Clinical, Cosmetic and Investigational Dermatology

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ORIGINAL RESEARCH

Life Events Preceding Alopecia Areata Onset—a Descriptive Retrospective Cohort Study Focusing on Strain

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Background: Patients often relate preceding life events to the onset of alopecia areata (AA). This cohort study systematically examined number and type of life events together with experienced strain during two years before AA onset.

Methods: The study involved 100 patients with AA who reported life events through the Social Readjustment Rating Scale (SRRS). Life event strain was examined using the Streiner model, a stress-based model in which strain is defined as undesirable, unanticipated and uncontrollable. SRRS readjustment rating and the rated strain for each life event were obtained. Percentages of strainful life events for each SRRS category were calculated. Associations between AA disease-variables, sociodemographic-variables, Beck Depression Inventory-scores and Beck Anxiety Inventory-scores were examined in relation to the number of SRRS events and the number of strainful events.

Results: Total life events reported were median (range) 7.0 (0–22), almost two times higher than lifetime population studies on life events. The most experienced life events were loss of health and separation. At least one strainful life event prior to the AA onset was reported by 82% of patients. The highest strainful ratings were found in the Family and Personal categories of SRRS, such as Major change in health of a family member and Major personal injury or illness. A comparison between SRRS life events and strain ratings showed that 60% of the life events were rated higher and 35% were rated lower than the standard SRRS readjustment weight order.

Conclusion: This study provides support for an inquiry into any strainful life event preceding AA onset in newly diagnosed patients with AA. Categories of highly strainful events and the importance of subjective strain are identified in patients with AA. This implies the need to address strain, which seems to be important for strain reduction thereby decreasing the burden among patients with AA.

Plain Language Summary:

Life Events and Strain before Alopecia Areata Onset

Patients with the hair loss disease alopecia areata (AA), often associates its onset with the experience of life events, but scientific studies show conflicting results.

We wanted to know more about life events for two years preceding AA onset, and to know more about how patients perceived different types of life events, both minor and major events such as changing to a new school, leaving home or the death or illness of a family member.

With this purpose, we examined life events reported by 100 patients with AA two years before the AA onset and asked them about their perceived strain in terms of whether the event was desirable or not, expected or not, or controllable or not. We also asked them about their AA illness, their social life, and symptoms of depression and anxiety.

Our results show that patients with AA experienced a high number of personal and familiar life events perceived as strainful before AA onset. Dermatologists and medical staff need to be observant of the strain these patients may have. Asking about previous life events when seeing these patients may reduce the strain and hence the burden of disease.

Keywords: alopecia areata, life events, social readjustment rating scale, psychodermatology, strain, stressors

https://doi.org/10.2147/CCID.S567911
Received: 16 September 2025
Accepted: 25 December 2025
Published: 12 January 2026

Introduction

Alopecia areata (AA) is an autoimmune hair loss disease often reported to be initiated by life events.[1–4] AA is characterized by patches on the scalp that sometimes progresses to total loss of scalp hair, alopecia totalis (AT), or total loss of all scalp and bodily hair, alopecia universalis (AU).[5–7] Hair regrowth may occur within a year in about 50% of cases, but relapses occur[8,9] in up to 85%.[9] The estimated lifetime prevalence of AA worldwide is about 2%[5,6] with a positive family history of 12%,[6] and about 60% are affected before the age of 20.[10] Negative life events have in previous research been suggested as a trigger for the onset of AA, but results are ambiguous sometimes with methodological doubts.[1–4]

A life event is defined as an experience of change; positive, neutral, or negative, within a qualitative range from trivial events to severe traumatic loss. Life events are parts of life that raise individual emotional and physical responses.[11–13] Major negative life events, such as the death of a significant other, have been shown to have a negative impact on physical health through influence on the immune and endocrine system. Even common life events, such as leaving home or starting a new school, may have a negative impact[12–14] depending on the individual's perception of the associated strain,[14–17] a recognition supported by Selye.[18]

The SRRS (Social Readjustment Rating Scale) by Holmes and Rahe is the most used life event instrument,[11] created for studies on the demand for readjustments after life events but not based on the presumption of whether they are experienced as positive or negative.

