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REVIEW

Beyond the Surface: A Deeper Look at the Psychosocial Impacts of Acne Scarring

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Abstract: Post-acne scarring is a common consequence of acne vulgaris with no universal cure. Although there have been many recent advances to address acne scars physically, there is still a lack of research that investigates their psychosocial impacts. Our comprehensive PubMed search presents an overview of existing information to highlight known sources of mental distress caused by post-acne scarring, both related to and independent of the psychosocial detriments caused early on by active acne. The literature indicates that acne scarring is a distinct condition from acne vulgaris and therefore requires a comprehensive clinical approach unique from those available for active acne.

Keywords: acne scar, quality of life, psychosocial, social stigma, self-esteem, mental health

Introduction

Acne vulgaris is the most common skin disease in the United States (U.S.), with a prevalence of 85% in people between the ages of 12 and 24.[1,2] Measured in disability-adjusted life years, the global burden of disease of acne vulgaris ranks above most dermatological conditions including urticaria, psoriasis, viral and fungal skin diseases, and even melanoma. Extensive research has been conducted on both the management and psychosocial impacts of acne, which has led to the development of effective, widely available treatment interventions. However, although the physical symptoms of acne vulgaris can be easily controlled, associated maladaptive thought processes, mental illnesses, and avoidant social behaviors are not so easily reversed once established.

Many of these psychosocial effects can be linked to residual scarring from acne vulgaris. Post acne scarring affects up to 95% of individuals with acne, representing a permanent disfiguring condition with no universal solution. Acne scars result from dysregulated collagen production during the natural healing process of active acne lesions. Whether the scars are hypertrophic or atrophic depends on whether there is a net gain or loss of collagen during the extracellular matrix remodeling process.[3] Due to their tendency to appear in highly visible areas on the body, including the facial and truncal regions, acne scars play a significant role in triggering and exacerbating negative body image and self-esteem. Recognizing the impact acne scars pose to both physical appearance and psychological well-being is of paramount importance in the field of dermatology.

This review seeks to summarize the known psychosomatic impacts of acne scarring and identify existing gaps in research and clinical practice that precludes proper diagnosis and management of acne scars.

Methods

A PubMed search was performed to identify papers related to acne, acne scarring, and scars in relation to quality of life. Results were limited to articles published in English. Each source was screened by three independent reviewers for title, abstract, body, and citations. Additional sources were added in a second review round to provide necessary background on key concepts discussed and elucidate existing inconsistencies in current research and medical intervention.

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Results

Our initial screening resulted in 141 papers. Of these, 102 were excluded for not containing focal evidence on acne scars independent of primary acne. We found 39 papers discussing the effects of acne scarring in relation to quality of life. 23 papers were centered on the psychosocial impacts of active acne, while the rest discussed the impact of acne scars alone. Of the 16 remaining papers focused on acne scarring, 10 included quantitative analyses based on robust health-related quality of life (HRQoL) measures. Included studies exhibited wide variance in the acne severity scores, scar types, comparison baselines, and measurement constructs utilized.

Discussion

Our results show that psychosocial distress is first initiated during active acne, but acne scarring can cause unique consequences on patients' emotional, psychological, and social well-being. Limited availability of high-quality evidence and measurement tools relevant for acne scarring obstructs the development and standardization of effective clinical recommendations. The following sections define known psychosocial impacts of acne scarring and address existing barriers to successful management of this widespread condition.

Psychosocial Distress Triggered by Active Acne Vulgaris

Acne scarring develops during the peak onset of active acne, which generally takes place between the ages of 14 and 19.[4,5] Active acne during adolescence and young adulthood is the initial trigger for psychosocial stressors associated with acne scars.[1] Adolescence is a critical developmental period characterized by the formation of self and social identities.[6] During this time, the developing brain undergoes significant structural and functional changes, which can make it more susceptible to the development of mental health problems.[7] Compared to congenital disfigurements, acquired disfigurements, such as acne scarring, are more easily influenced by coping mechanisms formed during initial onset of appearance changes.[8,9] Therefore, early effective intervention for active acne is the single best method to prevent acne scar formation, while also mitigating psychological stressors associated with active acne.[10,11] A survey of 250 adolescents and young adults aged 13–25 years with moderate to severe acne vulgaris revealed a significant association between acne severity and body image disturbances.[12] The results confirmed that unique vulnerabilities faced by adolescents, including changes in brain development and increased susceptibility to environmental stressors, contribute to the higher prevalence of psychiatric illness during this stage of life compared to all others.[7] Addressing dysfunctional body image and low self-esteem early in the disease progression timeline is necessary to mitigate mental health disturbances resulting from acne scars.

