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Original Article

Clinical and demographic profile of childhood alopecia areata in Iran

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Abstract

Objective To evaluate the clinical profile of alopecia areata (AA) in Iranian children.

Patients and methods One hundred Iranian children aged less than 16 years participated in this cross-sectional study. Data were obtained by administering a parental-recall questionnaire; and clinical and demographic parameters and associated diseases were evaluated.

Results The mean age of AA onset was 8.9±2.1 years. The scalp was the most common site of involvement. Thirty-five percent of the patients had a precipitating factor, with psychological stress being the most common factor. Associated diseases were recorded in 60% of the patients, with the most common associated disease being eczema. Twenty-one percent of the patients were positive for a family history of AA. Severity and extent of the disease and the age of onset showed significant relationships with parents' educational and economic status ($p<0.05$). Nail changes were also strongly associated with severity and extent of the disease ($p=0.006$).

Conclusion Our results suggest that the severity and extent of the disease both increase with an early age of onset, low parent educational levels, low socioeconomic status, and nail changes.

Key words
Alopecia areata, children, clinical, demographic, descriptive study, Iran

Introduction

Alopecia areata (AA) is a recurrent, non-scarring type of hair loss.[1,2] Although medically benign, it can cause tremendous emotional and psychosocial stress to the patients and their families.[1] While this disorder affects all age groups, children affected by AA constitute approximately 20% of all cases. A younger age of onset has been reported to be associated with a poorer prognosis.[4,5] While the pathophysiology of AA remains unknown, multiple factors, including genetic, immunological, and environmental components, are involved in the pathogenesis of AA.[6] Among the various hypotheses on the pathophysiology of AA, the most widely accepted hypothesis is that AA is a T cell-mediated autoimmune condition that is most likely to occur in genetically predisposed individuals.[1,3] Many factors favor a genetic predisposition for AA. Further, AA is likely to be caused by polygenic defects rather than a single gene defect. The roles of environmental

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factors in initiating or triggering the condition have not yet been determined.[1]

Few studies have reported the clinicoepidemiologic features of and diseases associated with childhood AA. Although there are a few reports from different Asian countries, including reports from Mongolian, Arabian, and Indian areas, reports from Iran, which has a different ethnic heritage, are lacking. Hence, we conducted this cross-sectional study to investigate the clinical and demographic aspects of and diseases associated with AA in Iranian children. We also sought to compare the results of the present study with those reported elsewhere in both child and adult patients.

Patients and methods

Design and subjects This cross-sectional survey was carried out from November 2008 to November 2009 in a pediatric dermatology clinic in Kerman, the largest province of Iran. A total of 100 consecutive AA patients aged less than 16 years participated in this study. Consent forms were obtained from the participants' parents.

Clinical diagnosis of AA was made by expert dermatologists. Patients with ambiguous symptoms or complications, such as scalp inflammation and trauma, were not included in the study. The patients were examined to determine the affected sites, morphologic patterns, extent and severity of the disease, and nail involvement. Patients' clinical details, including demographic information (age, nationality, and sex), age of onset, duration of disease, site of onset, affected sites, precipitating/aggravating factors, treatment history, associated diseases, with special reference to atopic disorders, thyroid and autoimmune diseases, and family history of AA, hay fever, vitiligo, or other significant diseases, were recorded on a special data-collection sheet. Ethical approval was obtained from the Medical Ethical Committee of Kerman University of Medical Sciences, and the project number given to this project was 89/124.

Definition of variables Age of onset was defined as the age when the patient or his/her parents first became aware of the disease, and the disease was classified according to its location and manifestation pattern. Localized and patchy AA was defined as well-circumscribed patches of AA. A reticular pattern was recorded when hair loss was extensive and the patches coalesced. Patients with hair loss localized to the sides and lower back of the scalp were classified as having ophiasis. Conversely, sisaipho, ophiasis spelled backward, was noted when hair loss did not develop on the sides and back of the head. Those with 100% hair loss on the scalp were classified as having alopecia totalis. Patients with complete loss of hair in all hair-bearing areas were diagnosed with alopecia universalis.[1,7]

The severity of AA was calculated on the basis of the severity of alopecia tool (SALT) score.[8] Eyebrow involvement was classified as AEB_0 when there was no hair loss, as AEB_1 when there was incomplete hair loss, and as AEB_2 when there was complete hair loss. Eyelash involvement was classified as AEL_0 when there was no hair loss, as AEL_1 when there was incomplete hair loss, and as AEL_2 when there was complete hair loss. Body involvement was classified as AB_0 when there was no hair loss, as AB_1 when there was incomplete hair loss, and as AB_2 when there was complete hair loss. To simplify the SALT score for scalp hair loss, we modified it as AS_0 when there was no hair loss,