This is why a model based on stress theories,[14–18] was developed by Streiner et al,[19] where negative and uncontrollable ratings were associated with increased strain on the individual. Only the two most negative combinations resulted in strain with a negative impact on the individuals health which is in accordance with stress theory.[19] This is in line with stress researchers' findings that negative, unpredictable, and uncontrollable life events tend to increase the number of stress hormones and negatively influence the immune system, thereby increasing the risk of future diseases.[13–17,20–22] Suggestions that strain plays a significant role in the etiology of autoimmune diseases has been proposed.[21,22]

Some previous studies have examined the relation between the number and the categories of life events and AA onset by using the SRRS[23,24] or other instruments.[25–27] They indicate that life events could be plausible triggers of AA[1–4,23–27] via immunological pathways by disrupting the immune privilege of the hair follicle, activating mast cells and amplifying T cells to attack the hair follicle[28,29] though results are ambiguous.[3]

Depression and anxiety preceding strainful life events may act as confounders and influence both the effect of strain and the memory thereof and are hence important to examine.[30–32]

When treating and caring for patients with AA, a knowledge of the strain of life events preceding disease onset may lead to an improved understanding of patients, which in turn may improve their quality of life and psychological health. Therefore, life event strain imposed on individuals before AA onset may be important to further explore.

The primary objective of this study is to examine the prevalence of life events and the reported associated strain during two years prior to the onset of AA, and the relation between the SRRS readjustments rating and the strain ratings according to the Streiner et al model. A secondary objective is to examine the presence of depression and anxiety.

Materials and Methods

Study Design and Study Population

In this cohort study, 102 patients with AA were recruited at the dermatology unit at a university hospital in Sweden between November 2019 and June 2021. Sixty patients were recruited through medical records (Melior®), 12 were asked during their regular visits, and 30 were recruited through recommendations from other patients with AA. To ensure similarity between recruitment groups, age, duration of disease, education, and gender were compared.

Inclusion criteria were at least one year of AA duration, an AA diagnose by a dermatological specialist (ICD-10), ≥18 years of age, and a good command of oral and written Swedish language. Exclusion criteria were overt psychotic behavior, intellectual disability, or being under the influence of alcohol or drugs. No patients were excluded. Two patients dropped out: one due to a mental health condition and one due to the study design. One hundred patients were included and received written and verbal information before giving consent to participate. A sample of 100 patients has been found to have the power to

detect statistical differences between variables.[33] Ethical considerations were made in accordance with the Declaration of Helsinki.[34] The study was approved by the Swedish Ethical Review Authority (Reg. No. 2019–03811).

The interviews and ratings took place at the dermatology clinic, with the interviewer available throughout the process. A structured interview was performed, designed by two of the authors. It included questions about sociodemographics, AA disease variables, e g, age at onset of AA, duration, and episodes. Information was obtained about negative obstetric history (miscarriage), and of intimate partner violence within two years preceding AA onset. Some questions could be answered by "yes" or "no", with the possibility of expansion. ICD-10 (International classification of diseases-10th revision) was used to categorize the severity of AA. Patients were asked to report life events experienced during a two-year period prior to disease onset.[22,35]

Instruments

The SRRS is a 43-item life event-instrument, where each life event item is attributed to a life readjustment weight order from 1 to 43, where item 1 indicates the highest demand of readjustment and 43 the lowest. Each SRRS item indicates the amount of readjustment required to regain stability, and not the psychological meaning, emotion, or social desirability.[11] The SRRS items are identified by a large sample of individuals and standardized for age, sex, race, and religion[36–38] and validated among Swedish and US patients, showing a satisfactory similarity between populations.[38]

Each life event is assigned to four SRRS categories containing Family, Personal, Work, and Financial events.[38] In this study we used the SRRS as an instrument for reporting life events and for the comparisons between the ratings of readjustment and strain.

One life event was added about intimate partner violence, regarding physical, psychological and sexual violence, since the SRRS was constructed during a time when there was no particular focus on this matter. This variable was analysed separately.

