

### Effects of stress and stressful events on Alopecia Areata

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**Abstract: Background:** Alopecia areata is a common cause of hair loss. It is an autoimmune disease with a genetic background, and is triggered by stimulating factors such as stress. In this research, the effects of stressful events in patients with alopecia areata were compared to the control group during the last three months prior to the onset of alopecia areata. **Method:** in this case-control study, 120 patients were studied. After precise examinations, they were divided into two groups of 60 individuals each, one group with alopecia areata and the other one without alopecia areata (control group). In these two groups the level of stress was assessed by stress questionnaire and then compared to each other. At the end, after data collection, the SPSS software, Chi-square test and T test were used to analyze the data. The significant level for interpreting the relationship between variables was 0.05. **Results:** There was a significant relationship between hair loss and stress, the severity of stress and stressful events among patients. **Conclusion:** Based on the results of this study and previous studies, we suggest that beside the evaluating endocrine disorders in patients with alopecia areata, they should also receive a consultation from psychologists or psychiatrists as part of the treatment to reduce the severity of the disease and manage stressful events. Also, further studies are recommended in this regard.

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#### 1. Introduction

Focal hair loss (Alopecia areata) is a common type of hair loss, and about 2% of the population experiences this disease throughout their life. Alopecia areata is seen at different ages; from breast-fed children to the elderly. However, Alopecia areata mostly happens at the ages of 40 to 50 and is more common at 30-50s (1). Alopecia areata is a non-scarring hair loss which is caused by an inflammatory or autoimmune process, and is mostly seen in the scalp (2). Alopecia areata, specifically targets hair follicles, and the genetic background is an important issue. However, evidences indicate the importance of melanocytic antigens as a motivator (3, 4, and 5). The aetiology of Alopecia areata is unknown. Nonetheless, according to the studies, stress could provoke the onset of the disease. However, the importance and the extension of the stress in arousing the Alopecia areata are controversial. Alopecia areata is mostly accompanied with other autoimmune diseases (6) such as atopia, Hashimoto's thyroiditis and vitiligo. Some studies highlight the risk of autoimmune diseases specially thyroiditis among first

degree relatives of children with Alopecia areata (7, 8, 9).

Furthermore patients with Alopecia areata confront more mental stresses due to their disease and the total process will diminish their quality of life (10, 11). Alopecia areata has the characteristics of autoimmune diseases and recent studies have indicated the role of stress on immune disease. Stress can affect the hormonal system such as changes in the cortisol (adrenal hormone) level, which consequently affects the immune system (12).

Alopecia areata is a psychosomatic disease, and like other diseases in this category, it is affected by mood swings. Even though this correlation is strong enough, unfortunately there are few studies in this regard. There is a positive correlation between skin and CNS because of the common ectodermal origin (12). For example stress increases acne and acne causes the stress and Alopecia areata is also correlated with stress. At the beginning of the 20<sup>th</sup> century medical science focused on absolute biologic issues, while recently there is a tendency to consider both biological, psychological and also social issues simultaneously, as we can perceive from the

definition of health, from the point of WHO's view, and the high volume of studies regarding to improve the quality of life support this claim. For this reason, these kinds of studies have more supporters. Because the definite cause of the Alopecia areata is still unknown, there is no cure yet.

Considering holistic approach there is a belief that mind and body have interactions with each other, and are related to each other. Therefore, the key for the solution or most important part of the problem might depend on patient's thought and mentality. Accordingly, in this study we tried to consider the effects of stressors on Alopecia areata and lay the groundwork to help scientists to find a way toward the cure.

## 2. Materials and methods

In this case-control study with regular sampling, we included 120 participants. After physical exam they were divided into two groups: 60 of those with Alopecia areata and the other 60 participants without Alopecia areata (control group) which complained of un-specific hair loss. Data was gathered by a valid and reliable questionnaire. Stress was identified and compared either subjectively by direct question from participant's perception of the stress or objectively from the stressful events during last 3 months prior to the development of the disease. Data analysis was done using statistical SPSS software, chi-square and

independent T tests. The significant level of 0.05 was used to interpret the relationship between variables.

