

## The Relationship between Atopic Dermatitis and Premenstrual Syndrome in Women Referred to the Skin Clinic of Hamadan

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### ABSTRACT

**BACKGROUND AND OBJECTIVE:** One of the factors affecting dermatophyte is hormonal factors, in which atopic dermatitis is more common in adult women. Since one of the psychotic problems regarding reproductive performance of women is premenstrual syndrome, in this study, the association between premenstrual syndrome and atopic dermatitis in reproductive age women was investigated.

**METHODS:** This case-control study was performed on 82 women aged between 15 and 49 years old in two groups of atopic dermatitis referring to Skin Clinic of Sina Hospital in Tehran and control group including healthy women for atopic dermatitis. Demographic questionnaire and (PSST) Premenstrual Symptoms Screening Test (with score 42-0) were completed and evaluated by both groups.

**FINDINGS:** The mean age of subjects in the case group was  $17.17 \pm 4.45$  and in the control group was  $27.29 \pm 8.03$  years. The results showed by controlling the possible confounding factors as age, occupation and marital status the probability of having moderate or severe premenstrual syndrome in patients with atopic dermatitis is 13.26 (OR= 13.26, CI-95%: 3.31, 53.07), as compared with healthy subjects.

**CONCLUSION:** The results showed that there is a strong relationship between moderate to severe menstrual syndrome and atopic dermatitis in women.

**KEY WORDS:** *Atopic Dermatitis, Premenstrual Syndrome, Case-Control Study, Women.*

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## Introduction

**P**remenstrual syndrome (PMS) is one of the psychotic problems regarding to reproductive function of women associated with behavioral and emotional disturbances such as anger, anxiety and irritability (1). The most common age of women with the syndrome is 20-35 years of age (3, 2).

Premenstrual syndrome in the 10th International Classification of Mental, Behavioral and Developmental Disorders is categorized as a component of women's medical disorders and not psychiatric disorders, which indicate the temporary state of impairment at certain times (premenstrual) (5, 4). Nowadays psychological disorders have a special place in psychiatry, and each passing day, the relationship between physical illness and human psyche is becoming more and more evident, which also requires more emphasis on mental health for the better treatment of these diseases.

Among the various medical disciplines, the skin line has the highest number of psychotic patients who are referred to dermatologists due to a lack of familiarity with psychiatric services or a reluctance to refer to a psychiatrist or psychologist. Of these patients, only a small percentage is presented by the dermatologist for psychological treatment, the rest of them are only examined and treated in terms of skin complaints, and they usually do not endorse commonly used treatments (4, 2), which causes their problems not to be fully addressed and refer to many physicians and treatment centers for complete treatment, which imposes a heavy burden on the individual and the community (6). The findings have shown that hormonal factors are effective on dermatophytes and atopic dermatitis is more common in adult women (8, 7).

Atopic dermatitis is a chronic inflammatory disease with an outbreak of about 17-8% in adults under the age of 60 years (9) that is chronic in severity and healing periods and is diagnosed with cutaneous eczema lesions (10) and can have a genetic background (12, 11). In patients with eczema, lesions (papules and plaques) are inflamed as periodic.

The lesions may be intensified by skin irritation, infection, stress, and other factors (13). The difference of constitutional atopic dermatitis form of other dermatitis is in the level of immunoglobulin E, which is normal in atopic dermatitis, as well as these individuals have no specific IgE and no immediate reaction symptoms (14-16). According to previous studies, about 25% of women experienced atopic dermatitis

improvement during pregnancy and more than 50% of women with atopic dermatitis had a deterioration during this period (18,17). In addition, women with atopic dermatitis often show worsening of skin symptoms during the menstrual period (19).

Timonen and colleagues showed that the relationship between atopic and depressive disorders is limited to women, and this relationship has not been found among men. They also stated that female hormones may be a contributing factor to the relationship between depression and atopic disorders, such as eczema (21, 20). The basis of these reports is the relationship between the number of pregnancies and the gestational age and atopic disorders, and the relationship between multiple atopies and depression (23, 22).

Relationships between premenstrual syndrome and various diseases including allergies, asthma, eczema, allergic rhinitis, acne, epilepsy and migraine have been studied (24). Considering the importance of psychosomatic diseases and premenstrual syndrome and its psychological symptoms such as depression, anxiety and emotional tension that are common in 90% of women, although the association between these symptoms and the premenstrual syndrome itself with atopic dermatitis was studied, but a similar study has not been conducted in these studies in Iran; since due to the relationship between hormonal changes and its effect on the exacerbation of skin diseases, a large amount of treatment costs are spent on temporary treatment of the disease.