The Streiner et al model was used to ask patients about perceived strain for each experienced life event, using variables such as desirable or undesirable, anticipated or unanticipated, and controllable or uncontrollable.[19] Eight combinations of variables were possible for each life event item and were written down in the SRRS instrument. According to Streiner et al only those rated as undesirable (negative), anticipated or unanticipated, and uncontrollable, showed the highest negative emotional impact that was related to psychological and physical distress.[39] In this study, we used the two most strainful combinations presented as UUU= undesirable, unanticipated, and uncontrollable, and UAU = undesirable, anticipated, and uncontrollable, referred to as strain or strainful life events. The number of strainful events for each SRRS item was calculated.

The experienced life events, using both the SRRS readjustment ratings and the numbers and percentages of strainful events, were then compared. Eight life events that were not experienced by any patient were excluded from analyses.

For the examination of depression and anxiety and their potential influence on the report of life events, the Beck Depression Inventory (BDI-II)[40] and the Beck Anxiety Inventory (BAI)[41] were used.

The BDI-II consists of 21 statements about depressive symptoms experienced in the past two weeks. Each statement is scored on a four-point scale (0–3), with 3 representing the highest level of severity. Scores of 0–13 are considered minimal, 14–19 mild, 20–28 moderate, and 29–63 severe symptoms of depression.[40]

The BAI consists of 21 statements about physical reactions to anxiety and psychological fear. The statements are scored on a four-point scale (0–3), with score 3 as the highest level of severity. Symptoms of anxiety range from 0 to 7 minimal, 8 to 15 mild, 16 to 25 moderate, and 26 to 63 severe.[41]

Groups were created for comparison with life event variables: The "low depression group and low anxiety group", with low scores of depression or anxiety, and the "depression and anxiety group", with moderate to severe depression or anxiety scores indicating clinical depression or clinical anxiety.

The WHO Alcohol Use Disorders Identification Test (AUDIT)[42] was used to measure intake of alcohol and dependency.

Statistical Analyses

Statistical analyses were carried out using the Statistical Package for Social Sciences (SPSS), version 28. Life events and strainful life events, AA variables, and sociodemographic variables were skewed. Sociodemographic variables were presented as frequencies and percentages. Life events were given in numbers, categories, and adjustment ratings. Median (ranges) for

skewed data and mean (SD) for normally distributed data were given. The Mann–Whitney *U*-test was used for comparisons between groups of AA variables and number of life events and strainful events. For each item in the reported SRRS categories, the percentage of strainful life events was calculated. A Kruskal–Wallis test was conducted to compare groups created based on the duration of AA in years and the number of reported life events and for comparison of differences between groups of recruitment and sociodemographic variables. A p-value of <0.05, two-tailed, was considered statistically significant.

Results

The background data for the 100 patients with AA are shown in Table 1.

No statistically significant differences were found between the recruitment groups with respect to age at interview, duration of AA (17.5 [1–71] years), education, and gender.

Table 1 Sociodemographic and Alopecia Areata Disease Variables in Patients with Alopecia Areata, N=100

Gender	**n (%)**
Female	90
Male	10
Marital status	
Married/cohabitants/in relation	64
Single/widow/er	36
Education	
Low/medium (compulsory school/upper secondary school diploma)	49
High (university degree)	51
Employment status	
Employed/studies/childcare leave	70
Retirement	20
Unemployed/sick leave	10
Self-estimated financial situation	
Low	20
Average	49
Above average	31
Amount alcohol units, glass [3] /occasion [#]	
None–low: 0–3	66
Moderate–high: 4–6	23
Above high: ≥7	11
Any addiction (drugs, food, gambling)	
No	76
Yes	24

Notes: [#]Measured according to the World Health Organization's AUDIT (alcohol use disorders identification test) (standard glass/occasion). [3] Standard units/glass of wine or beer, 15 and 33–50 cL, respectively.

The median (range) number of total life events was 7.0 (0–22), with a mean (SD) of 7.7 (5.4). Thirty-five percent of AA patients reported ≥10 life events, 31% reported 5–9 life events, and 28% reported 1–4 life events within two years prior to AA onset. Ninety-four patients were included in the analysis of strain since six patients did not report any life event. Seventy-seven (82%) patients reported one or more strainful life event (range 1–22) prior to AA onset. Patients rated 35 (81.4%) of the 43 SRRS life events as strainful and eight of the items mostly financial events as not strainful. Fifty percent of all reported SRRS life events belonged to the most strainful in each SRRS category (Table 2).

