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Original Research Article

CLINICOEPIDEMIOLOGICAL CHARACTERISTICS OF CHILDHOOD VITILIGO: A ONE-YEAR OBSERVATIONAL STUDY

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ABSTRACT

Background: Vitiligo is a chronic skin disorder marked by depigmented patches due to melanocyte loss. Childhood vitiligo, which manifests before 18 years, poses unique diagnostic, therapeutic, and psychosocial challenges. **Objective:** To investigate the clinicoepidemiological characteristics of childhood vitiligo in a cohort of pediatric patients. **Methods:** This prospective, observational study included 100 children under 18 years diagnosed with vitiligo over one year. Data on age, gender, subtype, lesion distribution, family history, autoimmune comorbidities, and clinical features such as Koebner's phenomenon were collected. Statistical analysis assessed associations among clinical parameters. **Results:** Vitiligo vulgaris was the most common subtype (45%), followed by focal (28%), segmental (14%), and acrofacial vitiligo (9%). Lesions predominantly involved the lower limbs (40%) and face (32%). Family history was present in 18%, associated with earlier onset (mean: 5.2 years). Autoimmune comorbidities, particularly hypothyroidism (4%), were identified in 10% of patients. Koebner's phenomenon occurred in 9%. Segmental vitiligo exhibited a more stable disease course, while nonsegmental forms were more progressive.**Conclusion:** Childhood vitiligo shows distinct clinical patterns, with nonsegmental subtypes predominating and significant psychosocial implications due to facial and limb involvement. Family history and autoimmune comorbidities are key factors influencing onset and progression. Comprehensive care, including early diagnosis, management of associated disorders, and psychosocial support, is essential to optimize outcomes.

Keywords: Vitiligo, childhood vitiligo, autoimmune comorbidities, vitiligo vulgaris, Koebner phenomenon, psychosocial impact.

INTRODUCTION

Vitiligo is a common chronic skin disorder characterized by the loss of melanocytes, leading to depigmented patches on the skin. While it affects individuals of all ages, early-onset vitiligo, particularly in children, has garnered increasing attention due to its distinct clinical, epidemiological, and psychosocial characteristics. Childhood vitiligo, typically defined as vitiligo manifesting before the age of 18, accounts for a significant proportion of cases and poses unique diagnostic and therapeutic challenges **(1).**

The clinical presentation of childhood vitiligo often mirrors that seen in adults. However, studies suggest that it may have a different disease trajectory, with variances in subtype prevalence, disease progression, and response to treatment. The psychosocial impact on children, who are at a critical stage of developing self-esteem and social identity, can be profound,

often leading to emotional distress, anxiety, and depression **(2)**. Given the early onset of the disorder, children with vitiligo may also face greater social stigma, which can significantly affect their quality of life. Therefore, understanding the distinct characteristics of childhood vitiligo is essential for timely diagnosis, effective treatment, and adequate psychosocial support **(3).**

The exact etiology of vitiligo remains elusive, but an autoimmune basis is widely accepted. It is postulated that genetic predisposition, coupled with environmental triggers, leads to the destruction of melanocytes in susceptible individuals **(4).** In childhood vitiligo, family history is considered a key risk factor, and studies indicate that children with a positive family history of vitiligo are more likely to experience an earlier onset and a more extensive disease course **(5).** Furthermore, autoimmune comorbidities, such as thyroid disorders, are more frequently observed in children with nonsegmental vitiligo, suggesting a possible link between vitiligo and systemic autoimmunity **(6).**

Epidemiologically, childhood vitiligo does not appear to show a strong gender predilection, although some studies report a slight female predominance **(7).** The onset of the disease in children typically occurs between the ages of 4 and 8, although cases as early as infancy have been documented **(8).** Clinically, the most common subtype in children is vitiligo vulgaris, followed by focal, segmental, and acrofacial forms **(9).** The distribution of lesions is often symmetric, with the lower limbs being a common site of involvement. Koebner's phenomenon, in which new lesions develop following trauma or pressure, is also frequently reported in pediatric cases, emphasizing the importance of minimizing skin injury in affected children **(10).**

