Original Research Article

A STUDY OF VITILIGO IN CHILDREN AND ADOLESCENT PATIENTS OF CENTRAL INDIA

[1]Dr. Pritica Debnath Mathur, [2]Dr. Vaishali H Wankhede, [3]Dr. Rajesh Pratap Singh

[1]Consultant Dermatologist, Indore, Madhya Pradesh, India
[2,3]Department of Dermatology, Government Medical College, Nagpur, Maharashtra, India

Corresponding Author:
Dr. Pritica Debnath Mathur (rahulmathurpsychiatry@gmail.com)

ABSTRACT

Introduction: Vitiligo has a worldwide prevalence of 0.5-2%. Treatment of vitiligo at any age remains a challenge for clinicians, more so during childhood. Understanding the clinical profile in children paves way for early diagnosis and management of this disorder which ultimately ensures better outcomes.

Aims and Objectives: To study the clinical spectrum and autoimmune associations of vitiligo in paediatric and adolescent patients.

Methods and Materials: It was a cross sectional observational study. All children and adolescents (≤19 years) with vitiligo attending the outpatient department were recruited over a period of three years. Detailed history was taken followed by complete physical examination. Vitiligo disease activity index (VIDA score) was calculated in all patients. Complete blood count, peripheral blood smear, random blood glucose levels, thyroid profile was done in all patients.

Results: 112 children with vitiligo were enrolled out of which 56.25% were girls. 8% had a positive family history of vitiligo. Vitiligo vulgaris was the most common type of vitiligo and face was the most common site. Leukotrichia was present in 23.22% of patients and Koebner's phenomenon was seen in 2.67% of our patients. 12.5% of patients had trichrome. Halo nevus was seen in 3.5% of our patients and thyroid dysfunction was reported in 2.6% of patients.

Conclusion: Exposed sites such as face and lower limbs were found to be most common sites of lesions probably due to Koebner's phenomenon. Hence, parents need to be counselled regarding avoidance of trauma and curbing of habits like finger biting and lip biting. We found significant association between segmental vitiligo and thyroid dysfunction. Thereupon, compulsory screening of children with vitiligo for thyroid abnormalities is recommended.

Keywords: vitiligo, pediatric dermatology, dermatology, childhood skin treatment

Introduction

Vitiligo is an acquired disorder characterized by circumscribed depigmented macules and patches that result from a progressive loss of functional melanocytes [1]. It has a worldwide prevalence of 0.5-2% [2, 3, 4, 5]. It is caused by a combination of factors like genetic predisposition and environmental triggers that finally result in the process of auto-immunity [6]. Special attention is warranted in childhood vitiligo because in half of the patients of vitiligo, the disease onset is before 20 years of age and in a quarter of the patients, disease manifests before the age of 10 years [7, 8]. The epidemiological and clinical characteristics of childhood vitiligo differ significantly from adult onset disease, with a better propensity for repigmentation in children. Segmental vitiligo is more common in children than adults. Also, autoimmune associations are rarely seen in childhood vitiligo compared to adult onset vitiligo [7, 9].

Children with vitiligo often suffer from anxiety and depression and may also become victims of social discrimination and ridicule especially in the presence of facial lesions and hence, the treatment should not be aimed at just treating the skin lesions, but it should include a more wholesome approach, so as to help the child in coping with his surroundings.

Materials and Methods

The study comprised of 112 children and adolescents (<19yrs) with vitiligo who attended the out-patient clinic of the Department of Dermato-Venereo-Leprology over a period of three years. After obtaining clearance from institutional ethical committee and written informed consent from the guardians, the study subjects were subjected to detailed history taking including demographic data, duration of condition, family history, age of onset and presence of concomitant illness like anaemia, diabetes mellitus and thyroid disease etc.

Physical examination included site, number and size of lesions, presence of leukotrichia or

Koebner's phenomenon, presence of any associated cutaneous finding like halo nevus, alopecia areata or trichrome. Vitiligo disease activity index (VIDA score) was calculated in all patients. Investigations done included complete blood count, peripheral blood smear, random blood glucose levels and thyroid profile.

Results

Out of 112 children, 56.25% are girls as compared to 43.75% boys. The mean age of presentation was 9±3.92 years and the mean age of onset was 8.11±3.79 years. 48% of children presented to us within six months of onset of lesions. 8% had a positive family history of vitiligo. Onset of the disease is earlier in these patients as compared to those with negative family history but the results were significant statistically. The distribution of patients based on the type of vitiligo is shown in table (table 1, fig 1).