## 3. Results

Demographic information, the appearance of hair loss, condition, and extension of stressful events have been presented in both patients, with Alopecia areata and non-specific hair loss groups.

**Table 1- Mean age of both control and Alopecia areata patients groups**

	Control group	Group with Alopecia areata
Female	28.56	30.48
Male	29.96	29.45

In Table 1, the average age of female patients with Alopecia areata is 30.48 (total n=17) and male patients is 29.45 and the average age of female control is 28.56 and male control is 29.96.

**Table 2- The age distribution in groups with Alopecia areata**

Age groups	15-20	21-30	31-45	>45
Number of males with Alopecia areata	7	20	8	8
Numbers of females with Alopecia areata	4	5	5	3

As shown in table 2 the majority of patients with Alopecia areata were in ages 21-30.

**Table 3- The location and appearance of hair loss in the group with Alopecia areata**

	Multiple Patches	Beard	Occipital	Parietal/Vertex	Temporal	Ophiasis
Male(43)	6	2	14	17	4	0
Female(17)	1	4	4	7	0	1

Considering table-3, the concentration of hair loss in both male and female were mostly located in the parietal and vertex.

**Table 4- Comparison between Alopecia areata and control groups regarding the nature of stressful events**

The problem	Alopecia areata group			Control group		
	Female	Male	Total	Female	Male	Total
1- Family problems	8	14	22	2	6	8
A death in family members	3	5	8	2	2	4
Couples separation	1	1	2	0	0	0
Friend's death	1	1	2	0	1	1
Marriage	1	1	2	0	1	1
Arrival of a new family member	0	1	1	0	0	0
Illness in a family member	2	5	7	0	2	2
2- Personal Problem	5	6	11	2	3	5
Pregnancy	1	0	1	0	0	0
Exams	2	2	4	1	2	3
Change in sleep	1	2	3	1	1	2
Change in eating habits	0	0	0	0	0	0
Change in settlement	1	2	3	0	0	0

3-Job and financial related problem	3	15	19	1	4	5
Firing from the job	3	4	7	0	1	1
Change in job location	0	3	3	0	1	1
Change in job condition	0	2	2	0	0	0
Far work location	0	1	1	0	0	0
Losing the job	0	2	2	0	0	0
Financial bankruptcy	1	3	4	1	2	3

In Table-4 stressful events were evaluated. Familial events were more common than the others, and among familial events death in a family member

was the most stressful event (36.36%) followed by illness in a family member (31.8%).

**Table 5- The total numbers of stressful events in patients with Alopecia areata compared to the control group**

Number of events	Patients with Alopecia areata				Control Group			
	Female N=17	Male N=35	Total N=52	%	Female N=5	Male N=13	Total N=18	%
One event	3	11	14	26.92	2	7	9	50
Two events	11	19	30	57.69	2	4	6	33.33
Three events	3	4	7	13.46	1	2	3	16.66
Four or more events	0	1	1	1.92	0	0	0	0

As shown in table 5, among patients with alopecia areata, 52 had experienced a stressful event 3 months before the appearance of the disease (86.66%). On the other hand, 18 patients of the control group experienced stressful events.

The majority of the patients with Alopecia areata (both male and female) had two stressful events while patients of the control group mostly experienced one stressful event. Considering the figure 1 there is a significant statistical relationship between stressful events in 3 months before the appearance of the disease in patients with Alopecia areata.

11 out of 60 patients with Alopecia areata (6 female and 5 male) mentioned a family history

(18.33) and this history is almost the same among both males and females.

In this study, according to the figures number 1, 2 and 3, the frequency percentage of hair loss and stress in patients with Alopecia areata and the control group, the frequency percentage of hair loss and the severity of stress in patients with Alopecia areata and control group, the frequency percentage of effects of stress in patients with Alopecia areata and the control group and the frequency percentage of effects of stressful events on onset of disease in patients with Alopecia areata and the control group were evaluated.

