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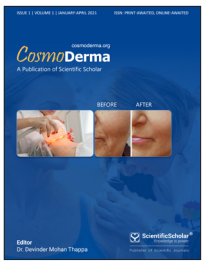

Review Article

Psychiatric comorbidities in dermatitis artefacta: A systematic review and meta-analysis

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ABSTRACT

Dermatitis artefacta, also known as factitious or factitial dermatitis, is a rare and difficult-to-treat condition characterized by self-inflicted skin lesions. Despite the well-documented psychological disturbances that characterize this condition, little is known about the relative frequency of specific psychiatric disorders in this patient group. The current systematic review was undertaken to address this gap in our knowledge and was conducted in accordance with PRISMA guidelines. The PubMed and Scopus databases were searched using the terms "dermatitis artefacta," "factitious dermatitis," and "factitial dermatitis" in combination with "psychiatry," "psychiatric diagnosis," "psychiatric disorder," "mental illness," "depression," and "anxiety." After screening a total of 215 citations, a total of 11 papers were included in the final review. All the included studies were of low to very low quality as per the GRADE guidelines, and there was substantial heterogeneity among them (I^2 = 50.4). It was observed that 46.2% of patients (95% CI: 35.4–57.4%) with dermatitis artefacta had a comorbid psychiatric disorder, with the most common diagnoses being depression, somatoform disorders, anxiety disorders, substance use disorder, and intellectual disability. About 20.1% of patients refused a psychiatric evaluation, while 40.9% reported a significant stressful life event. These results suggest that a significant proportion of patients with dermatitis artefacta suffer from psychiatric disorders, which may be related to their self-infliction of lesions either biologically or psychologically. Treatment of these disorders may lead to a partial or complete improvement in their dermatological condition. A sensitive, non-confrontational approach is essential when evaluating these patients to minimize the chances of refusal and improve patient compliance.

Keywords: Dermatitis artefacta, Psychodermatology, Depression, Anxiety, Stress

INTRODUCTION

Dermatitis artefacta, also referred to as factitious or factitious dermatitis, is a disorder characterized by self-inflicted skin lesions.[1] Although relatively rare, this condition is clinically important because it is often unidentified or misdiagnosed.[2] Moreover, treatment of dermatitis artefacta is difficult, and treatment outcomes are often not satisfactory.[3] Though psychological factors are considered to play a central role in this disorder, their exact nature is still a matter of debate. For example, though stressful life events have been identified as playing a role in triggering or maintaining this disorder, their exact nature and severity varies widely between subjects.[4] Recent research has also identified specific psychological mechanisms, such as dissociation and deficits in emotion regulation, that may play an important role in influencing this behavior.[5] Further, some authors have reported associations between self-inflicted skin lesions and specific psychiatric disorders, particularly those involving poor impulse control; however, it is not clear if treating these disorders would lead to an improvement or resolution

of dermatitis artefacta itself.[6,7] Psychotropic medications such as antidepressants have been used in individual cases of dermatitis artefacta, but reports of their efficacy have yielded mixed results.[8,9] Moreover, many patients with dermatitis artefacta are unwilling to acknowledge the self-inflicted nature of their lesions, and often refuse psychiatric consultations or psychological interventions.[10] As a result, these patients are at risk for further serious complications, including secondary skin infections, disfigurement, more severe forms of self-mutilation, the development of comorbid severe mental disorders, and, less commonly, suicide attempts.[11-13]

An important barrier to treating these patients is the traditional framing of this disorder as reflecting an unconscious wish to receive medical care or be identified as sick ("assuming the sick role"). Although this etiological theory is often taken as well-established or even proven in reviews,[1,3] a careful review of the literature suggests that the psychological underpinning of dermatitis artefacta is far more complex, and may involve a wide range of psychiatric disorders or adverse life circumstances that vary across patients and settings. For example, dermatitis artefacta in children and adolescents may be the result of difficulties in communicating distress and emotional immaturity – in other words, a "cry for help" in the face of familial, academic or peer-related stressors.[14] In younger adults, this behavior may represent the interaction of early life adversity, social isolation, and current life events.[15] At the other end of the age range, self-inflicted skin lesions in the elderly may be associated with organic brain diseases, such as dementia.[16] The evaluation and treatment of these comorbid psychiatric disorders, in a manner appropriate to the patient's age and clinical status, may directly or indirectly reduce self-inflicted skin lesions, while avoiding a confrontation that could adversely affect the doctor-patient relationship. This could facilitate fruitful collaboration between dermatologists and mental health professionals.