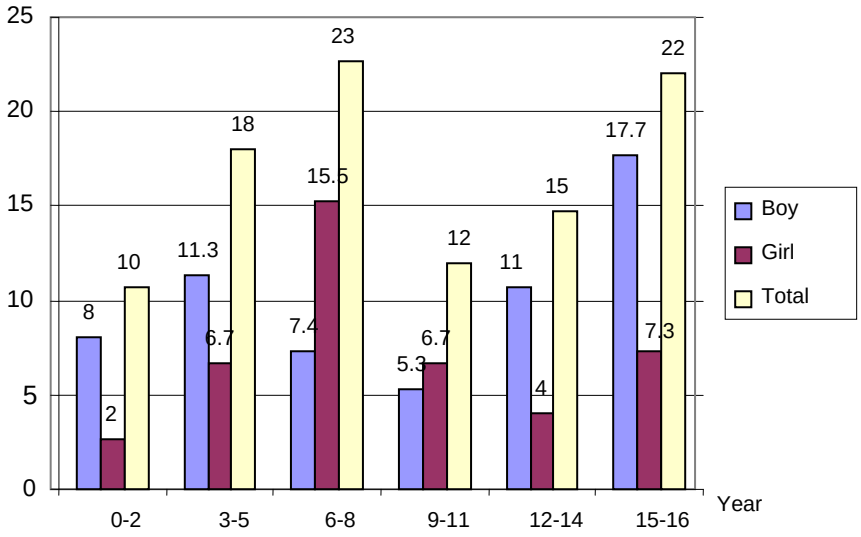

Figure 1 Age of onset (years) and sex distribution in 100 cases of childhood alopecia areata

as AS_1 when there was incomplete hair loss, and as AS_2 when there was complete hair loss. Nail involvement was classified as NP (pitting), NO (onycholysis), NT (trachyonychia), and NM (onychomadesis).

Statistical analysis Data were analyzed using SPSS version 16 (Statistical Package for Social Sciences, Chicago, IL). Chi-square and Mann-Whitney *U* test were used in the data analysis. A *p* value less than 0.05 was regarded as significant.

Results

We enrolled a total of 100 children with AA consisting of 57 boys (57%) and 43 girls (43%) with a male-to-female ratio of 1.3:1. As shown in **Figure 1**, the children's ages ranged from 1 to 16 years (mean 8.9±2.1 years), and the mean age of onset was 8.8 years in the girls and 9.2 years in the boys. The disease period varied from 1 day to 8 months, with a mean period of 1 month. As for parents' education levels, 34% had not graduated high school, 54% had graduated high school, 9% had a Bachelor's degree, 2% had a Master's degree, and 1% had a postgraduate degree. The patients belonged to various economic classes: 28% of the patients belonged to a low-income class, while 59% and 13% of the patients belonged to moderate- and good-income classes, respectively. Thirty-five children (35%) had a positive history of precipitating/aggravating factors, including psychological stress in 33 (33%), urinary infection in 1 (1%), and use of unknown drugs in 1 (1%). Fifty-four patients (54%) had previously undergone treatment, with topical steroid treatment being the most common treatment type (administered in 48.1% of those treated previously). Associated diseases were recorded in 34 patients (34%), with eczema being the most common (14%) disease, followed by hay fever (12%), asthma (5%), vitiligo (2%), and thyroid disease (1%). Other diseases, such as pernicious anemia, systemic lupus erythematosus (SLE), diabetes, ulcerative colitis, and Down syndrome were not reported. A positive family history of AA was found in 21% of the patients.

The scalp was the predominant site of involvement (82%), with the most common clinical pattern being patchy alopecia, which was observed in 69 of the 82 (84.1%) patients, followed by ophiasis in 7 (8.5%), reticular in 2 (2.4%), sisaipho in 2 (2.4%), and totalis in 2 (2.4%) patients. As shown in **Table 1**, eighty out

Table 1 The distribution of involved sites and the severity of the disease.