Therefore, in this study, the association between premenstrual syndrome and atopic dermatitis in women of reproductive age were studied to minimized treatment costs of the disease as much as possible.

## Methods

This case-control study was done on the women of reproductive age referred to the skin care clinic of Sina Hospital, Hamedan, in 2016 and in a 6-month period after approval by the Ethics Committee of Hamedan University of Medical Sciences with registration code of IR.UMSHA.REC.1394.558.

Considering the statistical power of 0.95, the error level of 0.05, the sample size ratio in the case group to the control (r) is equal to one, and the maximum difference between the two proportions that these two maximal sample sizes are presented according to previous studies. In this regard, for each case and

control group, there were 41 individuals and 82 individuals in total. Women aged 15- 49 years without mental illness and ability to understand and respond to the questionnaire, lack of smoking and alcohol was included in the study.

In the case of pregnancy, irregular menstrual cycle, the use of hormonal contraceptives and neurological drug consumption, and infectious dermatitis, such as fungal diseases were excluded. Among women referring to the skin clinic, if they were willing to participate in the study, written consent was obtained and then referred to the dermatologist for confirmation or rejection of atopic dermatitis. The method of diagnosis of atopic dermatitis was based on Hanifin and Rajka criteria. According to these criteria, if these patients had at least three creatures of the minor and three major, they were recognized as patients with atopic dermatitis.

Major criteria includes pruritus, flexor area dermatitis, chronic and recurrent dermatitis, general family history of atopy, asthma, allergic rhinitis and atopic dermatitis, and minor criteria includes dry skin, actinosis vulgaris, keratosis pillarys, pityriasis alba, Anterior neck folds, dani morgan folds, periorbital darkness, recurrent conjunctivitis, Increase of palmar lines, hand dermatitis, foot dermatitis, facial erythema, pale face, susceptibility to skin infections, white dermatographism, lips dermatitis, intolerance of wool and plastic, intolerance to solvents and detergents, increased itching with sweating, exacerbation of the disease with stimuli, foods and stress (25).

The control group was healthy women without atopic dermatitis. After selecting subjects and controls using Hanifin and Rajka criteria, the demographic and Premenstrual Symptoms Screening Test (PSST) questionnaires were completed by both groups. The demographic questionnaire included questions such as age, education, occupation, marital status, number of pregnancies, and questions about menstruation. The PSST questionnaire was consisted of 14 questions and had two parts:

The first part consists of 9 symptoms of mood and behavior, and the second part is the effect of these symptoms on people's lives and includes 5 questions. The Likert questionnaire is based on 4 options (at all, mild, moderate and severe), scoring from 0 to 3. In order to diagnose moderate or severe premenstrual syndrome (PMS), there must be three conditions: option 1 to 4 is at least one moderate or severe, in addition to the previous one, option 1 to 9 is at least 4 moderate or

severe, and at five last question, there is a moderate or severe case. The minimum score is zero and the maximum score is 42 points. Validity and reliability of the questionnaire were also confirmed (26).

Finally, the collected data were analyzed using SPSS-21 software and statistical tests of Kolmogorov-Smirnov, T-independent, Mann-Whitney and Chi-square were analyzed.  $P < 0.05$  was considered significant.

## Results

The mean age of participants in the dermatitis group was  $30.17 \pm 7.45$  in the case group without dermatitis ( $27.29 \pm 8.03$ ) ( $p = 0.04$ ). The majority of subjects in the case group were housewives (53.7%) and the majority of the control group were students (43.9%) ( $p = 0.004$ ) (Table 1).

**Table 1. Distribution of demographic and midwifery variables in two groups of atopic dermatitis and without atopic dermatitis (N=41)**

| Variables                         | Case<br>mean $\pm$ SD | Control<br>mean $\pm$ SD | P-value |
|-----------------------------------|-----------------------|--------------------------|---------|
| Age (year)                        | 30.17 $\pm$ 7.45      | 27.29 $\pm$ 8.03         | 0.04**  |
| Age of first menstruation (year), | 13.74 $\pm$ 1.62      | 14 $\pm$ 1.97            | 0.52*   |
| Duration of bleeding (day),       | 6.59 $\pm$ 3.03       | 5.63 $\pm$ 1.81          | 0.13**  |
| Periodic cycle (day),             | 26.64(4.45)           | 27.46(3.28)              | 0.34**  |
| occupation                        | N(%)                  | N(%)                     | 0.004   |
| Employed                          | 14(34.1)              | 6(14.6)                  |         |
| housewife                         | 22(53.7)              | 17(41.5)                 |         |
| Student                           | 5(12.3)               | 18(43.9)                 |         |
| education .                       |                       |                          | 0.67    |
| Under diploma                     | 13(31.7)              | 11(26.8)                 |         |
| diploma                           | 6(14.6)               | 9(22)                    |         |
| Academic                          | 22(53.7)              | 21(51.2)                 |         |
| Marital status                    |                       |                          | 0.07    |
| married                           | 29(7.07)              | 21(51.2)                 |         |
| single                            | 12(29.3)              | 20(48.8)                 |         |
| Gravida                           |                       |                          | 0.35    |
| 0                                 | 16(39)                | 22(53.7)                 |         |
| 1                                 | 11(26.8)              | 10(24.4)                 |         |
| $\geq 2$                          | 14(34.1)              | 9(9.22)                  |         |

