



Psychological Stress and Atopic Dermatitis: A Focus Group Study

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Background: Atopic dermatitis (AD) is a chronic inflammatory skin disorder. It is often reported to be worsened by psychological stress.

Objective: To explore the role of psychological stress and related triggers in AD, and its connection to worsening of this disease, focusing on patients' perspectives.

Methods: In total, 28 patients with AD were included in focus groups. Topics regarding psychological stress and psychological triggers were discussed.

Results: The hypothesis that psychological stress may have impact on eczema and its pruritus was supported by all of the patients. Distinguishing the worsening effect of psychological stress from effects of physiological triggers, such as infection, climate and allergic factors, was claimed to be difficult by many patients. Most of the patients thought that chronic stress affected the AD more when compared to acute stress. Family problems, financial problems, work overload, school exam periods, lack of structure at work, and unforeseen events were identified as important psychological triggers. Conventional treatment/therapy with topical corticosteroids and emollients, UV light treatment, were suggested as possible treatments, as well as psychological intervention and physical exercise.

Conclusion: Psychological stress is an important factor to consider in the management of patients with AD. In particular, chronic stress tends to worsen AD. The type of stress can possibly also affect the quality of the pruritus experienced by the patients. Unforeseen events and decision making were frequently mentioned as important triggers. Furthermore, physical exercise was reported to provide beneficial effects.

Keywords: Atopic dermatitis, Exercise, Focus groups, Psychological stress, Qualitative research

INTRODUCTION

Atopic dermatitis (AD) is one of the most common chronic skin inflammatory diseases. In USA and Europe the disease has been reported to affect about 20% of children and 7% to 10% of adults, with a considerable variation between countries¹.

The main characteristics of AD are pruritus, eczematous lesions and dry skin. The cause of AD is multifactorial, including genetic predisposition, impaired skin barrier, environmental triggers, and immune dysregulation². Patients with AD have been shown to have a substantial negative impact on their quality of life, by their disease, and this decreased qual-

ity has been estimated to be at least comparable to that seen in other chronic illnesses such as epilepsy or diabetes^{3,4}.

Several types of stress may be a trigger and aggravate AD. In general, different triggers have been shown to give rise to different biological response⁵. While the term "stress" includes both physiological and psychological stress, we have focused on psychological stress and its role in AD. There are epidemiological studies on the relationship between AD and psychological stress, stress being reported to exacerbate AD⁶. In addition, higher levels of psychological stress have been found in patients with AD compared to adults without AD^{6,7}. It has also been reported that a substantial number of patients with

moderate-to-severe AD worsened their eczema by anxiety and depression⁸, from a neurobiological point of view being difficult to differentiate from chronic stress.

Psychological stress modulates various neuroendocrine mediators, which may in turn, may activate local neurogenic inflammation and disrupt the skin barrier function^{6,7}.

Focus groups are an established method to obtain patients' perspectives on different subjects. The discussion benefits from group interaction, which provokes great spontaneity, and thereby yielding data that would not come from formal in-depth interviews.

In dermatology, focus group discussions have shown considerable potential, particularly in studies of patients' perspectives and attitudes to skin diseases, their treatment and causes. For example, focus groups have been used in psoriatic patients, exploring symptoms, such as itch^{9,10}. Furthermore, they have been used in a study of the experiences of parents of children with AD, regarding the disease cause, triggering factors and its emotional effects¹¹.

It was the aim of the present study to further explore the role of psychological stress in AD, using focus groups.

MATERIALS AND METHODS

AD patients were recruited from the outpatient clinical records of the Department of Dermatology, Karolinska University Hospital, Solna, Sweden. All patients included in the study had been diagnosed with AD by a dermatologist. The study was conducted in accordance with the declaration of Helsinki with ethical approval (2018/1836-32) and informed consent.

In total, 28 patients were included in the study (for patient

characteristics, Table 1). These patients had been referred from their family doctor, or other dermatological outpatient clinics, for specialist assessment regarding systemic treatment or optimized topical treatment, or further investigations such as epicutaneous patch test. Most of the patients had had eczema since childhood. The patients (23 females and 5 males; age range 18~67 years) were divided into 12 groups, with 2 to 3 patients participating in each group, so that each of them could interact properly.

The sessions took place at the Department of Dermatology, Karolinska University Hospital, Solna, Sweden. Each session lasted for approximately 45 minutes. The room used provided a neutral setting with the participants placed in comfortable chairs around a table with refreshments provided. Before the discussion, it was explained that the opinions of the group are vital, and that the aim is for the participants to talk to each other.