Site	*Severity**	*Number*	*%*
Scalp	AS_0	18	18
(n=100)	AS_1	80	80
	AS_2	2	2
Eyebrow	AEB_0	90	90
(n=100)	AEB_1	9	9
	AEB_2	1	1
Eyelash	AEL_0	93	93
(n=100)	AEL_1	6	6
	AEL_2	1	1
Body	AB_0	87	87
(n=100)	AB_1	11	11
	AB_2	2	2
Nails	NP	5	5
(n=10)	NO	3	3
	NT	2	2
	NM	0	0

*AS_0, AEB_0, AEL_0, AB_0: no hair loss from the scalp, eyebrows, eyelashes, body; AS_1, AEB_1, AEL_1, AB_1: incomplete hair loss from the scalp, eyebrows, eyelashes, body; AS_2, AEB_2, AEL_2, AB_2: complete hair loss from the scalp, eyebrows, eyelashes, body; NP: nail pitting; NO: nail onycholysis; NT: nail trachyonychia; NM: nail onychomadesis.

of 82 patients with some scalp hair loss had incomplete hair loss (AS_1), and 2 patients had complete hair loss (AS_2). We did not find any cases of alopecia universalis. The extent of scalp involvement was 1-3 cm in 57 (69.5%) patients, 4-10 cm in 24 (29.2%), and more than 10 cm in 9 (10.9%) patients. The mean size of involved areas was 1 cm × 2 cm. The body hair, eyebrow, and eyelash areas were affected in 11, 9, and 7 patients, respectively. Nail involvement was detected in 10 patients, with a mean duration of 2 years. Both extent and severity of AA had a strong association with nail involvement (p=0.006). The types of nail changes are shown in **Table 1**.

The sex of the patients, a positive family history of AA, aggravating factors, associated diseases, and previous treatment had no bearing on the extent and severity of the disease. On the other hand, socioeconomic level, parents' educational status, and age of onset had significant relationships with the severity and extent of the disease (p<0.05), indicating that children with low socioeconomic status, low parent education level, and early age of onset had more severe and extensive disease trajectories.

Discussion

Few reports have focused on AA in children. Approximately 6.7% of the total number of cases referred to pediatric dermatology clinics were related to childhood AA.[7] Our study aimed to review the demographic profiles and associated diseases of childhood AA in Kerman, Iran. We found that the scalp was the most common site of involvement (82%), similar to that in adult patients (75%).[9] The majority of our patients had patchy alopecia (84.1%), consistent with the findings in previous studies.[4,6,10,11] In our study, of the 82 patients with scalp involvement, 80 (97.6%) had incomplete hair loss (AS_1) and 2 (2.4%) had alopecia totalis (AS_2). Incomplete hair loss and alopecia totalis were reported in 93.8% and 3.5% of the patients, respectively, in a Chinese study.[6]

In this study, the body was the second most common site of involvement (11%), followed by eyebrows (10%), and eyelashes (7%). Nanda *et al.* (2002) found that the eyebrows were involved in 13% and eyelashes in 9.8% of Kuwaiti children with AA, while body involvement was seen in only 5.6% of these cases.[4] Kavak *et al*. (2008) found that 13 out of 539 (2.2%) adult and pediatric patients had eyebrow and eyelash area involvement; the number of patients with body hair loss is not mentioned in this study.[5]

Our study showed a slightly higher preponderance of boys (M:F = 1.3:1), corresponding with other studies from China and

Table 2 Summary of associated diseases and family history of alopecia areata from other studies, as compared with this study.

Associated disease	*Other studies*	*Present study*
Most commonly associated disease	Thyroid disease, 0.88%, and vitiligo, 0.44%, in China[2]	Eczema (14%)
Thyroid disease	1% in Singapore[10] 0.88% in China[2] 0.9% in Kuwait[5]	1%
Vitiligo	1.4% in Kuwait[4] 3.5% in India[18] 0.44% in China[6]	2%
Systemic lupus erythematosus (SLE)	0 in China[2]	0
Down syndrome	0 in China[2] 1.3% in Singapore[10]	0
Diabetes mellitus	0 in China[2]	0
Family history of AA	8.4% in Singapore[10] 10% in Karachi[7] 11.6% in China[2] 51.6% in Kuwait[5] 21% in Turkey[11] 12.4% in India[18]	21%

Singapore,[6,10] although some studies have shown higher proportions of girls.[4,18] Overall, in adult patients, AA affects both sexes equally.[19]

In our study, disease severity did not differ between males and females (p=0.68). Although Tan *et al*. (2002), in a study performed in Singapore, showed more severe AA in girls,[10] Xiao *et al.* (2006), in a study performed in China, showed more severe AA in boys.[6] Therefore, it is not clear whether gender affects the extent of the disease.

