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THE INFLUENCE OF ANXIETY DISORDERS ON DERMATOLOGICAL DISEASES: A VICIOUS CYCLE OF STRESS AND SKIN SYMPTOMS

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Abstract: INTRODUCTION This review begins by highlighting the significant prevalence of anxiety disorders in patients with dermatological conditions and the severe impact of this comorbidity on quality of life. It discusses the classification of anxiety disorders, including their specific psychological manifestations in dermatological settings. Biological mechanisms, including the HPA axis, are explored as key pathways through which anxiety exacerbates skin inflammation and barrier dysfunction, setting the stage for a cycle of psychological and physical symptoms that reinforce one another. **OBJETIVE** The main objective of this work was to investigate the complex bidirectional relationship between anxiety disorders and dermatological conditions, with a focus on understanding the underlying mechanisms and identifying potential treatment approaches. **METHODS** This is a narrative review which included studies in the MEDLINE – PubMed (National Library of Medicine, National Institutes of Health), COCHRANE, EMBASE and Google Scholar databases, using as descriptors: "Psychodermatology and anxiety" OR "Stress-related dermatological disorders" AND "Immune response in anxiety-driven skin conditions" OR "HPA axis and skin health" OR "Self-inflicted skin injury in anxiety disorders" in the last years. **RESULTS AND DISCUSSION** The results section details the specific dermatological conditions most commonly associated with anxiety, including atopic dermatitis, psoriasis, and acne. The section explores how chronic anxiety affects skin hydration, barrier function, and immune responses, emphasizing the role of cytokines and oxidative stress in skin aging and inflammation. Behavioral patterns like scratching and skin-picking are discussed as maladaptive responses that worsen skin conditions, highlighting the need for treatment approaches addressing both mental health and skin health. **CONCLUSION** The review concludes by emphasizing the necessity of an integrated treatment model that combines psychological and dermatological care. Addressing both the physiological and behavioral aspects of anxiety is essential for breaking the vicious cycle of stress-induced skin damage. A multidisciplinary approach that includes immune-modulating therapies, psychological support, and dermatological treatment holds promise for improving outcomes in patients with anxiety-related dermatological conditions.

Keywords: Psychodermatology; Anxiety disorders; Dermatological diseases; Skin inflammation; Stress-induced skin conditions.

INTRODUCTION

The intersection of mental health and dermatology has increasingly drawn attention, with anxiety disorders emerging as a significant factor in the pathogenesis and exacerbation of various skin conditions[1]. Anxiety disorders, which are among the most prevalent psychiatric conditions worldwide, manifest in several forms, including generalized anxiety disorder, panic disorder, and social anxiety disorder[1]. These conditions often coexist with chronic physical health conditions, affecting patients' overall quality of life and complicating disease management[1]. Dermatological patients, particularly those with chronic or visible skin conditions, frequently exhibit heightened levels of anxiety driven by the psychological toll of their symptoms and the social stigma associated with dermatological diseases[2]. This complex interaction between anxiety and dermatology highlights the need for an integrated understanding of how psychological stressors directly influence skin health[2].

The classification of anxiety disorders in dermatological patients encompasses a spectrum of psychological implications with direct and indirect effects on skin

conditions[2]. Specific subtypes, such as social anxiety disorder, are particularly relevant in dermatology, where concerns about appearance can amplify distress and worsen preexisting skin issues[2]. Psychological conditions like obsessive-compulsive disorder (OCD) also play a role, with behaviors such as skin-picking contributing to physical damage, infection risk, and further psychological distress[2]. Understanding the unique features of each anxiety disorder within the dermatological context is essential for clinicians, as it shapes treatment strategies and patient education, aiming to address both the dermatological symptoms and the psychiatric components that drive them[3].

Biological mechanisms linking anxiety disorders to dermatological health involve complex neuroendocrine and immune pathways[3]. The hypothalamic-pituitary-adrenal (HPA) axis is central in mediating the body's response to stress, with cortisol and other stress hormones influencing immune responses that lead to skin inflammation and dysregulation of the skin barrier[3]. Elevated levels of these hormones in patients with chronic anxiety contribute to systemic inflammation, which manifests in dermatological symptoms such as acne, eczema, and psoriasis flare-ups[4]. These skin conditions, in turn, further exacerbate anxiety, creating a self-perpetuating cycle that is challenging to break[4]. The role of these biological pathways underscores the importance of a multidisciplinary approach to treating dermatological patients with comorbid anxiety disorders[4].