To achieve this, the physicians primarily handling such cases must be aware of the mental disorders most commonly associated with dermatitis artefacta. Although individual reports of dermatitis artefacta accompanying specific forms of mental disorder are well-represented in the literature, little is known about the relative frequencies and correlates of specific forms of mental disorder, such as depression, anxiety disorders, or personality disorders, in dermatitis artefacta taken as a whole. The purpose of the current paper is to address this gap in our knowledge by systematically reviewing the existing literature in this field and summarizing existing data on the frequency of various mental disorders in groups or series of patients with dermatitis artefacta. As a secondary objective, data on stressful life events experienced by these patients were also extracted where available.

MATERIAL AND METHODS

This paper is a systematic review and meta-analysis of observational studies reporting the frequency of all specific psychiatric disorders, confirmed either by a structured instrument or by a psychiatric evaluation, in samples of patients identified as having dermatitis artefacta. Criteria for inclusion in the review were: (a) Observational studies of samples or series of patients with dermatitis artefacta, (b) evaluation of psychiatric diagnoses either through a structured instrument, such as a rating scale or interview schedule, or an independent interview by a mental health professional, (c) reporting of the numbers or percentages of patients with individual diagnoses, and (d) studies published in the English language. Single case reports, or case series focusing exclusively on dermatitis artefacta in the context of a single type of mental disorder, were excluded from this review.

This review was conducted in accordance with the PRISMA guidelines.[17] The PubMed and Scopus databases were searched for articles using the search terms "dermatitis artefacta," "factitious dermatitis," and "factitial dermatitis," in combination with "psychiatry," "psychiatric diagnosis," "psychiatric disorder," "mental illness," "depression" or "anxiety." All searches were current up to July 12, 2021. As an example, the search strategy for the PubMed database was as follows:

1. "Dermatitis artefacta" OR "factitious dermatitis" OR "factitial dermatitis" (Title, Abstract, Text or Key Words)
2. 1 AND ("psychiatr*" OR "psychol*")
3. 1 AND ("psychiatric diagnosis" OR "psychiatric disorder" OR "mental illness")
4. 1 AND ("depression" OR "major depression" OR "anxiety" OR "anxiety disorder")
5. 2 OR 3 OR 4

Using the above search strategy, a total of 215 citations were identified: 113 in PubMed and 102 in Scopus. After removal of duplicate citations, a total of 119 citations were screened for possible inclusion in this review. Of these, 108 citations were excluded for the following reasons: Single case reports (n = 48), studies of disorders other than dermatitis artefacta (n = 22), general or narrative review articles on psychodermatology without original data (n = 15), commentaries and editorials (n = 13), papers in languages other than English (n = 5), papers with no evaluation of psychiatric disorders (n = 4), and papers reporting histopathological findings without clinical or mental health data (n = 1). Among the papers in other languages, none reported data on a series or sample of cases; they were all classified as commentaries or single case reports. A total of 11 papers were included in the final review. Details of the above process are summarized in a flow diagram in Figure 1.

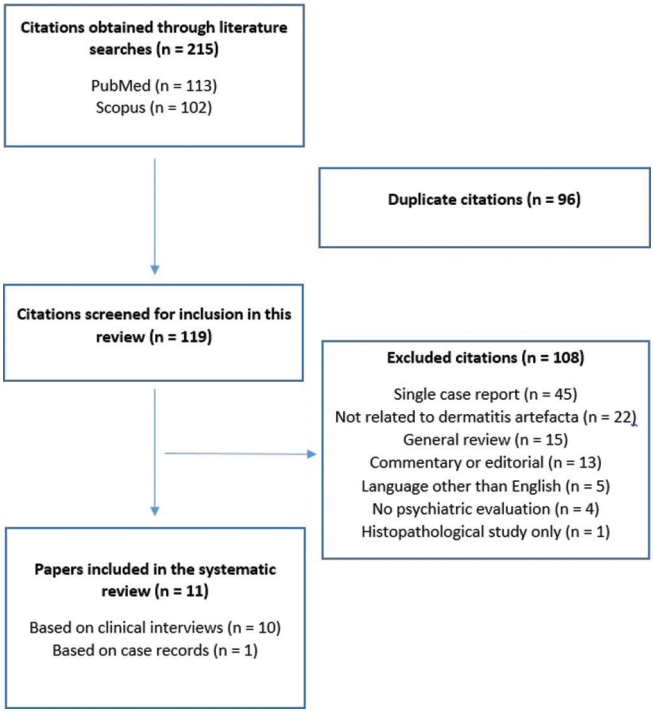

Figure 1: PRISMA flow diagram of the current systematic review.