At the beginning of the session, the moderators, who were physicians, introduced the topic and invited the group to share their perceptions and experiences. The following list of themes were discussed during each of the focus groups: The role of psychological stress among worsening factors, its impact on the area of involvement and characteristic of the eczema and its pruritus, important psychological triggers, and treatment modalities (Table 2).

Generally, the discussion was at first a bit slow, but this improved with time and with the moderators' encouragement. The moderators intervened when the discussion went beyond the scope of the aforementioned themes.

The sessions were conducted in Swedish. Each focus group discussion was tape recorded and, in addition, notes were taken by the moderators. The audiotaped recordings were then transcribed and translated into English.

Table 1. Patient characteristics (n=28)

	Value
Sex (male:female)	5:23
Median age (range), yr	29 (18~67)
Childhood debut	27 (96.4%)
Treatment*	
Topical treatment	25 (89.3%)
UV-light treatment	2 (7.1%)
Methotrexate	1 (3.6%)

Values are presented as number only, median (range), or number (%). UV: ultraviolet. *The table refers to ongoing treatment at the time for focus group sessions. Note that all patients receiving phototherapy or methotrexate were also prescribed topical treatment.

Table 2. Topics for each focus group

Role of psychological stress among other worsening factors for AD
Impact of psychological stress on symptoms of AD; nature and extent of eczema and pruritus
Important psychological triggers
Treatment options

AD: atopic dermatitis.

RESULTS

Overview

The hypothesis that psychological stress may have an impact on eczema and pruritus was supported by all of the patients. On the other hand, some patients reported that the eczema *per se* could be the trigger of psychological stress. The magnitude of psychological stress was reported to be of importance. Psychological stress may affect the patient all year round. The relationship between long-term psychological stress and depression was also discussed.

Relation of psychological stress to other worsening factors

The problem of discriminating psychological stress from other triggers, such as infection and climate, and even allergic factors, was recognized in all the focus groups. Some patients thought that the climate factor and infections were the most important worsening factors. However, psychological stress was rated high. It was recognized that there may also be a synergy of these worsening factors.

Acute and chronic psychological stress

Most of the patients thought that chronic stress was a more important worsening factor compared to acute stress, chronic stress leading to, e.g., sleep disturbance. Acute stress generally led to an instant, short lasting, pruritus, which is often canalized via scratching. Chronic stress, on the other hand, leads to more long-term pruritus and scratching.

Effect of psychological stress on eczema/pruritus

The patients reported that psychological stress affects both the eczema and the pruritus. Some of the patients reported that the psychological stress was preceding the eczema, “the stress finds its way to the skin,” while other patients reported that it was the other way around and that psychological stress is connected to the spreading of, the duration, and the level of the eczema. Those latter patients also reported that psychological stress results in more redness and spontaneous eczema, compared to climate trigger, such as the Nordic winter climate. Eczema worsened by climate was easier to improve by emollients, compared to psychological stress-worsened eczema.

Patients reported that psychological stress caused more intense pruritus compared to other worsening factors. Some patients described pruritus on specific areas of the body, such

as the head. Climate stress, on the other hand, caused a more general, diffuse pruritus. Interestingly, some of the patients reported that psychological stress caused a subjectively deeper pruritus, while climate stress caused a more superficial pruritus. Most of the patients reported that it was more difficult to handle pruritus caused by psychological stress than due to climate stress.

As mentioned above the patients reported that psychological stress leads to scratching. Accordingly, scratching was avoided more easily by the patient if there was no stress at all. On the other hand, it might be the scratching *per se*, which was the problem, not being induced by pruritus. In this context, avoiding scratching, through self-discipline, might be one way to handle psychological stress and its negative effects on the skin. In this context, a majority of the patients reported that exhaustion leads to more scratching and pruritus.

Interestingly, the patients reported that pruritus was more likely to appear if an unforeseen event happened that lead to psychological stress. A good example was reported by a patient working at a convenience store in Sweden that sells magazines and newspapers (Pressbyrån®). Every day, the patient faced stressed customers, and this patient was reflecting over the customers’ facial expressions and experienced pruritus when coming home. However, a majority of the patients reported that if they were able to prepare for psychological stress, there was less impact on their eczema/pruritus.

Different psychological triggers

The patients reported that the situation at work, such as work overload, bad psychological mood, too many tasks being piled on each other, and/or having to work at a high speed, could worsen their eczema/pruritus. Also, a lack of structure at work could worsen the situation. Exhaustion due to work overload, as well as sleep disturbance, could also cause worsening. Interestingly, on the other hand, also retirement and loneliness may also be triggers.