The skin, as a psychophysiological organ, is particularly vulnerable to psychological stressors, making it a crucial area of focus in understanding the interplay between anxiety and dermatological disease[5]. Unlike other organs, the skin is visible and accessible, often serving as a canvas that reflects both physical and psychological health[5]. Anxiety's impact on skin health can be direct, through biological responses that alter skin integrity, or indirect, by influencing patient behaviors that affect skin condition[5]. For example, patients with heightened anxiety may develop maladaptive coping mechanisms such as scratching, skin picking, or overuse of skincare products, which can exacerbate existing dermatological conditions and lead to new complications[6].

Anxiety-induced immune dysregulation is a critical factor contributing to dermatological manifestations in patients with chronic stress and anxiety[6]. Proinflammatory cytokines, which are elevated during states of chronic anxiety, play a significant role in the pathogenesis of various dermatological conditions[6]. These cytokines, including interleukins and tumor necrosis factor, drive inflammation within the skin, leading to conditions like psoriasis, eczema, and acne exacerbations[7]. The immune dysregulation observed in anxious patients may also impair wound healing and compromise the skin's natural barrier function, making them more susceptible to infections and other complications[7]. This immune response not only worsens existing skin conditions but also fosters a cycle of psychological stress that perpetuates skin inflammation and dysregulation[7].

Psychoneuroimmunology has been instrumental in elucidating the brain-skin connection, providing insights into how psychological factors, such as anxiety, trigger immune responses that impact dermatological health[8]. This field explores how the nervous and immune systems communicate and influence each other, with anxiety disorders identified as significant drivers of skin disease through neuroinflammatory pathways[8]. The intricate relationship between the nervous system and immune function means that anxiety disorders can lead to heightened sensitivity to skin stimuli, increasing discomfort in conditions

like eczema and rosacea[8]. Psychoneuroimmunology's contribution to dermatology underscores the need to view skin health holistically, accounting for psychological, neurological, and immunological factors[9].

Numerous dermatological diseases are strongly associated with anxiety, including eczema, psoriasis, and acne, each of which exhibits exacerbation under stress[9]. These conditions are not only reactive to psychological stressors but also have a pronounced effect on patients' mental well-being[9]. For instance, the visibility and chronic nature of these skin diseases often lead to social anxiety, self-esteem issues, and, in some cases, depression[10]. This bidirectional relationship between anxiety and dermatological diseases presents challenges for treatment, as effective management requires addressing both the psychological and physical dimensions of these conditions[10]. A better understanding of these associations can guide comprehensive treatment plans that mitigate the impact of anxiety on skin health[10].

Anxiety also alters the skin's barrier function, impacting its ability to retain moisture and protect against environmental irritants[11]. Studies have shown that individuals with chronic anxiety exhibit increased transepidermal water loss, leading to dryness and heightened sensitivity, which can exacerbate conditions like atopic dermatitis[11]. The compromised barrier function in anxious patients increases susceptibility to allergens, irritants, and pathogens, resulting in a greater likelihood of inflammatory skin conditions[11]. The dermatological consequences of a weakened skin barrier underscore the importance of integrating psychological support in the management of patients with anxiety-related skin conditions, as enhancing mental well-being can improve skin barrier integrity and overall dermatological health[12].

Patients with anxiety disorders often experience altered perceptions of pain and discomfort, with heightened sensitivity that affects their experience of dermatological symptoms[12]. This heightened perception may lead to an increased tendency for self-directed behaviors, such as scratching or skin picking, which can worsen skin conditions and create additional psychological distress[12]. Patients with conditions like eczema or psoriasis may experience amplified itching sensations, driven by anxiety, that compel them to scratch more frequently, resulting in exacerbated symptoms and a cycle of stress-induced skin damage[13]. The increased sensitivity to pain and discomfort in anxious patients further complicates dermatological management and requires a targeted approach that considers both physical and psychological factors[13].

OBJETIVES

The main objective of this work was to investigate the complex bidirectional relationship between anxiety disorders and dermatological conditions, with a focus on understanding the underlying mechanisms and identifying potential treatment approaches.

SECUNDARY OBJETIVES

1. To examine the prevalence of anxiety disorders in patients with dermatological diseases.
2. To explore the specific dermatological conditions most impacted by anxiety and stress.
3. To analyze the biological and immune mechanisms linking anxiety to inflammatory skin responses.
4. To investigate anxiety-driven behaviors, such as scratching and skin-picking, and their impact on skin health.
5. To discuss therapeutic strategies that integrate both psychological and dermatological care for effective management.