The quality of the studies included in this review was assessed using the GRADE guidelines. According to these guidelines, observational studies begin with a quality rating of "low" (or ++ on a scale of + to ++++), indicating that our level of confidence in the study estimate (in this case, prevalence of psychiatric disorders) is limited, and the true prevalence may vary significantly from what is reported in published papers. This baseline score is further adjusted to take into account indirectness, imprecision, publication bias, and assessment of potential confounding factors.[18] Indirectness, in the context of observational studies, refers to whether the patients studied are similar to those encountered in real-world settings.[19] Imprecision refers to the width of the confidence interval reported in a given study; a large confidence interval would indicate greater imprecision.[20] Publication bias is assessed on the basis of the number of studies and their funding source; a smaller number of studies, or commercially funded studies, would be associated with greater publication bias.[21] Finally, for the 11 papers examined in this review, it was not possible to assess imprecision in individual papers, as estimates of prevalence were given only as percentages, and in some cases had to be computed from the raw data for the purpose of this review; hence, imprecision was commented on for the review as a whole.[20] The lowest possible score that can be assigned to a study is "very low" (+); hence, all studies included in this review received a score of "low" (++) or "very low" (+). Table 1 illustrates the quality assessment for each study as per the GRADE guidelines.[16,22-31]

Information on demographic variables (age and marital status) was extracted from the aggregate and individual patient data provided in each report. Details on psychiatric diagnoses were extracted based on the details provided by the authors. If an outdated term was used due to an earlier date of publication, this was replaced by the contemporary diagnostic entity; this was required only in one patient who received a diagnosis of "war neurosis," which would be classified today as post-traumatic stress disorder (PTSD). As the diagnoses were based on single clinical interviews or file reviews, details regarding the severity of illness in individual patients, and additional clinical information of interest, could not be obtained. Where vague or inaccurate terms were used to describe a patient, such as "shy" or "nervous," no specific diagnosis was ascribed to them. All diagnoses were coded as the equivalent diagnostic category according to the World Health Organization's Classification of Mental and Behavioral Disorders, 10th Edition for the purpose of uniformity and ease of communication.[32] Overall confidence intervals for the prevalence of all psychiatric disorders were computed based on aggregate data from all available studies, using the MetaXL add-on to Microsoft Excel, and based on the most recent review on meta-analysis of prevalence data by the developers of this software package.[33]

RESULTS

Details of the studies included in this review

A total of 11 papers were included in the final review, representing a total of 334 patients with dermatitis artefacta.[16,22-31] The earliest of these reports was published in 1975, and the most recent relevant report was published in 2015. Nine countries were represented in these studies: Denmark, India, Iran, Mexico, Poland, Saudi Arabia, Spain, Switzerland, and the United Kingdom. All studies were based on hospital samples of patients seeking treatment from dermatology clinics or services. The majority of these reports (7 of 11) included patients from all age groups – children, adolescents, and adults, while two papers included only children and adolescents,[24,31] one included only adolescents and adults,[27] and one included only older adults.[28] One of the studies included in this review reported findings only in female patients with self-inflicted lesions confined to the breast area, while the remaining papers included patients of both genders and with lesions at any site.

From a methodological perspective, ten of the 11 papers included in this study reported psychiatric diagnoses on the basis of a clinical assessment by a psychiatrist or clinical psychologist, while one study reported diagnoses on the basis of the patients' existing medical records. None of the studies reported the use of a standard psychometric instrument, such as a rating scale or structured interview, to screen for

Table 1: Quality assessment of the studies included in the meta-analysis, as per GRADE guidelines.