No association was observed between the type of vitiligo and age of onset. Vitiligo vulgaris was the type most commonly seen in patients with positive family history, but the results were not statistically significant. Distribution of cases based on site is depicted in the form of bar diagram. (graph 1, figure 2)

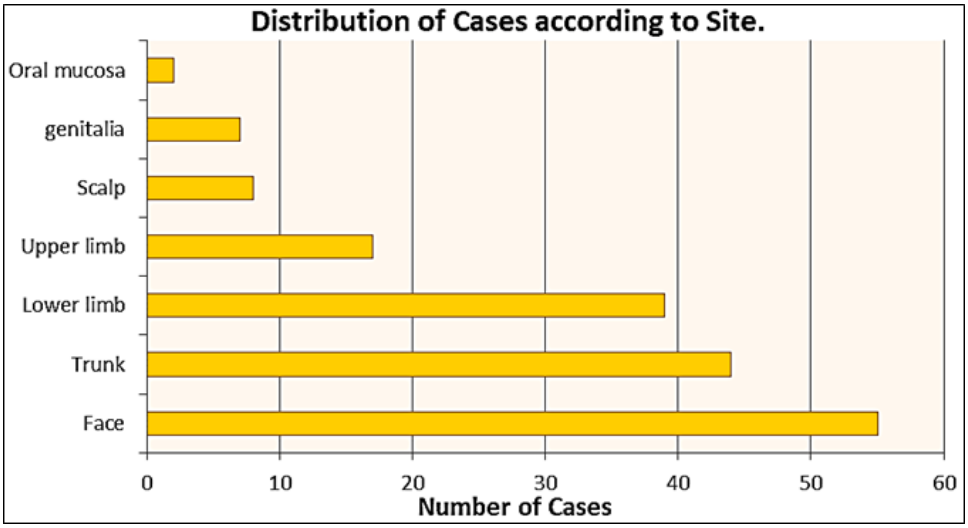
Leukotrichia was present in 23.22% of patients. It was most commonly seen in vitiligo vulgaris and in patients with negative family history but none of these associations were statistically significant. Koebner's phenomenon was seen in 2.67% of our patients. The value was low, considering the fact that children are more prone to trauma owing to their playfulness. Koebner's phenomenon was seen more commonly in non-segmental vitiligo, but the results were not statistically significant.

49.10% of patients showed some type of repigmentation at the time of presentation. It could be due to previous treatment taken before coming to a tertiary centre. The most common type of repigmentation seen was marginal type (47.27%). VIDA score was elicited from each patient and the results depicted in graph: (graph 2, figure 3)

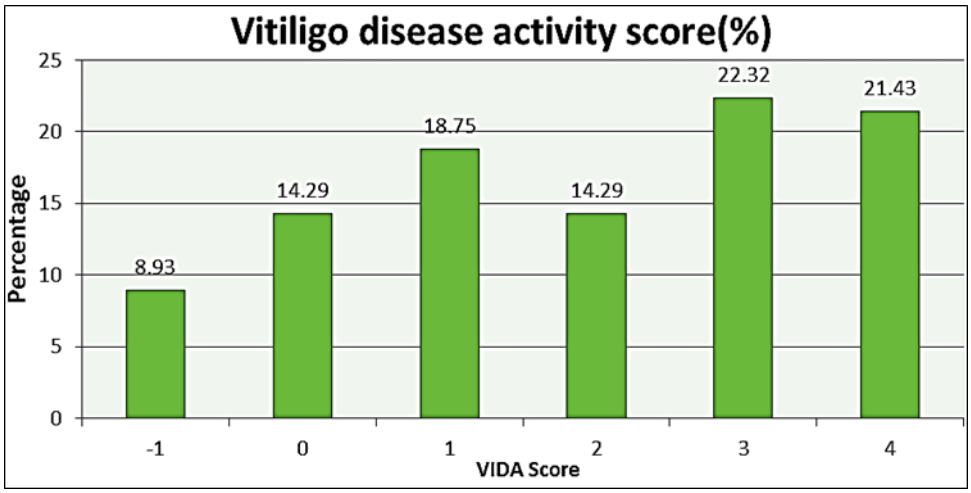
12.5% of patients had trichrome. Halo nevus was seen in 3.5% of our patients. Both of these cutaneous findings were more commonly associated with vitiligo vulgaris but the association was not statistically significant. Alopecia areata was observed in 1 patient. Thyroid dysfunction was reported in 2.6% of patients. We found significant association between segmental vitiligo and thyroid dysfunction (p value-0.042). However, thyroid immunoglobulins could not be assessed due to paucity of resources.