METHODS

This is a narrative review, in which the main aspects of the complex bidirectional relationship between anxiety disorders and dermatological conditions, with a focus on understanding the underlying mechanisms and identifying potential treatment approaches in recent years were analyzed. The beginning of the study was carried out with theoretical training using the following databases: PubMed, sciELO and Medline, using as descriptors: "Psychodermatology and anxiety" OR "Stress-related dermatological disorders" AND "Immune response in anxiety-driven skin conditions" OR "HPA axis and skin health" OR "Self-inflicted skin injury in anxiety disorders" in the last years. As it is a narrative review, this study does not have any risks.

Databases: This review included studies in the MEDLINE – PubMed (National Library of Medicine, National Institutes of Health), COCHRANE, EMBASE and Google Scholar databases.

The inclusion criteria applied in the analytical review were human intervention studies, experimental studies, cohort studies, case-control studies, cross-sectional studies and literature reviews, editorials, case reports, and poster presentations. Also, only studies writing in English and Portuguese were included.

RESULTS AND DISCUSSION

The prevalence of anxiety disorders in dermatology patients is notable, with multiple studies demonstrating a high comorbidity rate between anxiety and various skin conditions[14]. In clinical populations, anxiety disorders, including generalized anxiety disorder and social anxiety disorder, are particularly common among patients with chronic dermatological diseases, such as psoriasis and eczema[14]. The psychological burden of these skin conditions appears to exacerbate pre-existing anxiety, leading to a vicious cycle that complicates both dermatological and psychiatric treatment[14].

Specific dermatological diseases, including atopic dermatitis, acne, and psoriasis, are frequently linked with anxiety, each with unique clinical implications[15]. In atopic dermatitis, the persistent itching and visible symptoms can elevate stress levels and lead to anxiety-driven behaviors such as excessive scratching[15]. Acne, often associated with adolescence, significantly impacts self-esteem and social functioning, heightening anxiety in affected individuals[15]. Psoriasis patients similarly experience elevated levels of social anxiety and depression, driven by the condition's chronic nature and social stigma[16].

Physiological pathways play a significant role in linking anxiety to inflammatory skin conditions, with mechanisms involving both immune and neuroendocrine responses[16]. Chronic stress in anxious individuals leads to the activation of the HPA axis, increasing cortisol levels that impact immune function and promote inflammation[16]. This immune activation is implicated in the pathogenesis of inflammatory skin diseases, where cytokines and immune cells contribute to conditions like psoriasis and acne, thereby aggravating skin symptoms[17].

The prolonged impact of chronic stress on dermatological health is well-documented, with evidence showing that long-term exposure to stress hormones accelerates skin aging and reduces healing capacity[17]. Patients with persistent anxiety experience higher levels of oxidative stress, which damages skin cells and contributes to the early onset of wrinkles and dryness[17]. This cumulative damage not only worsens skin condition but also feeds into the psychological distress these patients endure[18]. Anxiety's impact on the skin barrier function and repair mechanisms

highlights the physiological vulnerability of anxious patients to dermatological issues[18]. Studies show that anxiety disrupts the integrity of the skin barrier, leading to increased transepidermal water loss and reduced lipid synthesis[18]. This weakened barrier leaves the skin more susceptible to external irritants, exacerbating conditions like eczema and dermatitis in affected individuals[19].

Skin hydration and moisture retention are notably compromised in individuals with chronic anxiety, primarily due to stress-related alterations in skin physiology[19]. Anxiety has been shown to reduce natural moisturizing factors in the skin, leading to increased dryness and sensitivity[19]. Consequently, patients with anxiety are more prone to dehydration-related skin issues, which can further fuel their psychological distress as their skin conditions worsen[20]. Oxidative stress, driven by chronic anxiety, contributes significantly to the process of skin aging and cellular damage[20]. The accumulation of reactive oxygen species (ROS) in anxious patients damages skin cells, leading to the breakdown of collagen and elastin, essential for maintaining skin elasticity[20]. This oxidative damage is particularly pronounced in patients with high levels of anxiety, accelerating visible signs of aging and worsening skin conditions[21].