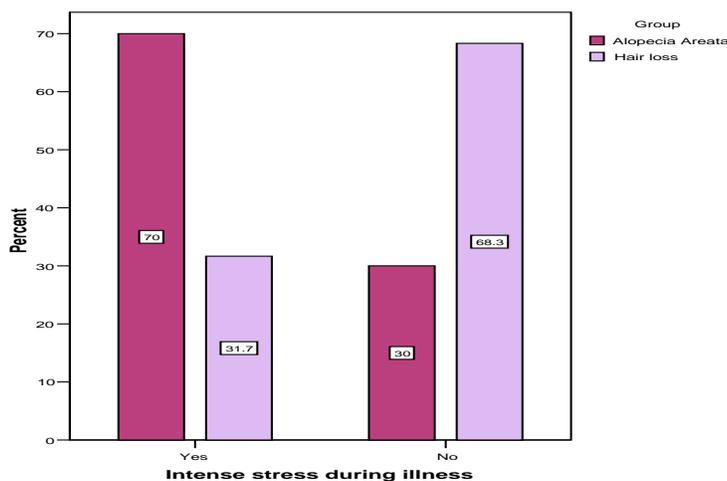


Figure 1- The frequency of hair loss and severity of stress among patients with Alopecia areata and control group (in these patients the perception of stress allegedly was severe).

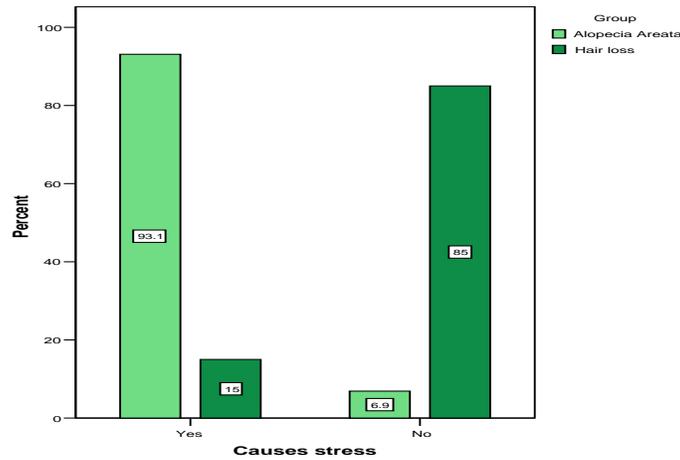
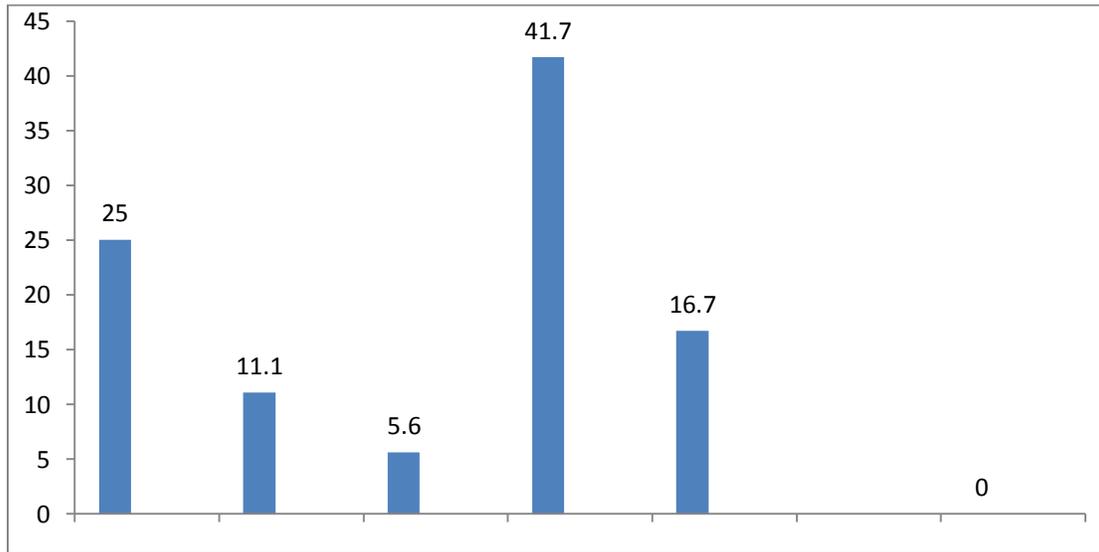


Figure 2- The frequency of patients who believed in the effects of stress on their current hair loss

There is a significant relationship between stressful events and the onset of Alopecia areata (P=0.001), indicating more severe events among patients with Alopecia areata compared with the

control group. Also, there is a significant difference between 2 groups when there are two stressful events simultaneously (P= 0.001), which is higher among patients with Alopecia areata.