Study	Baseline quality score	Indirectness	Publication bias	Assessment of confounding factors	Final quality score
Sneddon and Sneddon, 1975[16]	2 (++)	−1	−1	0	1 (+)
Haenel *et al*., 1984[22]	2 (++)	−2	−1	0	1 (+)
Obasi and Naguib, 1999[23]	2 (++)	0	−1	+1	2 (++)
Saez-de-Ocariz *et al*., 2004[24]	2 (++)	−2	−1	0	1 (+)
Nielsen *et al*., 2005[25]	2 (++)	0	−1	+1	2 (++)
Ehsani *et al*., 2009[26]	2 (++)	−2	−1	0	1 (+)
Rodriguez-Pichardo *et al*., 2010[27]	2 (++)	−2	−1	0	1 (+)
Wojewoda *et al*., 2012[28]	2 (++)	−2	−1	0	1 (+)
Mohandas *et al*., 2013[29]	2 (++)	0	−1	+1	2 (++)
Saha *et al*., 2015[30]	2 (++)	−2	−1	0	1 (+)
Luna *et al*., 2015[31]	2 (++)	−2	−1	0	1 (+)

Final quality scores are computed by adding the sub-scores to the baseline quality score. Scores less than 1 are rated as 1 ("very low quality")

the presence of mental disorders. There was no consistent mention of any standard diagnostic criteria, such as the World Health Organization's International Classification of Mental Disorders or the American Psychiatric Association's Diagnostic and Statistical Manual for Mental Disorder, being used to confirm individual diagnoses. Six of the 11 studies also documented a history of past or recent stressors that were considered to be relevant by the mental health professional evaluating the patient, while two studies reported details of possible childhood trauma or stressors in adult patients.

Demographic characteristics of the patients

A total of 334 patients were assessed in the studies included in this review. The majority of these patients (271 of 334, 81.1%) were female. The demographic details of these patients are summarized in Table 2. Specific details of the age of study participants were provided in ten of the 11 studies included. The age range of the patients included in this review ranged from a minimum of two to a maximum of 86 years of age, with mean ages from 12.9 to 60.8 years reported in individual studies.

For patients for whom data were available, the majority of patients (52.1%) were married or in a stable relationship. Information on other demographic variables of interest, such as income, employment, or religious affiliation, was not consistently provided across published reports.

Psychiatric diagnoses in samples of patients with dermatitis artefacta

The relative frequency and distribution of various psychiatric diagnoses in the patient samples included in this study are summarized in Table 3. Of the 334 patients whose data were included in this review, 67 (20.1%) were reported to have refused a psychiatric or psychological evaluation. Documented refusal of a mental health evaluation consultation was more frequent in the two studies of child and adolescent patients (48/73 patients; 65.6%) than in the other nine studies (19/261 patients; 7.3%); this difference was statistically significant ($P = 0.003$, Fisher's exact test).

In the remaining 267 patients who underwent some form of psychiatric evaluation, a clear psychiatric diagnosis could be established in 119 patients (44.5%). The most frequent diagnoses made were depression ($n = 50$; 18.7%), somatoform disorders ($n = 15$, 5.6%), substance use disorders ($n = 13$, 4.9%), anxiety disorders ($n = 11$, 4.1%), and mental retardation/intellectual disability ($n = 9$, 3.4%). Other diagnoses identified in smaller numbers of patients, in descending order of frequency, were personality disorders, bipolar disorder, conduct disorders, schizophrenia, PTSD, dementia, attention-deficit/hyperactivity disorder, specific developmental disorder of scholastic skills (specific learning disability), stuttering, and nocturnal enuresis.

Data on the relative frequency of psychiatric diagnoses in men and women were available in six studies, providing data on 165 women and 27 men who agreed to a psychiatric evaluation. This information is summarized in Table 4. Women were more likely to receive a diagnosis than men in three of the five studies. In a pooled analysis, psychiatric disorders were diagnosed in 65 of 165 women (39.4%) and 4 of 27 men (14.8%); based on this, it could be estimated that women with dermatitis artefacta had a 3.7-fold chance of being diagnosed with a mental disorder compared to men (odds ratio, 3.74; 95% confidence interval, 1.26–11.09; $P = 0.016$, Fisher's exact test). Due to the heterogeneity in patient population and age groups, no significant analysis of age differences in the frequency of psychiatric diagnoses could be undertaken. However, the pooled frequency of psychiatric diagnoses was 91.7% (22 of 24 subjects evaluated) in studies of children and adolescents alone, compared to 39.9% (97 of 243 subjects evaluated) in samples involving patients from all age groups.

Table 2: Demographic characteristics of patients in the studies reviewed.