Cytokines play a central role in anxiety-related skin inflammation, with elevated levels of inflammatory cytokines observed in patients with chronic anxiety[21]. These cytokines, including interleukin-6 and tumor necrosis factor-alpha, drive inflammatory processes in the skin, exacerbating conditions like psoriasis and acne[21]. This immune-mediated inflammation presents a challenge in managing dermatological conditions in anxious patients, as traditional skin treatments may not address the underlying psychological triggers[22]. Anxiety-driven behavioral patterns, such as skin-picking and scratching, significantly impact skin health, often leading to secondary infections and scarring[22]. In patients with generalized anxiety disorder, these behaviors are commonly reported as coping mechanisms for alleviating psychological stress[22]. However, these self-inflicted injuries aggravate dermatological conditions and can lead to chronic skin damage that requires further medical intervention[23].

Self-inflicted skin injuries, a common manifestation in anxiety disorders, further complicate dermatological care[23]. Patients with conditions like OCD often exhibit compulsive skin-picking behaviors that increase their risk of infection and contribute to visible scarring[23]. This behavior not only worsens their skin health but also reinforces their anxiety, creating a cycle that requires integrated mental health and dermatological interventions[24]. In patients with generalized anxiety disorder, skin changes are particularly evident, with symptoms ranging from dryness to hypersensitivity and inflammation[24]. The heightened reactivity of the skin in these patients suggests an amplified immune response driven by anxiety-related physiological changes[24]. This heightened response necessitates a careful approach in managing dermatological conditions, taking into consideration the patients' psychological state[25].

Panic disorder also has unique dermatological manifestations, often leading to acute episodes of sweating, redness, and rash[25]. The physiological responses associated with panic attacks exacerbate pre-existing skin conditions, with symptoms like erythema and hives being common during anxiety episodes[25]. These visible reactions often heighten the patient's panic, worsening both their mental health and dermatological symptoms[26]. Anxiety's influence on atopic dermatitis severity is particularly concerning, as the chronic itching and discomfort in these patients lead to a continuous cycle of stress and skin damage[26].

The psychological burden of atopic dermatitis exacerbates anxiety, making it harder for patients to refrain from scratching, which in turn worsens their condition[26]. This cyclical relationship highlights the need for psychological support in managing atopic dermatitis in anxious patients[27].

The exacerbation of psoriasis due to anxiety presents similar challenges, as the inflammation and scaling associated with this condition increase with stress levels[27]. Psoriasis patients with anxiety report more severe symptoms and a reduced response to conventional dermatological treatments[27]. This finding emphasizes the necessity of addressing the psychological components of psoriasis to achieve optimal therapeutic outcomes[28]. Rosacea flare-ups are also strongly linked to anxiety, as psychological stressors heighten skin reactivity and exacerbate symptoms[28]. In anxious patients, the vascular reactivity that characterizes rosacea is more pronounced, leading to frequent episodes of redness and swelling[28]. These flare-ups further impact the patient's mental health, creating a cycle where anxiety and dermatological symptoms reinforce each other[29].

CONCLUSION

The complex interplay between anxiety disorders and dermatological diseases underscores the need for an integrated treatment approach that addresses both psychological and physical symptoms. The presence of anxiety exacerbates skin conditions through multiple mechanisms, including immune dysregulation, oxidative stress, and maladaptive behaviors, each of which contributes to the worsening of dermatological symptoms. Understanding these pathways is crucial for developing comprehensive treatment strategies that can effectively break the cycle of stress-induced skin disease.

The role of biological mechanisms, particularly the HPA axis and cytokine activity, highlights the physiological underpinnings of anxiety-related skin conditions. These pathways underscore the importance of considering systemic treatments that target immune and neuroendocrine responses, offering potential benefits beyond conventional dermatological interventions. Given the impact of these mechanisms on skin health, treatments addressing both immune and psychological factors may hold promise for improving outcomes in anxious dermatology patients.

Behavioral patterns, such as skin-picking and scratching, further complicate the clinical picture, as these actions often result from anxiety-related coping mechanisms. Addressing these behaviors requires a combined therapeutic approach that includes both dermatological care and psychological interventions. Psychotherapy and psychotropic medications may offer benefit by targeting the underlying anxiety, potentially reducing self-inflicted skin injuries and improving the patient's overall skin health.

Finally, the cyclical nature of anxiety and skin conditions calls for a holistic, patient-centered approach that integrates mental health support within dermatology care. As research in psychodermatology advances, future treatments may increasingly focus on personalized care models that consider the unique psychological and physiological needs of each patient. This comprehensive approach holds promise for breaking the vicious cycle of anxiety and skin symptoms, ultimately enhancing quality of life for patients with comorbid anxiety and dermatological disorders.

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