Despite the growing body of literature on childhood vitiligo, there remains a need for region-specific data to better understand the clinicoepidemiological trends in different populations. This study aims to address this gap by examining the clinical and epidemiological characteristics of childhood vitiligo in a cohort of patients aged under 18 years over the course of one year. By identifying key clinical patterns and associations, this research seeks to contribute to improved disease management and patient outcomes, particularly for pediatric populations who are uniquely vulnerable to the physical and psychosocial impacts of vitiligo .

MATERIALS AND METHODS

This study was a prospective, observational analysis conducted over a period of one year, aimed at investigating the clinicoepidemiological characteristics of childhood vitiligo. The study was carried out in the dermatology outpatient department of a tertiary care hospital. Fifty pediatric patients under the age of 18 years, diagnosed with vitiligo, were enrolled after obtaining informed consent from their parents or guardians. Ethical approval for the study was obtained from the institutional ethics committee prior to the commencement of data collection.

Inclusion and Exclusion Criteria

Children aged 0–18 years with a clinical diagnosis of vitiligo were included in the study. The diagnosis of vitiligo was based on the clinical presentation of depigmented macules and patches, with or without the use of Wood's lamp examination to confirm the diagnosis. Patients with other causes of hypopigmentation, such as pityriasis alba, tinea versicolor, or post-inflammatory hypopigmentation, were excluded from the study.

Data Collection

A detailed history was taken from each patient or their guardians, covering the following aspects:

- **Age and sex of the patient**
- **Age of onset** of vitiligo
- **Duration of the disease** at the time of the study
- **Family history** of vitiligo and other autoimmune diseases
- **Presence of Koebner's phenomenon**, which was defined as the appearance of new vitiligo lesions in areas of trauma
- **History of associated autoimmune or endocrine diseases**, particularly thyroid disorders

The patients were subjected to a complete clinical examination, and the distribution and type of vitiligo were recorded. The clinical subtypes of vitiligo were classified as follows:

- **Vitiligo vulgaris** (generalized vitiligo)
- **Focal vitiligo** (localized to one area)
- **Segmental vitiligo** (unilateral distribution, often following a dermatomal pattern)
- **Acrofacial vitiligo** (involving the distal parts of the limbs and face)

The body sites affected by vitiligo were noted, with special attention to common areas such as the face, trunk, upper and lower limbs. The presence of **leukotrichia** (depigmented hair), Koebner phenomenon, and other associated features like **halo nevus** were also documented.

Statistical Analysis

The data was analyzed using descriptive statistics. Continuous variables such as age and duration of disease were expressed as means with standard deviations, while categorical variables such as gender, family history, and the clinical subtype of vitiligo were presented as frequencies and percentages. Statistical significance for the association between family history and age of onset, as well as other clinical parameters, was assessed using chi-square tests and t-tests where appropriate. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The study sample included 100 pediatric patients with a diagnosis of vitiligo, with a slight female predominance (55 females and 45 males). The mean age of participants was 9.3 years, with an age range spanning from 10 months to 17 years, highlighting a wide demographic. On average, these children had been experiencing symptoms of vitiligo for 2.5 years, with disease durations ranging from as brief as 3 months to as long as 12 years. The average age of vitiligo onset was 6.2 years.

A notable 18% of the participants had a family history of vitiligo, suggesting a possible genetic predisposition in some cases. Additionally, 10% of the patients had coexisting autoimmune conditions, reflecting the known association between vitiligo and autoimmune disorders. Of these, hypothyroidism was the most common, affecting four patients. Two children had alopecia areata, and another four had other autoimmune diseases such as type 1 diabetes and psoriasis. These findings emphasize the relevance of screening for autoimmune comorbidities in pediatric vitiligo patients, given the relatively high prevalence of such conditions within this group. This comprehensive demographic and clinical data provides a valuable basis for understanding vitiligo's progression and associated health issues in a pediatric population.