Author and publication date	Country of origin	Sample size	Mean age (range)	Gender distribution	Marital status*
Sneddon and Sneddon, 1975[16]	United Kingdom	43	36.5 (13–70)	38 F, 5 M	29% single, 71% married
Haenel *et al*., 1984[22]	Switzerland	71	NA	59 F, 12 M	NA
Obasi and Naguib, 1999[23]	Saudi Arabia	14	25.9 (12–71)	12 F, 2 M	50% single, 50% married**
Saez-de-Ocariz *et al*., 2004†[24]	Mexico	29	11.2 (2–18)	25 F, 4 M	-
Nielsen *et al*., 2005[25]	Denmark	57	39.0 (12–86)	42 F, 15 M	NA
Ehsani *et al*., 2009[26]	Iran	12	28.8 (NA)	7 F, 5 M	NA
Rodriguez-Pichardo *et al*., 2010ǂ[27]	Spain	27	34.3 (13–77)	27 F	35% single, 55% married, 10% widowed
Wojewoda *et al*., 2012[28]	Poland	4	60.8 (57–62)	2 F, 2 M	NA
Mohandas *et al*., 2013[29]	United Kingdom	28	28.1 (9–81)	24 F, 4 M	58% single, 21% married or in long-term relationship, 16% separated, 5% widowed
Saha *et al*., 2015[30]	India	5	26.8 (12–48)	3 F, 2 M	NA
Alcantara Luna *et al*., 2015†[31]	Spain	44	12.9 (4–17)	32 F, 12 M	-

*Calculated only for adult subjects, **Data missing for some patients, †Study involving only children and adolescents, ǂStudy included only female patients with breast lesions, NA: Data not available in the study or supplementary material

The I^2 statistic for heterogeneity across studies was 50.4, indicating substantial heterogeneity. Hence, a random-effects meta-analysis was carried out. Using this method, the pooled prevalence for psychiatric comorbidities in dermatitis artefacta across all studies was 46.2% (95% confidence interval, 35.4–57.4%), which was similar to that obtained through a direct systematic review.

Other details related to mental health in patients with dermatitis artefacta

Six studies, providing details of 115 patients, reported details of stressful events that were judged to be related to the patient's self-inflicted skin lesions on psychological evaluation.[16,23,24,28-31] The relative frequency of stressful life events reported in these samples ranged from 14.3% to 53.6%. The types of stressors reported by the patients are summarized in Table 5. Pooled analysis of all studies reporting this data found that 47 of 115 patients (40.9%) reported a significant stressor. Five of these studies, providing data on 94 patients, included gender-wise frequencies of stressful life events. A pooled analysis of these studies revealed that the frequency of stressful life events did not vary significantly between men (6 of 15; 40%) and women (38 of 79; 48.1%) with dermatitis artefacta (odds ratio, 1.39; 95% confidence interval, 0.47–4.14; $P = 0.58$, Fisher's exact test). There were insufficient data to compare variations in the type of stressful events across age groups, though certain specific stressors, such as bullying and difficulties with schoolwork, were reported only by older children or adolescents.

Only two studies reported details of traumatic events in childhood in samples of adult patients. In the first, two of 43 patients reported histories of alleged sexual abuse, but this was not examined further by the researchers.[16] In the second, it was noted that 25 of 71 patients experienced "stressful events" in childhood, but the exact nature of these events, such as abuse, neglect, parental death, or separation, was not specified.[22]

DISCUSSION

The findings of this review suggest that psychiatric diagnoses, though not universal or even a majority phenomenon, are found in a significant subset of patients with dermatitis artefacta. These disorders tend to be slightly more common in female than in male patients, though this was evident only on a pooled analysis, with most individual studies finding roughly equal frequencies of mental disorders in men and women with dermatitis artefacta. Moreover, a significant proportion of patients reported significant stressful life events, regardless of age or gender, and most of these stressors

Table 3: Psychiatric diagnoses in patients with dermatitis artefacta.