A comparison between SRRS life readjustment weight order ratings and the strain ratings showed that 60% of the life events were rated higher and 35% were rated lower than the standard SRRS readjustment weight order (Table 3).

The duration of AA had no influence on the reported number of life events at interview, (H = 24,43; df = 21; p = 0.273; N = 100).

In Table 3, the prevalences of experienced life events for each SRRS category are shown. Personal life events were the most frequently experienced followed by Family related life events. The highest strainful ratings were found in the Personal category: *Major personal injury or illness* and *Death of a close friend* were rated as strainful in 100%, and

Table 2 The relation between the SRRS life event number, strainful life events and alopecia areata disease variables, depression, and anxiety score, N=100

AA Disease Variables*	**Number of SRRS Life Events**	**Mann–Whitney *U*-test p-value**	**Numbers of Strainful Life Events UUU+UAU**	**Mann–Whitney *U*-test p-value**	**Total**
AA severity					
AA Mdn (range)	7 (0–20)		3 (0–16)		60
AT/AU Mdn (range)	6.5 (0–22)	0.83	3 (0–22)	0.17	40
Type of AA					
Progressive Mdn (range)	6 (0–22)		3 (0–22)		58
Relapsing Mdn (range)	7 (0–21)	0.42	3 (0–16)	0.67	42
AA Episodes					
1 Mdn (range)	6 (0–22)		3 (0–22)		61
≥2 Mdn (range)	8 (8–21)	0.22	3 (0–16)	0.53	39
Familial AA					
Yes Mdn (range)	5 (0–20)		2 (0–16)		40
No Mdn (range)	8 (0–22)	0.95	4 (0–22)	0.07	60
AA Onset Years of age					
≤ 25 Mdn (range)	5 (0–21)		2.5 (0–16)		50
>25Mdn (range)	9.5 (1–20)	<0.001	3.5 (0–22)	0.04	50
Depression groups BDI-II					
Depression Mdn (range)	7.5 (0–22)		6 (0–22)		16
No depression Mdn (range)	6 (0–20)	0.26	3 (0–16)	0.20	84
Anxiety groups BAI					
Anxiety Mdn (range)	7.5 (0–22)		4 (0–22)		22
No anxiety Mdn (range)	6 (0–20)	0.54	3 (0–16)	0.31	78

Notes: p-value <0.05 two-tailed. *ICD-10 (International Classification of Diseases 10th revision) diagnosed by a dermatologist.

https://doi.org/10.2147/CCID.S567911

Table 3 The Numbers of Reported SRRS Life Events and the Percentage of Reported Strainful Life Events for Each SRRS Category as Rated by Patients with AA, n=94

SRRS Category of Life Events	**SRRS Life Events (n)**	**Strainful Life Events (n)**	**Percentage of Strainful Rating per SRRS Life Event (%)**
Family (14 items)		UAU+UUU	UAU+UUU/SRRS
Death of spouse	2	2	100
Trouble with in-laws	5	5	100
Major change in health of family member	25	23	92
Death of close family member	24	21	88
Major changes in argument with spouse	13	11	85
Son or daughter leaving home	5	3	60
Divorce	17	10	59
Marital separation	17	10	59
Marriage	4	2	50
Major changes in family get-together	29	11	38
Pregnancy	18	4	22
Spouse starting or ending work	5	1	20
Marital reconciliation	2	0†	0
Addition of new family member	14	0†	0
Total	180	103	57
Personal (18 items)			
Major personal injury or illness	34	34	100
Death of a close friend	24	24	100
Major change in sleeping habits	38	36	95
Changing to a new school	6	5	83
Sexual difficulties	7	5	71
Major change in living conditions	52	36	69
Major change in social activities	45	24	53
Major change in recreation	28	12	43
Major change in eating habits	18	6	33
Minor violation of the law	4	1	25
Change in residence	43	10	23
Christmas	45	7	16
Beginning or ending of formal schooling	35	5	14
Major revision of personal habits	31	4	13
Vacation	52	5	13

(*Continued*)

Table 3 (Continued).