Neuromodulatory Effects of Prescription Drugs for Acne

In addition to the burden of somatic symptoms, psychological dysfunction may also arise due to the neuromodulatory effects of prescription drugs, namely isotretinoin. Antibiotics such as doxycycline are typically prescribed as the first line of treatment for acne breakouts, and one report documented increased suicidality in 3 cases.[13] However, most topical and oral antibiotics are well-tolerated and do not cause significant psychological disturbances. On the other hand, isotretinoin is an oral retinoid medication indicated for use in patients with severe acne that is resistant to simple topical therapies.[14] Isotretinoin binds to retinoic acid receptors (RARs) in the brain and can modulate neurogenesis and synaptic plasticity in the serotonergic neurotransmitter system.[15] The subsequent impairment in serotonin signaling is hypothesized to mediate symptoms of depression in patients taking the medication.[15] In addition to depression, oral isotretinoin treatment has been associated with a higher risk for suicide, psychosis, and bipolar disorder.[14] In fact, of the adverse consequences reported from isotretinoin use, psychiatric symptoms accounted for 25.16%.[15] These mental indicators did not show significant improvement following completion of the treatment course.[16] Furthermore, while the basis remains controversial, current clinical practice operates on the assumption that isotretinoin can slow healing and increase the risk of atypical acne scarring.[17,18] It is unfortunate that the cure for acne may come at the risk of increased scarring, which contributes to sentiments of hopelessness and medical disillusionment.

Longitudinal Impacts of Acne-Induced Mental Illness

Patients with acne and acne scarring experience significantly increased occurrences of depressive symptoms, anxiety, and suicidal tendencies.[19,20] Many of these psychiatric comorbidities are characterized by high likelihoods of recurrence, once again suggesting that the resolution of active acne does not represent the cessation of concurrently acquired psychopathological symptoms. Aaron Beck, the pioneer of the Beck Depression Inventory, postulated that depression leaves "cognitive scars" that increases the probability of recurrence.[21] Major depressive disorder has recurrence rates of 50% in patients who have experienced a single depressive episode and 80% of those with a history of two or more depressive episodes.[22] Similarly, generalized anxiety disorder has a high recurrence rate of 45%.[23] These high recurrence rates are reinforced by maladaptive thought processes ingrained through years of struggle with negative self-conceptualizations.[21,24,25] In addition, even after overcoming anxiety or depression, individuals with a history of mental illness may still have significantly lower self-esteem compared to those without a history of mental illness.[26] This suggests that the emotional stress caused by acne scarring may have lasting effects that culminate into chronic psychiatric dysfunction.

A key difference researchers found between patients with active acne and acne scars is the expression of hope: while patients with acne exhibited hope for improvement, patients with acne scars were more likely to express hopelessness and unwilling acceptance of their condition.[27] A 2022 project explored maladaptive cognitions in patients with acne scarring utilizing a "projective personification" approach.[27] Participants with acne and acne scarring wrote letters addressing their own disease.[27] These letters facilitated analysis of patient perceptions, sentiments, and beliefs about their scarring without the conscious defenses that bias traditional questionnaires. Many participants with acne scarring expressed regret for not having treated their acne earlier, which contributes to sentiments of hopelessness and low self-esteem.[27,28] Such feelings in turn lead to a perceived loss of control, which further magnifies existing psychological distress. Early and consistent management of mental health is necessary to reframe negative cognitions and prevent the recurrence of psychiatric disorders related to acne and acne scarring.