Table 1: Demographic and Clinical Characteristics of Pediatric Vitiligo Patients (n=100)

Parameter	Value
Total Sample Size	100
Gender	
- Females	55
- Males	45
Mean Age (years)	9.3 ± 3.1
Age Range (years)	10 months to 17 years
Mean Disease Duration (years)	2.5
Duration Range (years)	3 months to 12 years
Mean Age of Onset (years)	6.2
Family History of Vitiligo	18 (18%)
Autoimmune Comorbidities	10 (10%)
- Hypothyroidism	4
- Alopecia Areata	2
- Other Autoimmune Diseases	4 (e.g., type 1 diabetes, psoriasis)

Clinical Subtypes: The most frequently observed clinical subtype was vitiligo vulgaris, which accounted for 45% of the cases (n = 45). This was followed by focal vitiligo, seen in 28% of the patients (n = 28), segmental vitiligo in 14% (n = 14), and acrofacial vitiligo in 9% (n = 9). Additionally, 4% of the patients (n = 4) had an unclassified or mixed pattern of vitiligo, where multiple subtypes coexisted.

Site of Lesions: The lower limbs were the most commonly affected region, involved in 40% of the patients (n = 40). This was followed by the face,

which was affected in 32% (n = 32), and the upper limbs in 25% (n = 25). The scalp and mucosal areas were affected in 14% (n = 14). Many patients had multiple areas of involvement, with some exhibiting lesions in both acral and facial regions.

Table 2: Clinical Subtypes and Site Distribution of Vitiligo Lesions (n=100)

Clinical Subtype	Number of Patients	Percentage
Vitiligo Vulgaris	45	45%
Focal Vitiligo	28	28%
Segmental Vitiligo	14	14%
Acrofacial Vitiligo	9	9%
Unclassified/Mixed Pattern	4	4%
Site of Lesions	**Number of Patients**	**Percentage**
Lower Limbs	40	40%
Face	32	32%
Upper Limbs	25	25%
Scalp and Mucosal Areas	14	14%
Additional Features	**Number of Patients**	**Percentage**
Leukotrichia	7	7%
Koebner Phenomenon	9	9%
Halo Nevus	3	3%

Additional Findings:

- **Leukotrichia** was noted in 7% of the patients (n = 7), where depigmented hair was observed within the vitiligo patches.
- **Koebner phenomenon**, characterized by the development of new lesions following skin trauma, was present in 9% of patients (n = 9).
- **Halo nevus**, a pigmented mole surrounded by a depigmented ring, was documented in 3% of the patients (n = 3).

Family History and Comorbidities: A positive family history of vitiligo was reported in 18% of the patients (n = 18). Among these patients, the average age of onset was earlier, at 5.2 years, compared to 6.5 years in patients without a family history. Comorbid autoimmune disorders were seen in 10% of the patients (n = 10). Hypothyroidism was diagnosed in 4 patients, and 2 patients had a history of alopecia areata. Other autoimmune conditions, including type 1 diabetes and psoriasis, were noted in 4 patients.

Distribution by Age and Sex: There was no significant gender difference in the distribution of vitiligo subtypes, although females were slightly more likely to present with vitiligo vulgaris (47% of female patients), while males had a higher prevalence of segmental vitiligo (18% of male patients). The face and upper limbs were more commonly affected in females, whereas the lower limbs were the predominant site in males.

Duration and Disease Progression: The duration of vitiligo varied across the cohort. Approximately 35% of patients had the disease for less than 1 year, while 15% had a disease duration of more than 5 years. Patients with segmental vitiligo generally experienced a more rapid stabilization of the condition, with fewer reports of progression compared to those with nonsegmental subtypes, such as vitiligo vulgaris and focal vitiligo.

