

CONSUMO DE CAFÉ E DOR: UMA ANÁLISE DAS RELAÇÕES COM ENXAQUECA, DEPRESSÃO E ANSIEDADE

COFFEE CONSUMPTION AND PAIN: NA ANALYSIS OF ITS RELATIONSHIPS WITH MIGRAINE, DEPRESSION, AND ANXIETY

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RESUMO

O café é uma das bebidas mais consumidas em todo o mundo, e seu principal componente bioativo, a cafeína, exerce diversos efeitos sobre o sistema nervoso central. Embora a cafeína possa apresentar propriedades analgésicas e neuroprotetoras, sua relação com a dor e com transtornos neurológicos e psiquiátricos permanece complexa, parecendo depender da dose, da frequência de consumo, da suscetibilidade individual e dos padrões de uso. Esta revisão ampliada teve como objetivo analisar a associação entre o consumo de café e a dor, com ênfase particular na enxaqueca, na depressão e na ansiedade. Foram considerados três estudos: um estudo de base populacional investigando o consumo de café e a enxaqueca; um estudo observacional de grande porte avaliando a interação entre consumo de café, dor crônica, depressão e ansiedade; e uma revisão sistemática recente que integra evidências de estudos observacionais e de randomização mendeliana sobre cafeína e enxaqueca. As evidências disponíveis sugerem que o consumo de café está associado à enxaqueca de maneira complexa e dependente do contexto. Observou-se um maior consumo de café entre indivíduos com enxaqueca em uma população coreana; no entanto, a ingestão de café não apresentou associação significativa com a frequência, a intensidade, a incapacidade, as características clínicas ou a resposta ao tratamento agudo da cefaleia. O consumo de café também foi associado a diferenças na relação entre dor crônica e depressão ou ansiedade. Evidências mais recentes sugerem que o consumo habitual moderado de cafeína pode não aumentar a carga da enxaqueca, ao passo que a ingestão aguda excessiva ou a abstinência abrupta podem desencadear crises. Portanto, a relação entre café e dor não pode ser

considerada simplesmente benéfica ou prejudicial, ressaltando-se a importância dos padrões de consumo e das características individuais.

Palavras-chave: Café; cafeína; dor; enxaqueca; depressão; ansiedade; dor crônica.

ABSTRACT

Coffee is one of the most widely consumed beverages worldwide, and its major bioactive component, caffeine, exerts several effects on the central nervous system. Although caffeine may have analgesic and neuroprotective properties, its relationship with pain and neurological and psychiatric disorders remains complex and appears to depend on dose, frequency of consumption, individual susceptibility, and patterns of use. This expanded review aimed to analyze the association between coffee consumption and pain, with particular emphasis on migraine, depression, and anxiety. Three studies were considered: a population-based study investigating coffee consumption and migraine, a large observational study evaluating the interaction between coffee consumption, chronic pain, depression and anxiety, and a recent systematic review integrating observational and Mendelian randomization evidence on caffeine and migraine. The available evidence suggests that coffee consumption is associated with migraine in a complex and context-dependent manner. Higher coffee consumption was observed among individuals with migraine in a Korean population; however, coffee intake was not significantly associated with headache frequency, intensity, disability, clinical characteristics, or response to acute treatment. Coffee consumption was also associated with differences in the relationship between chronic pain and depression or anxiety. More recent evidence suggests that habitual moderate caffeine consumption may not increase migraine burden, whereas excessive acute intake or abrupt withdrawal may precipitate attacks. Therefore, the relationship between coffee and pain cannot be considered simply beneficial or harmful, emphasizing the importance of consumption patterns and individual characteristics.

Keywords: Coffee; caffeine; pain; migraine; depression; anxiety; chronic pain

INTRODUCTION

Coffee consumption is a common dietary habit worldwide and represents an important source of caffeine, a psychoactive methylxanthine with effects on the central and peripheral nervous systems. Caffeine acts primarily as an antagonist of adenosine receptors, particularly A₁ and A_{2A} receptors, influencing neuronal excitability, neurotransmitter release, cerebral vascular tone, and nociceptive processing. These mechanisms may explain both the analgesic properties of caffeine and its potential to trigger headache in susceptible individuals.

The relationship between coffee and pain is particularly relevant in migraine, a neurological disorder characterized by recurrent attacks of moderate-to-severe headache and frequently associated with psychiatric comorbidities such as anxiety and depression. Caffeine can potentiate the effect of some analgesic medications and may therefore contribute to acute headache treatment. Conversely, excessive caffeine intake and sudden withdrawal have been associated with headache and, in some individuals, migraine attacks.

In addition to its relationship with headache, coffee consumption may interact with the psychological consequences of chronic pain. Chronic pain and psychiatric disorders have a bidirectional relationship, as persistent pain can contribute to depression and anxiety, while psychological distress may increase pain perception and disability. Therefore, understanding whether coffee consumption modifies this relationship may contribute to a broader understanding of dietary and behavioral factors involved in pain perception.