Study	Sample size	Number of patients refusing evaluation	Number of patients evaluated	Overall frequency of psychiatric diagnosis	Diagnoses (number and percentage)
Sneddon and Sneddon, 1975[16]	43	-	43	17 (40%)	Somatoform disorders, 6 (14%) Depression, 4 (9%) Intellectual disability, 2 (5%) Post-traumatic stress disorder, 1 (2%) Anorexia nervosa, 1 (2%) Dementia, 1 (2%) Nocturnal enuresis, 1 (2%) Stuttering, 1 (2%)
Haenel *et al.*, 1984[22]	71	-	71	23 (32%)	Depression, 23 (32%)
Obasi and Naguib, 1999[23]	14	1	13	5 (38%)	Depression, 3 (23%) Schizophrenia, 1 (8%) Personality disorder, 1 (8%)
Saez-de-Ocariz *et al.*, 2004†[24]	29	7	22	19 (86%)	Intellectual disability, 7 (32%) Anxiety disorders, 7 (32%) Depression, 4 (18%) Conduct disorder, 1 (5%)
Nielsen *et al.*, 2005[25]	57	-	57	20 (35%)	Substance use disorder, 10 (18%) Somatoform disorders, 8 (14%) Depression, 1 (2%) Schizophrenia, 1 (2%)
Ehsani *et al.*, 2009[26]	12	2	10	10 (100%)	Bipolar disorder, 4 (40%) Depression, 2 (20%) Anxiety disorders, 2 (20%) Substance use disorder, 1 (10%) Personality disorder, 1 (10%)
Rodriguez-Pichardo *et al.*, 2010ǂ[27]	27	14	13	8 (62%)	Depression, 5 (38%) Personality disorder, 3 (23%)
Wojewoda *et al.*, 2012[28]	4	2	2	1 (50%)	Depression, 1 (50%)
Mohandas *et al.*, 2013[29]	28	-	28	15 (54%)	Depression, 7 (25%) Anxiety disorders, 2 (7%) Substance use disorders, 2 (7%) Somatoform disorders, 1 (4%) Schizophrenia, 1 (4%) Attention-deficit/hyperactivity disorder, 1 (4%) Specific developmental disorder of scholastic skills, 1 (4%)
Saha *et al.*, 2015[30]	5	-	5	0 (0%)	-
Luna *et al.*, 2015†[31]	44	41	3	1 (33%)	Personality disorder, 1 (33%)

All percentages are given with patients evaluated as the denominator and are arranged in descending order of frequency. †Study involving only children and adolescents, ǂStudy included only female patients with breast lesions

were related to difficulties in close interpersonal relationships involving a family member, spouse, or romantic partner.

As noted above, the most frequent diagnoses made were depression, somatoform disorders, substance use disorders, anxiety disorders, and intellectual disability; the latter diagnosis was made more frequently in children and adolescents. The fact that these diagnoses were commonly associated with dermatitis artefacta may yield clues about the psychological processes involved in specific patients. Depression is associated with high rates of both suicide

Table 4: Relative frequencies of psychiatric diagnoses in female and male patients with dermatitis artefacta.

Study	Sample size	Psychiatric diagnoses in female patients	Psychiatric diagnoses in male patients	Statistical significance (Fisher's exact test)
Sneddon and Sneddon, 1975[16]	43 (38 F, 5 M)	15 / 38 (39%)	2/5 (40%)	1.000
Haenel *et al*., 1984[22]	71 (59 F, 12 M)	23/59 (39%)	0/12 (0%)	0.007*
Obasi and Naguib, 1999[23]	14 (12 F, 2 M)	5/12 (42%)	0/2 (0%)	0.505
Wojewoda *et al*., 2012[28]	4 (2 F, 2 M)	1/2 (50%)	0/2 (0%)	1.000
Mohandas *et al*., 2013[29]	28 (24 F, 4 M)	13/24 (54%)	1/2 (50%)	1.000
Saha *et al*., 2015[30]	5 (3 F, 2 M)	0/3 (0%)	0/2 (0%)	1.000

*Significant at $P<0.05$

Table 5: Stressful life events reported by patients with dermatitis artefacta.

Study	Frequency of stressful life events	Stressful events by gender	Types of stressors reported
Sneddon and Sneddon, 1975[16]	18/43 (42%)	F: 16/38 (42%) M: 2/5 (40%)	Familial dispute or discord, 11 (26%) Marital or relationship discord, 3 (7%) Academic difficulties, 2 (5%) Illness in family member, 1 (2%) Bereavement, 1 (2%)
Obasi and Naguib, 1999[23]	7/14 (50%)	F: 6/12 (50%) M: 1/2 (50%)	Familial dispute or discord, 3 (21%) Marital or relationship discord, 3 (21%) Work-related stress, 1 (7%)
Saez-de-Ocariz *et al*., 2004†[24]	3/21 (14%)	Not provided	Familial dispute or discord, 3 (14%)
Wojewoda *et al*., 2012[28]	1/4 (25%)	F: 1/2 (50%) M: 0/2 (0%)	Bereavement, 1 (25%)
Mohandas *et al*., 2013[29]	15/28 (54%)	F: 13/24 (54%) M: 2/4 (50%)	Marital or relationship discord, 4 (14%) Academic difficulty, 3 (11%) Illness in family member, 2 (7%) Familial dispute or discord, 1 (4%) Work-related stress, 1 (4%) Bullying at school, 1 (4%)
Saha *et al*., 2015[30]	3/5 (60%)	F: 2 / 3 (67%) M: 1 / 2 (50%)	Familial dispute or discord, 1 (20%) Marital or relationship discord, 1 (20%) Academic difficulty, 1 (20%)