Visible Disfigurement and Body Image

Impacts on Self-Image

Acne scarring poses additional unique burdens on emotional and psychological well-being. While the impacts of traumatic disfigurements, such as burn scarring, are well established, acne scarring is often dismissed as a superficial cosmetic concern. However, a study on skin scarring and disfigurement showed that non-life-threatening causes for disfigurement, such as acne, are associated with increased concern for appearance-related changes.[29] Since acne scarring poses no threat to life, cosmesis becomes the primary concern for afflicted patients, which has shown to be central to patients' self-image and self-esteem.

A patient's perceived visibility of their own disfigurement predicts psychological disturbances significantly better than objective clinical assessments.[29] This discrepancy can be explained by the tendency for acne scars to appear in highly visible areas of the body, which informs initial social perceptions by others and fuels heightened levels of embarrassment, self-consciousness and self-evaluations of unattractiveness.[28,30–32] Most patients experience feelings of sadness, annoyance and persistent worry about their scars, realizing that they may never completely disappear.[27] This self-contrived lack of acceptability to self and others forms maladaptive cognitions that result in worsened HRQoL measures compared to non-scarred patients.[30] Greater perceived scar severity is associated with increased levels of anxiety and anger, as well as decreased levels of confidence, happiness, life satisfaction, sociability, and perceived control over one's own life.[28] Several functional domains in the Dermatological Life Quality Index (DLQI) are impaired by acne scarring, including personal relationships and social participation.[33,34] While average HRQoL impairment scores were higher on average in patients with more severe acne scarring, there were many cases of mild scarring with high impairment scores across all scales.[33] Psychosocial dysfunction due to body-image concerns in mild cases is thus not to be overlooked based on generalized statistics.

There are several moderating factors, including gender and location of scarring, that may also influence the extent to which acne scarring impacts patients' quality of life. Evidence shows that the psychological impact of acne scarring affects females at a disproportionately higher rate compared to males. Specifically, studies show that in certain domains

of the DLQI, particularly personal relationships, females were affected more frequently than males.[33] Similarly, in Tan's qualitative and quantitative surveys, females reported higher scores across most HRQoL indicators compared to males.[2,27,30] On the other hand, other factors, such as body location, have yielded mixed results: while some have found that facial disfigurements pose greater psychological concerns due to its high visibility, other studies have found that truncal acne can have greater impacts on QoL due to disruptions in interpersonal intimacy.[35,36] Additional research on how patient demographics, such as age and gender, and physical factors, such as location of scarring, may influence psychosocial stress is needed to prescribe more tailored interventions for a broader patient population.

Social Stigmatization and Associated Behavioral Changes

Acne and acne scarring can cause chronic stigma-related stress that leads to profoundly impaired social functioning. Coined in 1963, social stigma describes negative regard, inferior status, and powerlessness assigned to individuals or groups based on a particular characteristic or category.[37] A 2018 study found that feelings of social stigmatization can lead to the development of secondary somatic symptoms of skin diseases, further complicating treatment and recovery.[36] Moreover, perceived social stigma presents a higher predictive value for both psychological distress and functional impairment than gender, acne severity, acne location, and medication use.[36] People with acne scars are perceived as less attractive, confident, happy, healthy, successful, and less likely to lead promising futures compared to people with clear skin.[30] Such appearance-driven perceptions were recorded by reviewers regardless of whether they themselves had acne scars, and across study centers in 5 different countries, strongly reaffirming the social fears experienced by acne scarring patients.[30]

Stigma-driven assumptions lead to discrimination in both personal and professional interactions. In a patient-centered survey of acne scarring, over 30% of patients reported negative comments from others in reference to their scars, and 10% reported verbal and physical abuse as a consequence of their scarred appearance.[30] Furthermore, many patients with acne scarring experienced unfair treatment and dismissal at the workplace related to their scarred appearance, irrespective of scar severity.[30] This creates a positive feedback loop where external stigmatization leads to harmful internalization of negative perceptions, further decreasing self-esteem while increasing self-consciousness.