We found a slight difference in the mean age of onset between boys and girls, while a study in China showed no such difference.[6] Including both male and female patients, the mean age of our patients was 8.9 years, comparable to a report from Karachi with a mean age of onset of 9.1 years.[13] However, our age of onset was lower than the 11.2 years reported from Singapore and the 10 years reported from China,[6,10] but higher than the 5.7 years reported in another study from Kuwait.[4]

We found that the earlier the age of onset, the greater the severity, consistent with other reports in both adult and pediatric groups.[6,9,14,16] For instance, Seirafy *et al*. (2005) also showed that both a greater severity and longer duration in adult patients were associated with an early onset.[15] The youngest children in our report were 1-year-old, while in the study in Kuwait,[4] the youngest age was 1-month and in Singapore,[10] it was 2-year-old.

There have been a few reports of an association between AA and other diseases. Associated diseases were observed in 34% of the AA patients in our study, while the rate was 2.6% in a study in China.[6] We thought that one main reason for this discrepancy might be the

different screening methods used for diagnosis of the associated diseases; **Table 2** shows a comparison of associated diseases in different studies. For example, associated eczema was higher in our patients than in studies from Singapore, China, and Kuwait[4,6,10]; however, this may be due to the higher frequency of atopic eczema among children in Kerman society.[2] Personal and family history of atopy was 31-60% in adult Asian patients.[3] However, in a study performed in Pakistan, no association between the presence of atopy and the severity of AA has been found, as in the case of our study.[9]

The frequency of associated thyroid disease in our patients was 1%, similar to other reports in pediatric groups.[4,6,10] The prevalence of thyroid disease in the Iranian normal population is 2.97%.[17] The incidence of thyroid disease has been reported to vary from 8% to 28% in adult patients with AA.[15] Variations in incidence rates may be due to both the influence of different thyroid disease diagnostic tools and the varying incidence rates in the normal populations of different countries. In our study, the frequency of associated diseases was not related to the severity of AA.

Some childhood studies have described a positive family history of AA, and the ranges are shown in the **Table 2**. For instance, Bolduc *et al*. (2008) reported a positive family history of AA in 10-20% of patients.[1] The range of frequencies in the family histories in different studies may be caused by genetic variations. Moreover, the questionnaires were completed by parents, and therefore, recall bias may have been a factor.

A positive family history of AA was observed to have no relationship with the severity of disease in our study. This is consistent with the reports of Turkish and other Arabian pediatric studies, with an age range of 2 to 71 years. However in a study by Goh *et al*. (2006), 513 AA patients, aged 2 to 70 years, had a marked association between severity of AA and positive family history.[20]

Psychological stress has been reported to play an important role in the precipitation and exacerbation of AA.[4,14] In various studies, the percentage of patients whose alopecia was exacerbated by psychological stress ranged from 9.5% to 43%.[4,5] Thirty-five percent of the subjects in our study reported to have precipitating or aggravating factors, and AA was attributable to a stressful event in 33 (94%) of these subjects. However, correlation with stress is a subjective phenomenon and requires more planned and subjectively oriented surveys.

Nail involvement is found in 6.8-49.4% of patients with AA.[1] We detected nail changes in 10% of our cases, and pitting was the most common finding (50%). Nail changes in patients diagnosed with AA included 8.4% of the studied patients in Singapore, 26.4% in Kuwait, and 34% in Karachi, with pitting being the most common feature.[4,10,13] In our study, nail changes were seen more often in children with a severe form of the disease. This is consistent with other pediatric and adult studies.[1,4,10,18]

Studies examining the influence of parents' educational levels and socioeconomic status in AA patients are rare. In our study, the majority of patients had parents with moderate educational level and socioeconomic status. There is no control group in this study nor is there a comparable study, including Kermanian educational level and socioeconomic status. Therefore, we could not come to any conclusions in this regard, as our findings may be related to the moderate educational level and socioeconomic status of the majority of people

in Kerman. However, our study did show that children with low socioeconomic status and lower parental education levels had more severe and extended disease trajectories.

Strength of study

In this study, we compared parents' educational levels and economic status in children diagnosed with AA, in relation to the disease severity and extent.

Limitation of study

In this study, we did not use laboratory tests to detect associated diseases, such as thyroid disease, due to financial constraints. We also did not have documentation confirming the presence or absence of associated diseases and previous infections. Further, it was not possible to investigate all possible influences of the large number of related factors. As a result, we relied solely upon parental recall.