SRRS Category of Life Events	SRRS Life Events (n)	Strainful Life Events (n)	Percentage of Strainful Rating per SRRS Life Event (%)
Major change in church activities	2	0†	0
Outstanding personal achievement	0	0†	0
Detention in jail	0	0†	0
Total	464	214	46
Work (7 items)			
Retirement from work	3	3	100
Being fired from work	6	5	83
Changing to different line of work	22	17	77
Trouble with boss	11	8	73
Major business readjustment	16	7	44
Major change in working conditions	30	12	40
Major change in work responsibilities	26	7	27
Total	114	59	52
Financial (4 items)			
Major change in financial state	25	17	68
Mortgage or loan less than $20.000	1	0†	0
Mortgage or loan over $20.000	12	0†	0
Mortgage foreclosure	0	0†	0
Total	38	17	45

Notes: Numbers of rated life events during two years prior to alopecia areata onset. The two most negative combinations of strain are merged into one group (UAU+UUU) per total number of events. Events within each category are presented from the highest percentage of strain to the lowest for each type of life events experienced. Patients could experience more than one strainful event. †No patients reported this life events as strainful.
Abbreviations: UAU, Undesirable, Anticipated, Uncontrollable; UUU, Undesirable, Unanticipated, Uncontrollable.

Major change in sleeping habits in 95%, by patients who experienced them. The highest prevalences of strainful life events in the Family category were: *Major change in health of a family member* and *Death of a family member. Change to a different line of work* was the most strainful life events in the Work category and *Major change in financial situation* in the Finance category (Table 3).

Twenty-one (60%) of the life events were rated as more strainful by patients with AA than given by the SRRS readjustment ratings. The most strainful of these where *Major change in sleeping habits, Death of a close friend*, and *Trouble with in-laws*. Twelve (34%) life events were rated as less strainful such as *Marriage* and *Divorce* (Table 3).

When asked about traumatic life events not belonging to the SRRS, intimate partner violence, mostly physical and combined with sexual and psychological violence, was reported by 41% of all patients, and miscarriage was found in 17/90 (19%) of female patients within two years prior to AA onset.

No statistically significant differences between groups of `low depression` and `depression`, `low anxiety` and `anxiety` and the number of life events or strainful events were found (Table 2).

Those older at AA onset reported statistically more life events and more strainful events compared to those younger at AA onset: p <0.001, p=0.035, respectively. Those with non-familial AA reported twice as many numbers of strainful life events than those with familial AA, the result showed a non-significant trend (p=0.07) (Table 2).

To test whether the duration of AA interfered with memories of life events, five groups of duration in years were created consisting of 24, 17, 21, 17 and 21 patients, respectively, based on histogram comparisons. No statistically significant differences in reported number of life events were found.

Discussion

This study showed that most patients with AA experienced a high frequency of SRRS life events, and a high frequency of life events perceived as strainful before AA onset. The ratings of strain gave important information, demonstrating the importance of negative and uncontrollable strain evaluation. The result of this study also stresses that the experience of strain is subjective and exhibits a unique evaluation of life events. Eighty percent of patients reported one or more strainful life event in this study. In a review by Stojanovich,[21] up to 80% of patients reported stressful life events before the onset of autoimmune disease. The same association was later supported in a large cohort study by Song et al.[22]

Almost two thirds (60%) of the SRRS life events were rated as more strainful by patients with AA than indicated by the SRRS readjustment rating. According to Streiner et al, events often considered as positive could demand even greater readjustments than negative events, and if they were rated as strainful, they were related to both physical morbidity and distress.[14,19] This study found that the most strainful events involved loss, separations, disease, and conflicts indicating future separation. In similarity to our findings, Baxter et al found in the general population for one year that the most experienced events were reported as personal or familial.[12]

To our knowledge, this study is the first to systematically investigate the subjective strain of life events in patients with AA. Prevalence studies of life events among general populations are rare.[12] Two larger population studies using modified versions of the SRRS found frequencies of life events lower than our findings.[43,44] In comparison, the present study showed nearly twice as many life events during only a two-year period.