Graph 3- The frequency of two simultaneously stressful events in patients with Alopecia areata

**4. Discussion**

In this study 18.33% of patients had a family history of Alopecia areata, Tan et al showed that family history was present in 4.6% of the patients and 2.2% in the study conducted by Liana Manol and Vasile. (13) According to figure 1, the frequency of patients with severe stress in Alopecia areata was significantly (P<0.05) higher. According to the findings in figure 2, 93.1% of patients with Alopecia areata and 15% of patients with hair loss believed on

the effects of stress on the process of their disease. A significant statistical difference is noticeable in this regard (P= 0.05). The answer of patients to the questions indicates patients’ understanding of the level of stress might be interpreted in two ways. Firstly, the level of stress perceived by the patients could be due to their anxiety about their disease. Secondarily, the frequency of depression and anxiety in these patients is high enough to make the stress perceived higher than normal. From the point of view

of these patients, stress has a role in improving their current disease, and the significant number of patients claim that there is a relationship between their disease and stress which could be attributed to the information they heard about, from mass media or their physician, and in fact it is not truly related to the effect of stress on their disease. On the other hand, according to figure 5, which is evaluating the stressful events from 3 months before the presentation of disease, it is inferred that stressful events have occurred in patients with Alopecia areata with a higher frequency than the control group. Indeed, what patients perceived, is compatible with what really happens. Among patients with Alopecia areata, 42.30% had a family problem, 21.15% had financial problems and 36.5% had a job related problem. The pathogenesis of the Alopecia areata is a defect in immunity system (14). In addition, immune system is affected by the stress due to the endocrine disorders (12 & 15). Patients with Alopecia areata are not able to express their anger very well and therefore, the incidence of depression among them is higher than normal. Most probably, the process of problem solving and coping with stress is lower than what it should be among patients with Alopecia areata. The body of patients with alopecia areata might respond harder to stressful events. Family problem is the most common stressful event among these patients, which might be due to the deep relationship among family members. The result of this study is compatible with the study conducted by Liana Manol and Vasile Benea. Gupta and colleagues showed in their study that a significant statistical relationship between stress and Alopecia areata (10). Our study was conducted on patients with Alopecia areata and the control group and showed a significant statistical relationship between stress and the onset of the disease which is compatible with the result in the study carried out by Gupta and colleagues. Panus and colleagues announced that endocrine responses that occur due to the stress worsen alopecia areata disease (15). In our research, the endocrine system was not assessed, however, either the stress reported by the patients or the history of stressful events areata could be part of the pathogenesis of the disease. This is related to the effects of stress on neuroendocrine system.

A study conducted by Matzer and colleagues concluded that Alopecia areata was a reaction to the daily stresses (19), and our study was consistent with it. Other studies have shown the high incidence of mental disorders among these patients. According to different studies, anxiety, depression, phobia, paranoia and mood disorders are more common in these patients (15 & 16). In another study conducted by Van Der Steen and colleague, a significant

relationship between stress and Alopecia areata was reported (16).

On the other hand, it can be argued that patients with Alopecia areata are not able to well-tolerate the stressful events, and therefore their perception of stress is more than the normal population and therefore, are more influenced by them. Cognitive therapy might help them to improve their health.

Teshima and colleagues showed the effects of meditation on hair growth in patient with Alopecia areata. In this study fluctuations of lymphocytes and endorphins were studied simultaneously (20). In another study the control group (without treatment) were compared to the patients who were in therapy for less than 7 months, and considerably hair growth were shown in patients with treatment (Putt et al. 1994). Since none of these studies established by the standard clinical trial, the results should be evaluated by extended studies (15).

## 5. Conclusion

In this study we can say there is a significant relationship between hair loss and stress, the severity of the stress and the existence of stressful events.

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