Table 1

Type of vitiligo	Subtype			Total	Percentage
Localized	Focal		26	44	39.3
	Unilateral/segmental		11		
	Mucosal	Oral	1		
		Genital	6		
Generalized	Vulgaris		65	68	60.7
	Acrofacial		1		
	Mixed		2		
Universalis				0	
Total				112	100



Graph 1



Graph 2

Discussion

In our study, girls (63; 56.25%) outnumbered boys (49; 43.75%) with girl boy ratio of 1.28:1. This result is comparable to all other studies on childhood vitiligo conducted in India [10, 11, 12, 13, 14]. However, incidence of childhood vitiligo has been found to be comparable in boys and girls in studies from outside India [15, 16, 17]. The female preponderance seen in India could be because of more severe cosmetic disfigurement seen in the darker races as compared to the Western countries, resulting in parents being more vigilant in case of a girl child and hence, seeking medical help earlier.

Age of children in our study ranged between 5-9 years, which is similar to most other studies [13, 19, 18]. The youngest child in our study was aged one year, with focal lesions. Kayal *et al.* reported a 6-month-old infant and Sheth *et al.* reported a baby who was born with vitiligo patches, which are probably the youngest cases reported from India [14, 12]. However, congenital cases have been reported extensively from other countries. Xiao Lin *et al.* [15] reported 3 children born with vitiligo and Zhi Hu *et al.* [16] reported 8 children born with vitiligo; 7 of whom had focal patches and 1 had acrofacial lesions. A delay of around 6 months to 1 year is usually seen before presentation which can be attributed to the lack of awareness, ignorance of the disease when the number of lesions is less and seeking of medical help only when the disease progresses [19]. Also, as the children grow up and start going to school/playing outside, they become more conscious of the depigmented patches, thus prompting parents to seek medical advice.

The incidence of positive family history reported in childhood vitiligo ranges from 3.3% by

Jaisankar *et al.* to 35% by Haldar *et al.* [18, 11] We reported 4 children with similar lesions in their siblings, 3 children with documented vitiligo in parents and 2 children with history of vitiligo in maternal grandfather and maternal aunt respectively. Children with vitiligo had 5 times more chance of having an immediate relative and 3 times more chance of having an extended relative with vitiligo according to a study by Pajvani *et al.* The same study also found that patients with a positive family history had an earlier onset of the disease [20]. We also observed that patients with a positive family history had an earlier age of onset than those without but the results were not statistically significant. More studies are required to confirm this association.

Vitiligo vulgaris was the most common type of vitiligo encountered in our study followed by focal vitiligo and segmental vitiligo whereas acrofacial and universal vitiligo were the least common types of vitiligo seen. This is consistent with the results of similar studies conducted in India. 9.82% of our patients had segmental vitiligo. Incidence of segmental vitiligo in various studies ranges from 3% by Sheth *et al.* to 21.1% by Jaisankar *et al.* [12, 18] Children with segmental vitiligo have an earlier age of onset as compared to NSV as reported by Mazereeuw-Hautier *et al.* but the association was not statistically significant [21]. We found no such association in our study.

Vitiligo vulgaris was the clinical type most commonly seen in children with positive family history but the association was not clinically significant. Positive association between vitiligo vulgaris and positive family history has been documented by Pajvani *et al.* The same study also demonstrated a trend towards focal and segmental vitiligo in children with negative family history of vitiligo or other endocrine/autoimmune disease [20].

The most common sites of involvement in our study included face, trunk and lower limbs. This was similar to all other relevant studies where the most common site of involvement was the head and neck area followed by lower limbs. The reason for low incidence of lesions in the upper limbs which are exposed to trauma just like the lower limbs, is unclear. We separately documented scalp lesions and 8 patients (7.14%) presented with vitiliginous patches on the scalp. Sheth *et al.* reported 25% of children with scalp lesions [12].

23.22% of children had leukotrichia. Incidence of leukotrichia in various studies ranges from 12.3% to 32.5% [19, 13]. No statistically significant association was observed between leukotrichia and positive family history and between leukotrichia and type of vitiligo.

The incidence of Koebner's phenomenon reported by various studies is 24.3% by Agarwal *et al.*, 21% by Sheth *et al.* and 36.7% by Kayal *et al.* [12, 13, 14] These values are quite high as compared to our study (2.67%). Low value has also been reported by Handa *et al.* (11.3%)

[19]. The exact cause for these is unknown but the low values seem to be erroneous as children are more susceptible to trauma due to their increased playfulness. Koebner's phenomenon is more commonly associated with NSV than SV [21]. We could not affirm any such association in our study.