School exam periods were also reported to be a worsening factor, with flare ups during such periods. Financial problems, worry about the future and life events, family problems (such as separation) were important triggers. In general, situations where decisions were needed to be made or when not knowing what to do, had a negative impact on the eczema/pruritus. Reported triggers are also summarized in Table 3.

Table 3. Important psychological triggers

Family problems
Financial problems
Work overload
School exam periods
Lack of structure at work
Unforeseen events
Decision making

Treatment of the stress-worsened eczema

Generally, the patients reported fat emollients to be important as a relief during winter but not during summer (when several patients suggested that there should be more water in the emollient). Patients also preferred fat emollients at night and more water containing ones at daytime. Topical corticosteroids or topical tacrolimus were also found to be helpful. Even though UV light treatment was reported to be a trigger for stress *per se*, since it takes time to attend the treatments (which was also the case for conventional topical treatments), UV-light treatment was still regarded as valuable.

Antihistamines might cause sedation, according to the patients. A selective serotonin reuptake inhibitor drug caused worsening of the pruritus in one patient. Cognitive behavioral therapy (CBT), acceptance and commitment therapy, and talking therapy/psychotherapy, were reported to be useful, since the patients were taught to identify and prepare themselves for the triggers. Yet, only a limited number of the patients had been subject to such treatment modalities.

Patients reported that climate therapy or going away on vacation might be of great value. Some of the patients had tested alternative medicine with topical products, but with no evident effect. Some of the patients were longing for an “antistress cream.”

Patients reported that the eczema was not worsened by physical exercise. The eczema *per se* was no obstacle to exercise. Physical exercise was suggested to be one way to get rid of/improve the psychological stress *per se* and also generally regarded as being beneficial for health.

DISCUSSION

In the present study we used focus groups to investigate the relation between AD and psychological stress, in order to get a deeper understanding of underlying factors/mechanisms for worsening of the eczema/pruritus and be able to identify new

patient perspectives.

To the best of our knowledge this is the first focus group study on the relation between AD and psychological stress.

The hypothesis that psychological stress may have an impact on eczema and its pruritus was supported by all of the patients. In addition, the stress was reported to lead to more scratching. The problem of discriminating psychological stress from other triggers, such as infection and climate, and even allergic factors, was recognized. A possible synergy of these different factors was also suggested. This highlights the importance of a holistic view on AD.

Most of the patients thought that chronic stress worsened the eczema/pruritus more than acute stress.

There were also different reports about what comes first, the eczema or the psychological stress, as well as different aspects of the character of pruritus in relation to psychological stress, where some patients reported feeling a deep pruritus differing from their “normal” pruritus.

Family problems, financial problems, work overload, school exam periods, lack of structure at work, having to make decisions, and unforeseen events were identified as important triggers by patients. Considering the stated importance of these types of triggers, like unforeseen events, and considering the neurobiological pathways involved, it is interesting that chronic mild stress has been reported as a worsening factor in a mouse model of AD¹².

Conventional treatment with topical corticosteroids and emollients, UV light treatment, CBT therapy/psychotherapy, climate therapy and exercise, were identified as possible treatments.

In previous studies, physical exercise with sweating causing worsening of the symptoms of AD, has been reported¹³. In a questionnaire study, we found that Swedish patients with AD had the same level of physical exercise and attitude to physical exercise as the normal population, and that the skin symptoms of AD did not appear to be an obstacle to moderate physical exercise¹⁴. In our focus groups, exercise was generally considered to be well tolerated, not being affected by the disease, and even decreasing possible symptoms of stress. A recent study has shown that stress levels of Korean youths with AD was lowered by physical exercise¹⁵. In this context, in a study of atopic mice (NC/Nga) mild exercise was shown to decrease symptoms of dermatitis¹⁶.

One of our patients reported improvement by psychother-

apy, another patient improvement by conversational therapy. Early case studies on the use of insight-oriented psychotherapy in adults with recalcitrant AD resulted in skin clearing and psychiatric improvement⁷. Psychological treatment in patients with AD was shown to improve anxiety level, response to frustration, and itch-scratch patterns. CBT has been used to give parents and patients insight into AD-related problems and to restructure thinking patterns⁷.