\* Independent T test, \*\* Mann-Whitney test, rest: Kai-two

The results of single-variable analysis of the relationship between atopic dermatitis and severity of premenstrual syndrome showed that the risk of moderate or severe premenstrual syndrome in subjects with atopic dermatitis was 7.9% more than healthy subjects (CI-95%: 2.57-21.58, OR=7.49). Because of the significant difference in some of the variables in the

studied groups and in order to control the possible interventional factors, variables with a significant level of less than 0.1 were re-entered into logistic regression. By controlling these factors, the probability of having moderate or severe premenstrual syndrome in subjects with atopic dermatitis was 13.26 times more than healthy subjects (CI-95%:3.31-53.07, OR=13.26) (Table 2).

**Table 2. Comparison of severity of premenstrual syndrome in case and control group**

| Variables                     | Severity of premenstrual syndrome |                         | Unadjusted       |         | Adjusted*         |         |
|-------------------------------|-----------------------------------|-------------------------|------------------|---------|-------------------|---------|
|                               | Moderate to severe<br>N=29        | Without or mild<br>N=53 | OR(CI-95%)       | p-value | OR(C-95%)         | p-value |
| <b>Atopic dermatitis N(%)</b> |                                   |                         |                  |         |                   |         |
| +                             | 23(56.1)                          | 18(43.9)                | 7.49(2.75-21.58) | <0.0001 | 13.26(3.31-53.07) | <0.0001 |
| -                             | 6(14.6)                           | 35(85.4)                | 1                |         | 1                 |         |

\* adjusted for age, job, marriage

## Discussion

The findings of this study showed that there is a significant relationship between the severity of premenstrual syndrome and atopic dermatitis, so that in patients with atopic dermatitis, the probability of having moderate or severe premenstrual syndrome is 13.26 times that of healthy people. The results of this study indicate that there is a relationship between hormonal effects and clinical manifestations of atopic dermatitis. The results of other studies are also consistent with the results of our study.

In some studies, it has been suggested that hormonal factors have been effective in dermatosis in people with dermatitis, and atopic dermatitis is more common in adult women (8, 7). Some studies have shown that patients with eczema are more susceptible to rheumatoid arthritis than normal controls (27, 10). In some studies, worsening skin symptoms have been shown during menstruation.

The prevalence of menstrual cycles, which is associated with worsening symptoms of atopic dermatitis, varies from 9% to 100% in these studies (28). Kemmett et al. In their study stated that there may be a weak link between the symptoms of atopic dermatitis in premenstruation and the presence of PMS symptoms (29).

In a study by Kiriya et al., PMS symptoms were worse in all patients with dermatitis during this period, while these symptoms were not found in people whose skin lesions were not worse during this period (19). In two studies, it has been shown that skin reactivity to

anti-allergenic substances and anti-gluing agents increases during premenstrual phase (31, 30), and psychosomatic conditions such as premenstrual syndrome accounts for more than half of the cases relate to anxiety and depression and eczema (1).

Considering that the variables of age, occupation and marriage in the study group in either of the two groups had a significant level of 0.1 or less, they could be considered as possible interventional factors. Prior to controlling these factors, moderate to severe PMS in individuals with atopic dermatitis was about 7.5 times higher, which increased to 13.26 times after controlling for these variables, which is significant. It seems that further studies are needed in this area so that more definitive results can be obtained.

One of the limitations of this study is the low prevalence of atopic dermatitis and the difficult and time-consuming access to patients, which required a long time to collect data, and good collaboration among participants in the study was one of the strengths of this study.

The results showed that the incidence of moderate to severe menstrual syndrome in atopic dermatitis was more than 13 times higher than healthy subjects. The results of this study further clarify the relationship between atopic dermatitis and premenstrual syndrome. Considering the strong relationship between these two variables, it is suggested that in the presence of premenstrual syndrome, the possibility of atopic dermatitis should be considered and treated if necessary.

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