49.10% of children in our study showed some form of repigmentation at the time of presentation, the most common type of repigmentation being marginal (47.27%) followed by mixed (36.36%) and perifollicular (16.36%). No such data on repigmentation has been reported from any other study. The presence of repigmentation could be due to the fact that this being a tertiary centre, most children come to us after having received some form of treatment elsewhere resulting in initiation of resolution. Only two previous studies have documented VIDA in their patients and both of them reported comparable results with majority of the children having a score of +3 or +4 and least number of children with scores 0 to-1. The same observations were made in our study as well [12, 14]. VIDA score can be a useful tool for assessing disease activity in patients who present for the first time.

Mazereeuw-Hautier *et al.* found that 8.99% of NSV children had trichrome whereas none of the children with SV had it [21]. 11 of our children with trichrome had NSV whereas 3 had SV, but the association between NSV and trichrome was not significant statistically. Another common cutaneous association was halo nevus seen in 4(3.5%) of our children. Incidence of halo nevus was reported as 3% by Sheth *et al.* and 4.4% by Handa *et al.* [12, 19] Brandon *et al.* observed that children with vitiligo and halo nevus were more commonly male, presented at a later average age than children with vitiligo alone. Halo nevus is also more common in generalized vitiligo than segmental or focal vitiligo. There is a trend towards lesser body surface area involvement and more repigmentation in patients with halo nevus [23]. We could not affirm any of these associations which could be because of smaller sample size of our study. We observed alopecia areata in 1 child. It was reported in one child by Sheth *et al.*, [12] 2 children by Haldar *et al.*, [11] 2 children by Handa *et al.* [19] and in 3.4% children by Agarwal *et al.* [13] No other cutaneous association was observed in any of our patients.

Hypothyroidism was reported in 3 (2.6%) children. Sheth *et al.* reported hypothyroidism in one child [12]. Thyroid abnormalities were reported in 1 child by Handa *et al.* and in 9% of children by Agarwal *et al.*, however these studies do not specify the type of thyroid abnormality observed [19, 13].

Lacovelli *et al.* studied 121 paediatric patients with vitiligo and found that 16% of NSV patients had altered thyroid parameters compared to 0% of SV patients. Thyroid abnormalities were more common in females and no relation was seen between extent of

lesions and thyroid abnormality. Hypothyroidism was the more common association of childhood vitiligo in comparison to hyperthyroidism in the ratio of 6:1 [8].

We observed that two of our cases with hypothyroidism had SV, while 1 had NSV. This is in contrast to the aforementioned study. This could be attributed to the fact that our study had a smaller sample size. No significant association of thyroid dysfunction was seen with the gender, age of onset and family history.

In total we found autoimmune associations in 4 (3.5%) children. Incidence of autoimmune associations in various studies is 1.3% by Handa *et al.*, 0% by Jaisankar *et al.* and 17% by Sheth *et al.* [12, 18, 19] Sheth *et al.* found atopic dermatitis to be the most common cutaneous condition associated with vitiligo seen in 13 patients.[12] More detailed and large-scale studies are required to explore and understand the pathogenesis of all the autoimmune associations of childhood vitiligo.

Conclusion

Female preponderance is seen in childhood vitiligo in India, which can be attributed to the increased contrast between patches and normal skin in darker races as well as to the significant cosmetic concern in Indian parents regarding the girl child. As children start going to school and interacting with other children, they become more conscious of their appearances and in such a scenario lesions on exposed parts of the body such as face, hands and feet can be very detrimental to their self-confidence. Unfortunately, these are the most susceptible body parts in children due to Koebner's phenomenon. So, it is very important to counsel the parents regarding avoidance of minor or major physical trauma in children as much as possible as well as curbing of habits like finger biting or lip biting in their wards.

Fortunately, the rates of repigmentation are high in childhood vitiligo which goes on to predict the excellent response to treatment as seen in various previous studies. Hence, treatment should not be aimed only at treating the skin lesions, but it should also aim to alleviate the psychological stress on the child as well as the guardians so as to ensure their co-operation and compliance.

We found association of SV with thyroid dysfunction which was in contrast to previous studies which reported association between NSV and thyroid dysfunction. Hence, irrespective of the type of vitiligo it is mandatory to be vigilant about other autoimmune conditions that can be associated and particularly thyroid dysfunction in these children. In conclusion, more studies are required to explore the associated autoimmune conditions and treatment options

available for vitiligo so as to reduce the morbidity of an otherwise benign disease.