Thyroid Abnormalities: Thyroid function was assessed in all patients, and thyroid abnormalities were found in 10% (n = 10). Hypothyroidism was the most common abnormality, particularly in patients with nonsegmental vitiligo. None of the patients with segmental vitiligo had thyroid dysfunction.

DISCUSSION

This study provides valuable insights into the clinicoepidemiological characteristics of childhood vitiligo. Our findings indicate that vitiligo vulgaris is the most common clinical subtype, consistent with previous studies that highlight this form as the predominant variant in both pediatric and adult populations **(11)**. The relatively higher frequency of vitiligo vulgaris (45%) suggests that nonsegmental forms of vitiligo are more common in children, which may have implications for disease progression and management. Vitiligo vulgaris is known for its potential to spread over time, making early diagnosis and intervention crucial to limit the psychological and physical impact on pediatric patients **(12).**

The observation that the lower limbs are the most frequently involved site (40%) aligns with existing literature, which often reports that acral areas, including the hands, feet, and legs, are commonly affected by vitiligo in both children and adults **(13).** However, the significant involvement of the face (32%) and upper limbs (25%) highlights the potential for greater psychosocial stress in pediatric patients, as facial involvement can lead to visible disfigurement, affecting social interactions and self-esteem, particularly during critical stages of childhood development **(14).**

The presence of Koebner's phenomenon in 9% of patients further underscores the need for protective measures to prevent trauma, as skin injury can exacerbate the development of new lesions **(15).** Although the frequency of Koebner's phenomenon in our study is lower than in some previous studies, it remains an important consideration in the management of childhood vitiligo **(16).** Educating patients and their caregivers about avoiding physical trauma can be a key part of preventing disease progression in children.

The role of family history in the onset and progression of vitiligo was evident in this study, with 18% of patients reporting a family history of the condition. Consistent with earlier research, children with a positive family history had an earlier onset of the disease, with an average age of onset of 5.2 years compared to 6.5 years in those without a family history **(17).** This suggests a genetic predisposition in the development of childhood vitiligo, emphasizing the importance of family screening and early intervention in high-risk groups **(18).**

Autoimmune comorbidities, particularly thyroid disorders, were present in 10% of the patients, which is in line with previous studies that have identified a strong association between vitiligo and autoimmune diseases **(19).** Hypothyroidism was the most common comorbidity in our cohort, seen primarily in patients with nonsegmental vitiligo. The presence of these autoimmune conditions highlights the need for routine screening for thyroid function and other autoimmune markers in children diagnosed with vitiligo **(20).** Early detection of associated autoimmune disorders can lead to more comprehensive care, improving long-term outcomes for pediatric patients.

Interestingly, segmental vitiligo, observed in 14% of the patients, was associated with a more stable disease course, which has also been reported in other studies **(21).** Unlike nonsegmental vitiligo, segmental vitiligo typically follows a unilateral distribution and often stabilizes after initial progression, making it a distinct clinical entity with better prognostic implications in some cases **(22).**

This study has several limitations. The sample size is relatively small, which may limit the generalizability of the findings to broader pediatric populations. Additionally, as a single-center study conducted within a specific geographic region, the results may not accurately represent variations in childhood vitiligo across diverse populations or healthcare settings. The study's observational nature restricts the ability to infer causation, especially regarding associations with autoimmune comorbidities. Future research involving larger, multicenter cohorts with longer follow-up periods would provide more comprehensive insights and allow for validation of the trends observed in this study.

CONCLUSION

This study sheds light on the clinicoepidemiological characteristics of childhood vitiligo, highlighting that vitiligo vulgaris is the most common subtype, with a significant association with family history and autoimmune disorders, especially thyroid dysfunction. The involvement of the lower limbs and face suggests that vitiligo in children can lead to profound psychosocial challenges, emphasizing the need for early diagnosis and targeted management. Family history and the presence of comorbidities could serve as important predictors of disease onset and progression. Early intervention and comprehensive patient support are essential to improve quality of life and outcomes for children with vitiligo.

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