In fact, highly noticeable visible differences, including acne scars, can be considered "social disabilities" for their impacts on cognitive and behavioral patterns.[29] Acne scarring is associated with significantly higher levels of social anxiety, higher frequencies of social phobia disorder, generally decreased social functioning, and greater emotional role difficulties.[38] A 2000 study found that facially disfigured individuals reported: 1) levels of socially phobic behaviors and agoraphobic avoidance on par with patients with social phobia and 2) higher levels of social avoidance compared to patients with agoraphobia.[32] Socially avoidant behavioral adaptations affect daily activities in various ways, including avoidance of photographs, changes in clothing and hairstyle choices to hide scarring, and decreased social media activity.[30,39] More debilitating social impairments cause decreased willingness to attend social activities, form intimate relationships, and apply to job opportunities.[28,30,39] Interestingly, the severity of scarring does not directly correlate with the extent of social disability experienced by affected individuals, as various studies have reported "mild" disfigurements causing greater anxiety than more "objectively" visible disfigurements.[29,40] While acne scars may not seem as medically significant as scars from traumatic injury, the potential psychological harm caused can be as severe, if not greater.

Deficiencies in Existing Systems for Acne Scar Management

Limited Data on the Psychosocial Effects of Acne Scarring

Our literature screening showed that there is still a lack of high-quality studies addressing both the psychosocial and the physical management of acne scars. The current knowledge base on treatments for acne scarring is limited by inconsistent methodology, underpowered studies, lack of standardized improvement assessments and different baseline variables.[41]

This underrepresentation in research, in turn, leads to differences in clinical care.[42] For instance, the morphological classification of acne scars (rolling scars versus boxcar scars versus ice pick scars) still remains a subject of discordance among physicians.[43] Selection of indicated treatments is provider-dependent, and differences in methodology exist even within similar treatment plans. For example, variance in chemoexfoliant formulations, subcision instruments, or

combinatory treatment selection can produce contrasting clinical outcomes.[44,45] Furthermore, treatment success is not always guaranteed. Clinical outcomes are highly dependent on the operator's skill and experience as well as the patient's individual response to treatment.[42,43]

The lack of standardized clinical guidelines reflects patient sentiments about available treatment options for their condition. In a multinational study including over 700 patients, over half felt existing treatments for acne scars were insufficient due to factors such as financial accessibility, variable healing times, and inconsistent results.[30] These factors present standalone stressors to quality of life, while adding to feelings of frustration and powerlessness associated with acne scarring. More high-quality studies with large sample sizes and placebo-controlled trials are needed to improve global understanding of effective therapies pertaining to different acne scar morphologies. With the improvement in treatment modalities, more patients may be able to find solace in successful treatment options.

Lack of Patient Health Literacy

Additional barriers to treatment include lack of patient awareness of what treatments are available or most effective for their unique acne scarring profile. A study of 50 Nigerian patients with post-acne scarring found that only 74% of subjects were aware that their scars were treatable, while less than 30% were aware of the specific treatment modalities available.[46] Similarly, a survey of 900 Korean patients with acne scars showed that 62.1% never had any medical treatment for their acne scars.[47] In Tan's 2021 study, 30% of patients reported a perceived lack of control over their scars, believing that nothing could be done to improve their scars' appearance.[23] However, among those same patients, two-thirds of the subjects felt that even a minor improvement in scarring would be worthwhile.[30]

The literature suggests that patient awareness of available treatment modalities for acne scarring is essential, as delayed treatment leads to suboptimal treatment outcomes. Delayed treatment of active acne may also be harmful, as it leads to increased frequency and severity of post-acne scarring.[48] A survey of 900 patients with resolved active acne confirmed that scar-free patients visited dermatologists earlier than scarred patients.[47] Patients with post-acne scarring frequently report sentiments of regret and self-blame, adding to existing psychological stress caused by physical symptoms alone.[27] Therefore, it is important to improve literacy of acne scar treatments, allowing patients to make informed decisions regarding their own care.

