders remains under investigation (Saraiva et al., 2023).

The mechanism of action of caffeine involves antagonism of adenosine receptors, resulting in increased release of neurotransmitters such as dopamine and glutamate, which mediate its stimulatory effects. Additionally, caffeine promotes the release of cortisol and adrenaline, thereby enhancing physiological arousal. This effect may be particularly relevant in individuals with anxiety disorders, as these substances are directly associated with the stress response and activation of the sympathetic nervous system. Consequently, it has been questioned whether caffeine may contribute to the exacerbation of anxiety symptoms, potentially acting as an aggravating factor in such conditions (Klevebrant et al., 2022).

Although caffeine is generally considered safe at moderate doses, excessive consumption (above 1–1.5 g/day) may result in adverse effects, including insomnia, agitation, increased heart rate, and, in extreme cases, arrhythmias and seizures. Therefore, understanding the relationship between caffeine and anxiety is essential to assess potential mental health risks in individuals predisposed to anxiety disorders (Jee et al., 2020).

Given the widespread consumption of caffeine and its effects on the central nervous system, it is important to elucidate how this

substance may influence mental health, particularly in individuals with anxiety disorders. By stimulating the release of neurotransmitters and stress-related hormones, caffeine may potentially exacerbate anxiety symptoms such as restlessness, insomnia, and tachycardia. In this context, investigating this relationship is crucial to support clinical recommendations, promote responsible consumption, and expand scientific knowledge regarding the potential risks associated with caffeine intake in vulnerable populations.

Accordingly, the present study aimed to analyze the effects of caffeine in individuals with anxiety disorders, comparing them to those without this condition. To this end, the study sought to examine the mechanisms of action of caffeine in the central nervous system and how these processes may influence the onset or worsening of anxiety symptoms. Furthermore, it aimed to identify scientific evidence supporting an association between caffeine consumption and increased anxiety, as well as to discuss the implications of caffeine intake in the daily lives of individuals diagnosed with anxiety disorders, considering potential clinical guidance regarding its use in this population.

Contextualization and analysis

This study was characterized as descriptive in nature, with a qualitative approach, and based on secondary sources (scientific articles), considering publications from 2010 to 2024. Its purpose was to systematically gather, analyze, and interpret information previously published in the scientific literature on the selected topic, in order to address the following guiding research question: What are the effects of caffeine in individuals with anxiety disorders?

This approach was chosen because it allows the integration of findings from empirical studies with different research designs, enabling a critical analysis of the existing scientific literature on the effects of caffeine, particularly in individuals with anxiety disorders.

The review was conducted according to the following steps: (1) definition of the research question; (2) establishment of inclusion and exclusion criteria; (3) selection of information sources; (4) data collection; and (5) evaluation of the included studies. The data sources consisted of scientific articles available in academic databases such as PubMed, SciELO, and LILACS, as these platforms are widely used and recognized in the health sciences and provide reliable and up-to-date studies.

Article selection was based on the following inclusion criteria: original articles available in full text online and free of charge, directly related to the topic of this study, and published in Portuguese, English, or Spanish. Exclusion criteria included duplicate articles identified across databases and studies deemed not relevant to the scope of the literature review.

The searches were conducted directly on the respective database websites using targeted search strategies, with the following descriptors combined through Boolean operators (“AND,” “OR”): caffeine, symptoms, anxiety disorders, as well as their equivalents in English.

During the screening and reading process, information was collected regarding the main study outcomes, including reported symptoms, mechanisms of action of caffeine in the central nervous system, and potential exacerbation of anxiety conditions. Data analysis was performed qualitatively, allowing for a critical and comprehensive understanding of the topic, with emphasis on the neurochemical mechanisms involved, reported symptoms, affected population profiles, and observed clinical implications, aiming to identify patterns and interpretations that contribute to a deeper understanding of the subject.

Results and discussion

A total of 33 potentially relevant studies were identified in the PubMed, SciELO, and LILACS databases, published between 2010 and 2024. After the initial screening of titles and abstracts, 10 articles were excluded for not being directly related to the topic, 9 were excluded due to duplication across databases, and 6 were excluded because the full text was not freely available. At the end of the selection process, 8 articles met the inclusion criteria and were considered eligible for inclusion in this review.

A flowchart 1 illustrating the search, screening, and article selection process is presented below.