Research on life events often focuses on major events, which may obscure more common events that may be very strainful with a negative impact. For example, we found when *Marriage* was reported, half of the patients experienced it as strainful, which indicates the importance of exploring strain even in ´positive´ events. Furthermore, patients with AA in this study rated *Social activities and Recreation* as strainful possibly because of the stigma of hair-loss and its consequences. For *Pregnancy*, strain was rated considerably lower than indicated by the SRRS readjustment ratings. Today's secure delivery care and the Swedish model with parental allowance could explain this difference. Patients with AA rated the *Loss of a close friend* as very strainful compared to the SRRS readjustment ratings. A close friend who knows about the patient's hair loss may be of great importance to AA patients. These disparities stress the subjectivity of life event ratings in different populations, a finding already addressed by Brown and Harris[32] and Mechanic et al.[17]

Interestingly, *Divorce* and *Marital separation* were not rated as strainful within this cohort of AA patients, which could be associated with the high prevalence (41%) of intimate partner violence reported. In comparison, 13.6% of the Swedish population (aged 16–84) report experience of intimate partner violence.[45] Such stressors should be taken into consideration when studying life events and stresses the need for traumatic events to be included in life event research. Furthermore, nearly a quarter of patients reported moderate to high alcohol use, with a tenth above high use, which may further indicate a heavy psychological strain.[46]

Some studies found that ongoing depression influenced the perception of life events.[30,31] This study could not support this finding at interview. However, this finding may not exclude any influence of anxiety or depression reactions around the time of the life event.

Attention to life events before AA disease onset seems important for the understanding of the psychological well-being of patients. Asking patients whether a strainful event happened before the onset of AA may increase the awareness of the influences of life events as stressors. Some individuals appear to be more vulnerable to life events than others[13] and in need of psychological support such as crisis intervention or grief counselling especially if the event is experienced as strainful.[18,47]

The patients own narratives of experienced life events may therefore reduce strain in response to life event and increase compliance in treatment, as suggested already by Meyer et al in 1951.[47]

Strengths and Limitations

One strength of this study is that the data are collected in an interview setting by the same researcher. Another strength is the use of structured and validated research instruments[11,40,41] and the Streiner et al model[19] based on stress theories[14–18] which makes it likely to increase validity and generalizability.

We found a study period of two years before AA onset to be appropriate since memory researchers found that patients often remember life events within one up to two years, then memory gradually decreases. Even though, subjects are often able to recall major stressful life events for a longer time interval.[48] Emotional distress tends to both impair and increase memory consolidation, which may result in both over- and under-reporting of life events.[49,50] Moreover, it can be difficult to remember whether an event happened ten months or 15 months ago. Furthermore, there is a consensus among researchers that the time interval between a life event and the disease studied ought to be adjusted to the type of disease.[35,48,51] For autoimmune diseases such as AA, researchers have examined events for a two-year interval or more, since accumulated stress may be more important to the onset of autoimmune disorders.[22] Employing a checklist, such as the SRRS, may facilitate memory, which increases validity.

Recall bias due to longer duration of AA disease is one possible limitation, since a longer AA duration might retrospectively influence reports of life events because of memory distortion.[48–51] However, AA duration did not affect recall in this study.

The potential bias from the recruitment strategy of this study was analyzed with respect to differences in some important variables such as age at onset, duration of AA, education and gender but no differences were identified which makes them appropriate for comparison.

Conclusion

Patients with AA have a high prevalence of strainful life events prior to disease onset, a result consistent with studies on other autoimmune diseases. Most patients (82%) reported at least one strainful event within a two-year period before AA onset. Familial and personal life events such as Death of a loved one, Major illness in self, family and friends, and Conflicts with threats of separation were the most frequent types of life events rated as strainful. Twenty-one (60%) of the SRRS life events were rated as more strainful by patients with AA compared to the SRRS readjustment rating. Addressing any negative feelings and sense of loss of control following life events seems to be important for strain reduction when meeting newly diagnosed patients with AA.Future research should focus on prospective designs and interventions aimed at mitigating the impact of strainful life events at the onset of AA.

Disclosure

The authors report no conflicts of interest in this work.

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