attempts[34] and non-suicidal forms of self-injury (NSSI), such as cutting.[35] Studies of individuals who exhibit NSSI have found that this behavior results from an interaction between depression, inability to tolerate distressing situations, and difficulties in controlling or regulating negative emotions, and patients with depression who exhibit NSSI show altered patterns of activation in several brain regions related to emotion regulation and self-perception.[36-38] Similarly, anxiety disorders are associated with both suicide attempts and NSSI,[39] and individuals may engage in NSSI to reduce inner anxiety or tension.[40] This mechanism may explain the tendency of patients with dermatitis artefacta to self-inflict skin lesions when faced with an anxiety-provoking stressor. Somatoform disorders are characterized by multiple physical complaints, referred to various organ systems, for which no clear cause can be found even after comprehensive medical evaluation. Like dermatitis artefacta, somatoform disorders tend to be chronic, difficult to treat, and are often exacerbated by stressors.[41] Somatoform disorders appear to arise from a complex interaction between genetic vulnerability, early life experiences, and individual differences in interpreting bodily sensations and coping with stressful events, particularly of those of an interpersonal nature;[42,43] neuroimaging studies in these patients show alterations in the structure and function of brain circuits related to bodily sensation and emotion.[44] The above conditions have been linked together in terms of genetics, risk factors and response to specific medications, and may form a continuum – the "neurotic spectrum" or "anxiety-depressive spectrum" with common underlying neurobiological and psychological processes.[45-47] These disorders are characterized by psychological processes such as dissociation, intolerance of distress, and deficits in emotion regulation, which are important predictors of NSSI.[48-50] Thus, some cases of dermatitis artefacta may be understood as variant forms of NSSI occurring in the

context of these spectrum conditions, and may be amenable to similar forms of psychological treatment.[51]

Despite being the third most common comorbid diagnosis identified in this review, the association between substance use disorder and dermatitis artefacta has not been examined systematically to date. It has been hypothesized, on the basis of an observed association between alcohol use and NSSI, that substance use and self-injurious behavior may both represent attempts to deal with psychological distress ("psychic pain").[52] If dermatitis artefacta is viewed alongside these behaviors, the association between these two conditions can be explained on this basis. Patients with substance use disorders also have altered pain sensitivity and sensory responsiveness, which may also be relevant to the self-infliction of superficial lesions; these patients sometimes exhibit other, possibly related dermatological phenomena, such as unexplained chronic pruritus.[53,54] A "final common pathway" that may link alterations in pain perception and response to the "psychic pain" is altered functioning of endogenous opioid receptors in the brain, though the exact receptors and pathways involved remain unclear.[55,56] In addition, certain substance use disorders, such as alcoholism, are genetically linked to depression;[45] in these cases, mechanisms similar to those described above for the "anxiety-depressive spectrum" may be relevant.

Apart from these four disorders, intellectual disability was a common comorbidity in patients with dermatitis artefacta, particularly in children and adolescents. Self-injurious behaviors of various kinds are commonly seen in intellectual disability, both in general and in relation to specific genetic syndromes.[57] The mechanisms involved in self-inflicted injuries in these patients are quite distinct; these behaviors may represent a form of self-stimulation, or may reflect alterations in pain sensitivity and autonomic nervous system functioning.[58,59] Identifying intellectual disability, particularly in association with genetic syndromes, may be important in younger patients with dermatitis artefacta, both in terms of establishing a syndromal diagnosis and in providing appropriate treatment, which would involve measures such as environmental enrichment and behavior therapy.[60]