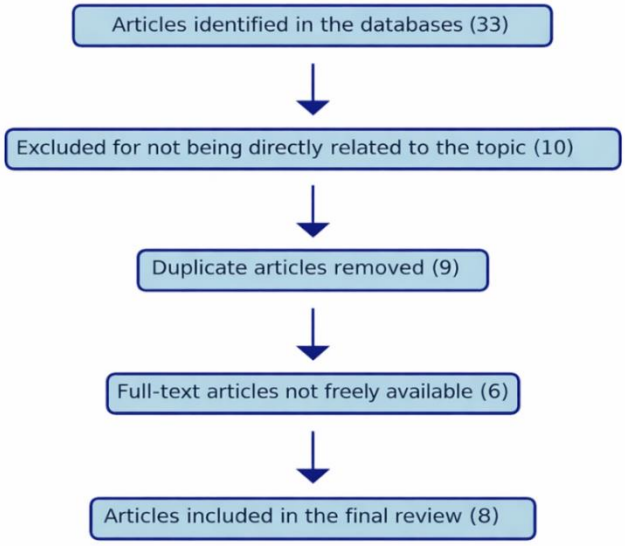
The following table presents the selected studies, including information on the authors, year of publication, title, objective, study design, and main findings. This organization allows for a concise and comparative overview of the scientific evidence regarding the effects of caffeine in individuals with anxiety disorders.

The relationship between caffeine consumption and anxiety disorders has proven to be complex and multifactorial, involving physiological, psychological, and behavioral aspects that vary according to dose, frequency of intake, and individual sensitivity. Overall, the studies analyzed indicate that caffeine may either exacerbate anxiety symptoms in predisposed individuals or exert neutral or adaptive effects in habitual consumers. This duality underscores the importance of considering both the clinical profile and the context of consumption when evaluating its impact on anxiety.

In their study, Santos et al. (2019) employed a case–control design including 65 adults with panic disorder and 66 healthy controls, and observed that regular caffeine consumption was not significantly correlated with the occurrence of panic attacks. The authors suggested that the body may develop resistance or tolerance to the anxiogenic effects of caffeine with continuous use. However, this finding does not rule out the substance’s potential to

provoke acute responses in sensitive individuals, as demonstrated by Masdrakis et al. (2015), who reported that high doses (400 mg) induced panic attacks in patients with panic disorder. Thus, variability in responses appears to be associated with individual vulnerability rather than solely with the amount consumed.

Complementarily, Hoppe et al. (2025) observed that the ingestion of 150 mg of caffeine increased physiological arousal and avoidance behavior without a significant elevation in subjective anxiety symptoms. This finding suggests that, even at moderate doses, caffeine may modulate the body's stress response without necessarily intensifying emotional distress.



Flowchart 1. Study selection process.

Table 1. Comparative Analysis of the Effects of Caffeine in Individuals with Anxiety Disorders

Author/Year	Study Title	Study Objective	Study Design	Main Findings
Kosecka *et al.* (2025)	Caffeine Intake Mediates the Relationship Between Problematic Overstudying and Psychological Distress.	To investigate the mediating role of caffeine consumption in the relationship between compulsive studying and psychological distress (perceived stress, anxiety, and depression) among university students.	Cross-sectionalstudy	Students exhibiting problematic (excessive) study behavior tend to consume higher amounts of caffeine. Elevated caffeine intake, in turn, is associated with increased levels of stress, anxiety, and depression.
Hoppe *et al.* (2025).	Acute effects of 150 mg caffeine on subjective, physiological, and behavioral components of anxiety in panic disorder and healthy controls – A randomized placebo-controlled crossover trial.	To evaluate the acute effects of caffeine (150 mg) on subjective, physiological, and behavioral anxiety responses in individuals with panic disorder and healthy controls.	Randomized Clinical Trial	Low-dose caffeine did not increase or trigger anxiety symptoms; however, it elevated physiological arousal and avoidance behavior in both individuals with panic disorder and healthy participants.
Cho *et al.* (2024).	The Association between High-Caffeine Drink Consumption and Anxiety in Korean Adolescents.	To investigate the association between high consumption of caffeinated beverages and anxiety in a nationally representative sample of South Korean	Observational study	Participants who reported consuming high-caffeine beverages demonstrated a higher prevalence ratio for anxiety symptoms. This association remained