Financial Barriers to Treatment

Health insurance often covers effective treatments for active acne, including oral and topical prescription medications. However, our experience with thousands of patients indicates that many of the treatments implemented for acne scarring, including dermal fillers, lasers, and chemical peels, are considered cosmetic procedures and typically incur significant out-of-network costs. Although multinational analyses have shown that patients are willing to invest financial resources for acne scarring treatments, many subjects simply cannot incur the high clinical expense.[46,49] With privatized cosmetic institutions as the sole option available for scar treatment; patients are faced with significant financial barriers to treatment access, in addition to further stigmatization for perceived aesthetic vanity. Currently accepted guidelines for acne scar treatment recommend extensive combination therapies over multiple sessions. However, there are no standardized protocols for the procedures, tools, and techniques used. Additionally, the development of novel instruments and therapeutics must undergo extensive approval processes to ensure safety and intellectual property protection. These factors pose barriers to innovative treatments aside from the high clinical cost.

Future Directions and Recommendations

Clinical Evaluation of Psychosocial Burden

It is important for clinicians to recognize how acne scarring can trigger or exacerbate patients' mental distress. Since treatment success is ultimately determined by the patient themselves, it is especially important to emphasize insights of patients' lived experiences with their acne scarring, which may not be immediately apparent to clinicians. Implementation of standardized clinical surveys utilizing patient-reported outcomes (PROs) can help clinicians better understand patients' psychosomatic experience with their scars. Currently, there is a lack of effective PRO surveys implemented for acne and acne scarring. According to one 2022 systematic comparative study of PROs for acne, only 2

out of 54 surveys had sufficient measurement properties for clinical use.[50] Of these, only the ACNE-Q considered the impact of post-acne scarring. The ACNE-Q is a specific patient-reported psychosocial outcome measure consisting of 7 independent scales that measure patient perspectives on the appearance, symptoms, and appearance-related distress resulting from facial acne and acne scars.[51]

In general, QoL measures designed for acne are not sensitive for acne scarring.[52] Our literature screening found only two surveys specific to acne scarring, the Facial Acne Scar Quality of Life (FASQoL) and the SCARS patient-reported survey for atrophic acne scars, which evaluate psychosocial impact and somatic symptoms, respectively.[50,51] Combined use of these surveys may better inform clinicians' approach to care by providing insight on patients' perceived level of distress, burden of illness and expectations for treatment. With increased use, these surveys can be further developed, validated, and disseminated to effectively diagnose the psychological ailments of patients with acne scarring.

Psychodermatological Medicine: A More Holistic Approach to Acne Scar Management

Holistic treatment for acne scarring should address both physical and emotional scars. Early physical intervention of acne and acne scars can help prevent and ameliorate acute psychosocial distress.[53] Similarly, psychotherapy and support groups can provide additional clinical benefit to patients who are undergoing physical treatments for their acne scars.[54] While there have been few studies so far, integrated dermatological and psychiatric care for patients with post-acne scarring shows promising potential. In a study of 48 depressed patients with facial acne scars, cognitive behavior-oriented psychological interventions performed concurrently with photothermolysis treatment for scar appearance was able to significantly decrease levels of anxiety, depression and interpersonal sensitivity.[54] Early implementation of synchronous psychotherapeutic interventions, such as cognitive behavioral therapy and support groups, help promote constructive coping mechanisms, manage realistic expectations for improvement, and mitigate social handicaps. In severe cases of major comorbid psychiatric conditions, psychopharmacological management, such as the use of selective serotonin reuptake inhibitor antidepressants can provide greater relief to patients.[55] Multidisciplinary collaboration from healthcare professionals including psychotherapists, psychiatrists, and dermatologists enables the creation of comprehensive treatment plans with improved patient outcomes.

Conclusion

Scarring is an undesirable complication of acne that causes a significant impact on body image, self-esteem, and overall quality of life. Acne scarring prolongs existing maladaptive thought processes, low self-esteem, negative body image, and avoidant social behaviors initiated during active acne. These stressors are further compounded with sentiments of hopelessness, disillusionment, and regret due to permanent disfigurement for which no universal cure exists. The profound impact of post-acne scarring on quality of life warrants its consideration as a primary skin condition and not simply one of many sequelae of acne vulgaris. Further research is needed to better characterize the psychosomatic impacts of acne scarring and allow for improvement in current clinical practices. Integrated psychodermatologic evaluation and intervention early in the disease progression timeline is critical to delivering successful, comprehensive management of acne scarring.

Disclosure

The authors report no conflicts of interest in this work.

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