References

1. Ortonne JP, Passeron T. Vitiligo and other disorders of hypopigmentation. In: Bolognia JL, Jorizzo JL, Schaffer JV, editors. Dermatology. 3rd edition. Edinburgh: Elsevier, 2012, 1023-30.
2. Howitz J, Brodthagen H, Schwartz M, Thomsen K. Prevalence of vitiligo. Epidemiological survey on the Isle of Bornholm, Denmark. Arch Dermatol. 1977 Jan;113(1):47-52.
3. Krüger C, Schallreuter KU. A review of the worldwide prevalence of vitiligo in children/adolescents and adults. Int J Dermatol. 2012 Oct;51(10):1206-12.
4. Mehta NR, Shah KC, Theodore C, Vyas VP, Patel AB. Epidemiological study of vitiligo in Surat area, South Gujarat. Indian J Med Res. 1973 Jan;61(1):145-54.
5. Boisseau-Garsaud AM, Garsaud P, Calès-Quist D, Hélénon R, Quénéhervé C, Claire RC. Epidemiology of vitiligo in the French West Indies (Isle of Martinique). Int J Dermatol. 2000 Jan;39(1):18-20.
6. Silverberg NB. Pediatric vitiligo. Pediatr Clin North Am. 2014 Apr;61(2):347-66.
7. Palit A, Inamadar AC. Childhood vitiligo. Indian J Dermatol Venereol Leprol. 2012 Jan;78(1):30.
8. Lacovelli P, Sinagra JLM, Vidolin AP, Marenda S, Capitanio B, Leone G, *et al*. Relevance of thyroiditis and of other autoimmune diseases in children with vitiligo. Gupta M. Childhood vitiligo: A clinicoepidemiological study. Indian J Paediatr Dermatol. 2018 Jul;19(3):212.
9. Handa S, Kaur I. Vitiligo: clinical findings in 1436 patients. J Dermatol., 1999.
10. Halder RM, Grimes PE, Cowan CA, Enterline JA, Chakrabarti SG, John A, *et al*. Childhood vitiligo. J Am Acad. Dermatol. 1987 May;16(5):948-54. Oct;26(10):653-7.
11. Sheth P, Sacchidanand S, Asha G. Clinico-epidemiological profile of childhood vitiligo. Indian J Paediatr Dermatol. 2015;16(1):23.
12. Agarwal S, Gupta S, Ojha A, Sinha R. Childhood vitiligo: clinicoepidemiologic profile of 268 children from the Kumaun region of Uttarakhand, India. Pediatr Dermatol. 2013 Jun;30(3):348-53.
13. Kayal A, Gupta LK, Khare AK, Mehta S, Mittal A, Kuldeep CM. Pattern of Childhood Onset Vitiligo at a Tertiary Care Centre in South-West Rajasthan. Indian J Dermatol.

2015 Oct;60(5):520.

14. Lin X, Tang LY, Fu WW, Kang KF. Childhood vitiligo in China: clinical profiles and immunological findings in 620 cases. Am J Clin Dermatol. 2011 Aug;12(4):277-81.
15. Hu Z, Liu JB, Ma SS, Yang S, Zhang XJ. Profile of childhood vitiligo in China: an analysis of 541 patients. Pediatr Dermatol. 2006 Apr;23(2):114-6.
16. Cho S, Kang HC, Hahm JH. Characteristics of vitiligo in Korean children. Pediatr Dermatol. 2000 Jun;17(3):189-93.
17. Jaisankar TJ, Baruah MC, Garg BR. Vitiligo in children. Int J Dermatol. 1992 Sep;31(9):621-3.
18. Handa S, Dogra S. Epidemiology of childhood vitiligo: a study of 625 patients from north India. Pediatr Dermatol. 2003 Jun;20(3):207-10.
19. Pajvani U, Ahmad N, Wiley A, Levy RM, Kundu R, Mancini AJ, *et al.* The relationship between family medical history and childhood vitiligo. J Am Acad. Dermatol. 2006 Aug;55(2):238-44.
20. Mazereeuw-Hautier J, Bezio S, Mahe E, Bodemer C, Eschard C, Viseux V, *et al.* Segmental and non-segmental childhood vitiligo has distinct clinical characteristics: a prospective observational study. J Am Acad. Dermatol. 2010 Jun;62(6):945-9.
21. Prcic S, Djuran V, Mikov A, Mikov I. Vitiligo in Children. Pediatr Dermatol. 2007 Nov;24(6):666-666.
22. Cohen BE, Mu EW, Orlow SJ. Comparison of Childhood Vitiligo Presenting with or without Associated Halo Nevi. Pediatr. Dermatol. 2016 Feb;33(1):44-8.