Author/Year	Study Title	Study Objective	Study Design	Main Findings
		adolescents.		consistent regardless of sex.
Makki NM *et al.* (2023).	Caffeine Consumption and Depression, Anxiety, and Stress Levels Among University Students in Medina: A Cross-Sectional Study.	To evaluate the association between caffeine consumption and levels of depression, anxiety, and stress among university students using the DASS-21 instrument.	Cross-sectional observational study	No significant association was found between the severity of anxiety, stress, and depression and daily caffeine consumption in this group of students, suggesting that caffeine was not related to symptom exacerbation.
Paz-Graniel *et al.* (2022).	Caffeine intake and its sex-specific association with general anxiety: a cross-sectional analysis among general population adults.	To evaluate the relationship between caffeine intake and anxiety in adults, considering sex differences.	Cross-sectional study	Moderate caffeine consumption (≥220 mg/day) was associated with increased anxiety levels among female participants, whereas no significant association was observed among male participants.
Staack *et al*. (2022).	The Impact of Caffeine Intake on Mental Health Symptoms in Postmenopausal Females with Overactive Bladder Symptoms: A Randomized, Double-Blind, Placebo-Controlled Trial.	To evaluate the impact of caffeine consumption on mental health symptoms (anxiety, depression, and stress) in postmenopausal women who also present symptoms of overactive bladder.	Randomized Clinical Trial	A moderate dose of caffeine (400 mg/day) demonstrated a small positive effect on mental health. Symptoms of depression, insomnia, and stress were not affected at this dosage.
Santos *et al*. (2019).	Panic Disorder and Chronic Caffeine Use: A Case-control Study.	Evaluate the use of caffeine in patients with Panic Disorder and whether the consumption of the substance was associated with clinical characteristics.	Case-control study.	Caffeine consumption showed no significant correlation with the presence of panic attacks. However, regular intake of the substance suggests that the body may adapt and develop tolerance to its anxiogenic effects.
Richards e Smith (2015).	Caffeine consumption and self-assessed stress, anxiety, and depression in secondary school children.	Analyze caffeine consumption and its relationship with anxiety, stress, and depression in high school adolescents.	Cohort study.	The authors found a significant association between higher total caffeine consumption (with coffee being the main source) and higher levels of self-reported anxiety and depression among the study participants.
Pané-Farré*et al*.(2015).	Anxiety sensitivity and expectation of arousal differentially affect the respiratory response to caffeine.	To investigate how anxiety sensitivity and expectancy of physiological arousal influence respiratory and subjective responses following caffeine consumption.	Randomized Clinical Trial	Caffeine increased respiratory rate and subjective discomfort in individuals with high anxiety sensitivity, particularly when they expected to experience physiological arousal. These findings suggest that the anxiogenic effects of caffeine depend on individual psychological factors.
Masdrakis*et al*. (2015).	Lack of specific association between panicogenic	To investigate whether caffeine triggers panic attacks through activation of	Randomized Controlled Trial	Caffeine intake (400 mg) triggered panic attacks in 48% of patients, whereas

Author/Year	Study Title	Study Objective	Study Design	Main Findings
	properties of caffeine and HPA-axis activation: A placebo-controlled study of caffeine challenge in patients with panic disorder.	the hypothalamic–pituitary–adrenal (HPA) axis in patients with panic disorder, compared with healthy controls.		no patient experienced panic following placebo administration. It was also concluded that caffeine's potential to induce panic is not specifically associated with activation of the HPA axis.

Similarly, Pané-Farré et al. (2015) reported that individuals with high anxiety sensitivity (i.e., predisposed individuals) experienced greater discomfort and increased respiratory rate following caffeine intake, indicating that cognitive factors and personal expectations directly influence anxiogenic responses.

From an epidemiological perspective, Paz-Graniel et al. (2022) identified a higher prevalence of anxiety symptoms among women with moderate caffeine consumption (≥220 mg/day), but not among men, suggesting sex-related differences in psychophysiological responses to the substance. This finding partially converges with the results of Cho et al. (2024), who reported a positive association between high consumption of caffeinated beverages and anxiety symptoms in adolescents; however, in that study, the association did not differ according to sex.

According to the analysis conducted by Makki et al. (2023), no significant association was found between daily caffeine consumption and levels of anxiety, depression, and stress among university students participating in their study, indicating that psychological impact may depend on individual characteristics, consumption patterns, and sociocultural contexts.

Among specific populations, Staack et al. (2022) demonstrated that moderate caffeine intake (400 mg/day) did not exacerbate anxiety symptoms but rather alleviated them in postmenopausal women with overactive bladder (OAB), suggesting that under certain physiological conditions, caffeine's effect may be neutral or even slightly beneficial to mood. In contrast, Kosecka et al. (2025) reported that university students exhibiting compulsive (excessive) study behavior showed higher caffeine consumption and elevated levels of anxiety, indicating a potential feedback cycle between substance use and the worsening of pre-existing anxiety or mood symptoms.

Similarly, Richards and Smith (2015) concluded that caffeine consumption may be associated with increased levels of anxiety and depression among secondary school children, with intake exceeding 1000 mg/week representing a significant risk factor. However, the study emphasized that, due to its cross-sectional design, causality cannot be inferred. Considering the body of evidence as a whole, it appears that the impact of caffeine on individuals with anxiety disorders depends on dose, frequency of consumption, and contextual factors such as academic stress or individual perceptions of the substance's effects.

Paz-Graniel et al. (2022) further emphasized the importance of an individualized approach when assessing caffeine consumption and its potential impact on anxiety disorders.

Conclusion

Based on this review, the findings indicate that caffeine should not be regarded as a harmless substance, particularly among individuals with a history of anxiety disorders. Although it presents well-recognized benefits when consumed in moderation, excessive intake may intensify anxiety symptoms and compromise mental health.

The effects of caffeine are dose-dependent and influenced by individual consumer characteristics, underscoring the need for personalized assessment and greater awareness of individual tolerance limits.

Finally, there is a clear need for further field research with larger sample sizes and better control of individual variables in order to deepen the understanding of the relationship between dose, frequency of consumption, and genetic and psychological predisposition. Such investigations may provide a foundation for clinical interventions and educational campaigns aimed at promoting the safe and balanced use of caffeine.

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