Conclusion

Our findings show that most patients had patchy alopecia, with a slight preponderance in males, and that girls had the same extent and severity of the disease as boys. Further, the age of onset has an impact on the extent and severity of alopecia. Low socioeconomic status and parental educational levels were also related to the severity and extensiveness of alopecia in their children. Associated diseases were detected in about one-third of the patients. Further, about one-third of the patients had a positive family history of AA. Analyzing the effects of parental prevalence of AA and heritability, we speculate that the effect of genetic factors is not clear.

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References

1. Bolduc C, Lui H, Shapiro J. Alopecia areata. eMedicine Specialties. Last updated: September 11, 2010. Available at: http://www.emedicine.com/derm/topic14.htm
2. Farajzadeh S, Esfandiarpour I, Poorhamzeh B. Detection of the frequency of skin diseases in children in Kerman city. *Irn J Dermatol*. 2008;**10** (4):44-5.
3. Tan E, Tay Y-K, Goh C-L, Giam Y-C. The pattern and profile of alopecia areata in Singapore – A study of 219 Asians. *Int J Dermatol*. 2002;**41**:748-53.
4. Nanda A, Al-Fouzan AS, Al-Hasawi F. Alopecia Areata in children: A clinical profile. *Pediatr Dermatol*. 2002;**19**:482-5.
5. Kavak A, Yeşildal N, Parlak AH *et al*. Alopecia areata in Turkey: Demographic and clinical features. *J Eur Acad Dermatol Venereol*. 2008;**82**:104-10.
6. Xiao F-L, Yang S, Liu J-B *et al*. The Epidemiology of childhood alopecia areata in China: A study of 226 patients. *Pediatr Dermatol*. 2006;**23**:13-8.
7. Harrison S, Sinclair R. Optimal management of hair loss (alopecia) in children. *Am J Clin Dermatol*. 2003;**4**:700-56.
8. Olsen EA, Hordinsky MK, Price VH *et al*. Alopecia areata investigational assessment guidelines – Part II. National Alopecia Areata Foundation. *J Am Acad Dermatol*. 2004;**51**:440-7.
9. Ejaz A, Jameel KH, Suhail M. Pattern and profile of alopecia areata in Pakistan. *J Pak Assoc Dermatol*. 2009;**19**:136-40.
10. Tan E, Tay Y-K, Giam Y-C. A Clinical study of childhood alopecia areata in Singapore. *Pediatr Dermatol*. 2002;**19**:298-301.
11. Hawit F, Silverberg NB. Alopecia areata in children. *Cutis*. 2008;**82**:4-10.
12. Kasumagić-Halilović E, Prohić A. Association between alopecia areata and atopy. *J Eur Acad Dermatol Venereol*. 2008;**22**:977-81.

13. Ahmed I, Nasreen S, Bhatti R. Alopecia areata in children. *J Coll Physicians Surg Pak*. 2007;**17**:587-90.
14. Kakourou T, Karachristou K, Chrousos G. A case series of alopecia areata in children: impact of personal and family history of stress and autoimmunity. *J Eur Acad Dermatol Venereol.* 2007;**21**:356-9.
15. Seyrafi H, Akhiani M, Abbasi H *et al*. Evaluation of the profile of alopecia areata and the prevalence of thyroid function test abnormalities and serum autoantibodies in Iranian patients. *BMC Dermatol.* 2005;**5**:11.
16. Yang S, Yang J, Liu J-B *et al*. The genetic epidemiology of alopecia areata in China. *Br J Dermatol*. 2004;**151**:16-23.
17. Heydarian P, Azizi F. Thyroid dysfunction and autoantibodies 10 years after implementation of universal salt iodization: Tehran Thyroid Study. *Irn J Endcorinol Metab*. 2003;**4**:229-41.
18. Sharma VK, Kumar B, Dawn G. A clinical study of childhood alopecia areata in Chandigarh, India. *Pediatr Dermatol*. 1996;**13**:372-7.
19. Alkhalifah A, Alsantali A, Wang E *et al*. Alopecia areata update. Part I. Clinical picture, histopathology, and pathogenesis. *J Am Acad Dermatol*. 2010;**62**:177-88.
20. Goh C, Finkel M, Christos PJ, Sinha AA. Profile of 513 patients with alopecia areata: Associations of disease subtypes with atopy, autoimmune disease and positive family history. *J Eur Acad Dermatol Venereol*. 2006;**20**:1055-60.