A limitation of our study was the relatively low number of individuals in the respective groups. There was also a majority of females. Previous studies have shown that stress responses differ by sex and gender due to, respectively, sex hormones and gender socialization¹⁷. In a population-based study from Korea, females with AD were reported to be more stressed than males⁶.

Patients' perspectives on the relation between psychological stress and AD are essential for a better understanding of their condition, also in relation to available treatment options. Furthermore, it is important to investigate the types of stress and triggers possibly worsening the disease. In this study we found that, particularly chronic stress, tends to worsen AD. The type of stress possibly also affects the quality of the pruritus experienced by the patients. Unforeseen events and decision making were frequently mentioned as important triggers. Furthermore, physical exercise was reported to provide beneficial effects.

CONFLICTS OF INTEREST

M.H. works full-time as a consultant medical monitor/medical advisor for the pharmaceutical companies Tillotts Pharma AB, Attgeno AB, Aprea AB, Xsray AB, and BioGaiA AB. L.L. has received consultancy fees and registration fees from LEO Pharma for conferences, and a consultancy fee from Sanofi for an expert meeting. K.N. has received a consultancy fee from Menlo Therapeutics Inc for participating in an advisory board. S-B.L-R. has received a consultancy fee from LEO Pharma for participating in an advisory board meeting.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

1. Bylund S, Kobyletzki LB, Svalstedt M, Svensson Å. Prevalence and incidence of atopic dermatitis: a systematic review. *Acta Derm Venereol* 2020;100:adv00160.
2. Pavlis J, Yosipovitch G. Management of itch in atopic dermatitis. *Am J Clin Dermatol* 2018;19:319-332.
3. Lewis-Jones S. Quality of life and childhood atopic dermatitis: the misery of living with childhood eczema. *Int J Clin Pract* 2006;60:984-992.
4. Beattie PE, Lewis-Jones MS. A comparative study of impairment of quality of life in children with skin disease and children with other chronic childhood diseases. *Br J Dermatol* 2006;155:145-151.
5. Haykin H, Rolls A. The neuroimmune response during stress: a physiological perspective. *Immunity* 2021;54:1933-1947.
6. Park H, Kim K. Association of perceived stress with atopic dermatitis in adults: a population-based study in Korea. *Int J Environ Res Public Health* 2016;13:760.
7. Arndt J, Smith N, Tausk F. Stress and atopic dermatitis. *Curr Allergy Asthma Rep* 2008;8:312-317.
8. Lin TK, Zhong L, Santiago JL. Association between stress and the HPA axis in the atopic dermatitis. *Int J Mol Sci* 2017;18:2131.
9. Amatya B, Nordlind K. Focus groups in Swedish psoriatic patients with pruritus. *J Dermatol* 2008;35:1-5.
10. Globe D, Bayliss MS, Harrison DJ. The impact of itch symptoms in psoriasis: results from physician interviews and patient focus groups. *Health Qual Life Outcomes* 2009;7:62.
11. McNally NJ, Phillips DR, Williams HC. Focus groups in dermatology. *Clin Exp Dermatol* 1998;23:195-200.
12. Grip L, Lonne-Rahm SB, Holst M, Johansson B, Nordlind K,

- Theodorsson E, et al. Substance P alterations in skin and brain of chronically stressed atopic-like mice. *J Eur Acad Dermatol Venereol* 2013;27:199-205.
13. Kosse RC, Bouvy ML, Daanen M, de Vries TW, Koster ES. Adolescents' perspectives on atopic dermatitis treatment-experiences, preferences, and beliefs. *JAMA Dermatol* 2018;154:824-827.
 14. Lonne-Rahm SB, Sundström I, Nordlind K, Engström LM. Adult atopic dermatitis patients and physical exercise: a Swedish questionnaire study. *Acta Derm Venereol* 2014;94:185-187.
 15. Kong S, Koo J, Lim SK. Associations between stress and physical activity in Korean adolescents with atopic dermatitis based on the 2018-2019 Korea youth risk behavior web-based survey. *Int J Environ Res Public Health* 2020;17:8175.
 16. Orita K, Hiramoto K, Inoue R, Sato EF, Kobayashi H, Ishii M, et al. Strong exercise stress exacerbates dermatitis in atopic model mice, NC/Nga mice, while proper exercise reduces it. *Exp Dermatol* 2010;19:1067-1072.
 17. Juster RP, de Torre MB, Kerr P, Kheloui S, Rossi M, Bourdon O. Sex differences and gender diversity in stress responses and allostatic load among workers and LGBT people. *Curr Psychiatry Rep* 2019;21:110.