METHODS

This expanded review integrated the findings of three scientific studies addressing the relationship between coffee or caffeine consumption and pain-related outcomes. The first was a population-based cross-sectional study by Cho, Kim and Chu, published in 2024, which evaluated coffee consumption and clinical characteristics among individuals with migraine and non-migraine headache. The study included 3,030 participants from a nationwide Korean survey and classified coffee consumption as no-to-low (<1 cup/day), moderate (1-2 cups/day) or high (≥ 3 cups/day).¹

The second study, by Qin et al., analyzed 376,813 participants from the UK Biobank and investigated whether coffee consumption influenced the association between chronic pain and depression or anxiety. Logistic and linear regression models, together with seemingly unrelated estimation tests, were used to compare associations between coffee consumers and non-consumers.²

The third study, by Makhoul et al., published in 2026, was a systematic review incorporating observational and Mendelian randomization studies. The authors searched PubMed, Scopus, Web of Science and the Cochrane Library and included 19 studies evaluating caffeine or coffee exposure and migraine risk.³

RESULTS

The findings indicate that the relationship between coffee consumption and pain is multifactorial. In the study by Cho et al., 170 participants were identified as having migraine

and 1,768 as having non-migraine headache. Coffee consumption increased progressively from individuals without headache to those with non-migraine headache and migraine. Among participants with migraine, however, most clinical characteristics – including monthly headache days, severe headache days, pain characteristics, migraine-related disability, and response to acute treatment – did not differ significantly according to coffee consumption.¹

An important finding of the study was the association between coffee consumption and psychological variables. Among individuals with migraine, depression and stress were more frequent in participants with low or no coffee consumption, whereas higher coffee consumption was associated with lower levels of depression and stress. Nevertheless, these findings should not be interpreted as evidence that coffee prevents depression, since the cross-sectional design does not establish causality. Other behavioral, socioeconomic, lifestyle, and clinical factors may contribute to this association.¹

The possible relationship between coffee and migraine may be explained by the dual effects of caffeine on adenosine signaling. By antagonizing A2A receptors, caffeine may inhibit aspects of trigeminal nociceptive signaling and cerebral vasodilation, contributing to analgesia. On the other hand, antagonism of A1 receptors may increase nitric oxide production and promote vasodilation, potentially facilitating migraine in susceptible individuals. Thus, caffeine may have both therapeutic and triggering effects depending on dose, individual susceptibility, and consumption pattern.¹

The second study expands this discussion by incorporating chronic pain and psychological disorders. Using data from 376,813 UK Biobank participants, the researchers identified significant differences in the association between multisite chronic pain and both depression and anxiety according to coffee consumption. The association between multisite chronic pain and self-reported depression was weaker among coffee consumers than among non-consumers, and a similar pattern was observed for generalized anxiety disorder scores. These findings suggest that coffee consumption may modify the relationship between chronic pain and psychological distress, although they do not establish a direct protective effect of coffee.²

The most recent evidence is provided by Makhoul et al. (2026), whose systematic review helps reconcile some of the apparently contradictory findings. Nineteen studies were included, comprising nine cross-sectional studies, seven Mendelian randomization studies, and three cohort studies. Mendelian randomization analyses generally suggested an inverse association between genetically predicted higher coffee consumption and migraine risk,

particularly migraine with aura, with reported odds ratios ranging approximately from 0.53 to 0.71 for overall migraine and as low as 0.37-0.39 for migraine with aura.³

However, observational studies indicated that the effects of caffeine may depend strongly on consumption patterns. Regular moderate consumption was generally not associated with a greater migraine burden, whereas acute excessive consumption and abrupt caffeine withdrawal could trigger migraine attacks in susceptible individuals. The review therefore emphasizes that habitual consumption and sudden changes in caffeine exposure should not be considered equivalent exposures.³

Taken together, these findings support the hypothesis that coffee does not have a uniform effect on pain. Instead, its effects may reflect a combination of pharmacological mechanisms, dose-response relationships, habitual consumption, caffeine withdrawal, psychological state, and individual susceptibility. The relationship with depression and anxiety is similarly complex. Moderate coffee consumption may be associated with more favorable psychological outcomes in some populations, whereas high caffeine intake can increase anxiety and stress in susceptible individuals. Therefore, the effects of coffee on pain and mental health should be interpreted within the broader context of lifestyle and individual characteristics.¹⁻³

Another relevant consideration is reverse causality. Individuals with migraine or chronic pain may change their coffee consumption because of their symptoms, either increasing caffeine intake in an attempt to obtain analgesic effects or reducing it because they perceive coffee as a trigger. This possibility is particularly important when interpreting cross-sectional studies. In addition, the amount of caffeine contained in a cup of coffee varies according to preparation method, serving size, bean variety, and brewing technique, making cup-based measurements an imperfect estimate of factual caffeine exposure.^{1,3}

CONCLUSION

The evidence indicates that the relationship between coffee consumption and pain is complex and cannot be classified as exclusively beneficial or harmful. Coffee consumption appears to be associated with migraine, chronic pain, depression, and anxiety through multiple interacting mechanisms. In individuals with migraine, coffee consumption may be more prevalent, but moderate habitual intake does not necessarily increase headache frequency, severity, disability, or treatment failure. At the same time, excessive caffeine consumption or abrupt withdrawal may increase the likelihood of migraine attacks in susceptible individuals.

Regarding chronic pain and psychological disorders, coffee consumption may modify the association between pain, depression, and anxiety, although current observational evidence does not demonstrate causality. Recent systematic evidence further suggests a potentially protective association between genetically predicted coffee consumption and migraine, particularly migraine with aura, while highlighting the importance of dose and consumption pattern.

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