A significant number of patients with dermatitis artefacta reported stressors, particularly involving family or marital relationships, and this was observed both in pediatric and adult patients. This finding is consistent with literature on patients with other forms of self-injury, where poor attachment to parents or peers in childhood leads to an unstable sense of identity and poor adult relationships. In some of these individuals, self-induced skin lesions may be a way of developing an identity as a "sick person" or "patient." This would lead to a removal, at least temporarily, from a stressful situation ("primary gain") as well as increased attention and care from family members and health-care professionals ("secondary gain").[61,62] Appropriate psychological therapies may be indicated in some of these cases to minimize interpersonal disputes and enable more adaptive forms of communicating one's desires and difficulties, while preventing parents and other family members from unintentionally reinforcing this behavior.[63]

Cases of dermatitis artefacta in relationship to more severe mental disorders, such as schizophrenia, have been reported in the reviewed literature.[23,25,29] Although these conditions are relatively rare, they should be considered in cases where a bizarre motive is ascribed to the self-inflicted lesions: For example, a patient may claim that he is trying to remove a device implanted in him, or that he hears voices commanding him to injure himself.[64] In such cases, treating the underlying disorder is essential. Similarly, dermatitis artefacta occurring for the first time in an elderly person may indicate a neurocognitive disorder, particularly dementia;[16] patients in this age group should be evaluated to rule out dementia or other organic brain disorders.

Finally, an important recurring theme across all the papers reviewed is the high likelihood that patients will refuse psychological evaluation and treatment, particularly in the pediatric age group.[24,27,31] This poses a challenge to treating dermatologists who have correctly identified the nature of the patient's lesions, as well as to psychiatrists who would not be permitted to offer involuntary treatment in such a scenario. In such cases, it may be helpful to explain the concept of dissociation, in which a patient is not fully aware of a particular act or behavior, and thereby allow the patient to "save face."[65] Alternately, patients can initially be told that their lesions may be related to stress, and they may be given screening questionnaires that identify common mental disorders without the stigma associated with a formal psychiatric referral.[66] It is important not to confront the patient directly without such preliminaries, as this could result in denial and loss to follow-up.[65] Further research is needed to define optimal communication strategies when handling such patients and their families, particularly in cases of pediatric dermatitis artefacta.

This review is subject to certain important limitations. First, the number of published studies and their sample sizes is both small, limiting the conclusions that can be drawn about the actual prevalence of individual psychiatric disorders in dermatitis artefacta. Second, all the cited studies have relied on clinician interviews or reviews of medical records, without any specific reference to diagnostic criteria or checklists; it is possible that certain diagnoses may have been missed using these methods. Third, a significant number of patients refused evaluation, and the prevalence of psychiatric

disorders in this sub-group is unknown. Fourth, the temporal relationship between mental illness and dermatitis artefacta could not be examined in these studies, due to their cross-sectional nature. Fifth, certain disorders known to be associated with repetitive and self-injurious behavior, such as autism spectrum disorders, were not mentioned in any of the studies, though they may have been relevant in younger patients. Sixth, most studies were based on patients treated at specialized dermatology services with facilities for psychiatric consultation and psychological evaluation: Such facilities may not be available in all settings. Seventh, no study assessed the relationship between dermatitis artefacta and other forms of non-suicidal self-injury, such as wrist-cutting. Eighth, the quality of most published studies was low, with high indirectness and marked heterogeneity across studies. This is manifested in the fairly broad confidence interval obtained in the final meta-analysis, indicating a certain degree of imprecision in the final estimate presented in this paper. Finally, as no treatment data were provided in the included papers, it is not known whether treating the underlying psychiatric condition (e.g. antidepressants for depression, or behavior therapy for specific anxiety disorders) would lead to a reduction or even a resolution of self-inflicted skin lesions.

CONCLUSION

Psychiatric disorders affect a significant number of patients with dermatitis artefacta. Many of these conditions are treatable, and may share mechanistic links with the other forms of self-injury seen in these patients. However, the management of these conditions is challenging because many patients refuse evaluation and treatment, even when facilities for the same are available. Future research should focus on: (a) Estimating the frequency of psychiatric disorders or symptoms in dermatitis artefacta using standard psychometric instruments to ensure better study and data quality, (b) conducting such studies in community or primary care settings, rather than specialized clinics, to address the issue of indirectness, (c) devising better strategies to motivate patients with dermatitis artefacta to undergo psychological evaluation, and (d) assessing whether the treatment of psychiatric disorders, when identified, leads to an improvement in the outcome of dermatitis artefacta.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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