Clinicoepidemiological Features of Childhood and Adult Vitiligo - A Cross-Sectional Observational Study

A. Archana Devi¹, P. V. Krishnam Raju², B. Gayatri Devi³, K. V. T. Gopal⁴, T. Narayana Rao⁵

¹, ², ³, ⁴, ⁵ Department of DVL, Maharajah’s Institute of Medical Sciences, Nellimarla, Vizianagram, Andhra Pradesh, India.

ABSTRACT

BACKGROUND
Vitiligo is an acquired primary, usually progressive, melanocytopenia of unknown aetiology clinically manifested by circumscribed achromic macules and histologically by degeneration and disappearance of melanocytes in involved skin. Childhood vitiligo deserves special attention as it has unique epidemiological features. We wanted to determine, compare and analyze the clinical and epidemiological features and autoimmune disease associations in childhood vitiligo and adult vitiligo.

METHODS
It was a prospective cross-sectional observational hospital-based clinical study conducted in a suburban medical college hospital over 20 months which involved 120 patients with vitiligo who were assessed using detailed history and clinical examination for demographic and clinical data. Relevant history and family history were noted. Investigations including complete hemogram, serum biochemistry profile, thyroid profile and fasting plasma glucose examination were performed in all patients. Data were collected, tabulated, and all statistical analysis was done by using SPSS trial version 25 and in MS Excel 2007.

RESULTS
The majority of patients were in the age group of 16-30 years. Among 60 patients, female preponderance was noted in the study with a percentage of 53.3% followed by 46% males in the childhood group. The prevalence of segmental vitiligo was more in children (30%) than in adults (5%) which was statistically significant (P=0.000). In adults, there was a statistically significant higher prevalence (P=0.000) of mucosal vitiligo (30%) than in children (3.35%). On performing statistical analysis, thyroid dysfunction (P=0.00) and diabetes mellitus (P=0.01) were found to be significantly more prevalent in adults than in children.

CONCLUSIONS
This study provides clinical evidence that vitiligo at different ages has different characteristics mainly regarding an increased incidence of segmental vitiligo and a more common positive family history among children than adults. A higher prevalence of thyroid dysfunction and diabetes mellitus in adult vitiligo patients compared to children warrants prompt treatment in all detected cases to prevent long-term morbidity and complications.

KEY WORDS
Childhood vitiligo, Adult vitiligo, Clinicoepidemiological Features, Associations
Vitiligo is an acquired pigmentary disorder characterized by progressive depigmentation of the skin occurring irrespective of age, sex and race.\(^1\,2\,3\,4\) It has a profound effect on the quality of life of the affected patients and it's a cosmetic concern. Many of them feel depressed and stigmatized by the condition and previous studies have shown that the psychosocial impact of vitiligo is independent of the extent of depigmentation. Childhood vitiligo deserves special attention as in up to 50% of cases, the disease onset is before the age of 20 years and it has unique clinico-epidemiological features.\(^5\) Vitiligo occurs worldwide with an overall prevalence of about 1 percent. Its incidence ranges from 0.1 to 8.8 percent in different studies \(^6\,12\,13\) from all over India. In various studies, the prevalence of childhood vitiligo has been reported to be 26 percent in South India \(^12\) and 23.3 percent in North India.\(^13\)

Childhood vitiligo is often encountered in dermatological practice and children with vitiligo suffer from anxiety and depression because of their unusual appearance. It differs significantly from adult disease in many aspects including female preponderance, more prevalence of segmental vitiligo and rare association with autoimmune and endocrine disorders.\(^14\) Though many clinico-epidemiological studies on vitiligo have been performed in India, few have compared the features of adult vitiligo and childhood vitiligo in the same target population.

**Objectives**

The present study was conducted to determine and evaluate the clinical, epidemiological features and the prevalence of common autoimmune and endocrine disorders in adult vitiligo and compare them with the features of childhood vitiligo.

**METHODS**

A total of one hundred and twenty (120) patients with clinically diagnosed vitiligo were chosen for a prospective cross-sectional observational study and presented to the Department of Dermatology of our suburban medical college hospital. The study was carried out for 20 months from December 2017 to July 2019 after being approved by the Institutional Ethics Committee. The sample size was calculated by the difference of means formula to achieve a power of study of 80% and precision alpha of 0.05 with a 95% confidence interval (CI), the estimated sample size was determined to be 120.

The sampling method used was simple random sampling. After obtaining informed assent, 60 consecutive children affected with vitiligo of age < 18 years presenting to the OPD were included in the childhood group and 60 consecutive adults affected with vitiligo of age > 18 years were included in the adult group. A detailed history of onset, duration, progression and associated symptoms were obtained from the patients and their parents. Relevant history, family history and the presence of commonly associated diseases – anaemia, diabetes mellitus and thyroid dysfunction were noted. General and systemic examination was done. A thorough dermatological examination was carried out. Morphology, distribution, progression and various special features of vitiligo were recorded. Oral and genital mucosas were examined.

All the vitiligo patients were classified into five groups based on the distribution and extent of depigmentation: focal, segmental, acrofacial, vitiligo vulgaris (generalized) and mucosal. The presence of cutaneous associations of vitiligo including halo nevi, poikilosis, premature greying of hair, leukotrichia, trichrome vitiligo and koebners phenomenon was noted. All routine basic investigations like complete hemogram and serum biochemistry profile were carried out in all patients.

All patients were also subjected to thyroid profile tests and fasting plasma glucose examinations (using the glucose oxidase method). A diagnosis of hypothyroidism was made when thyroid function tests showed a raised TSH with or without low T3/ T4 levels. Hyperthyroidism was diagnosed when T3/ T4 levels were raised with associated lowered levels of TSH. A diagnosis of diabetes mellitus was made when fasting plasma glucose was more than 126 mg/dl. Data were collected, tabulated, and all statistical analyses were done by using SPSS trial version 25 and in MS Excel 2007. Quantitative variables were expressed as mean ± SD. Qualitative variables were expressed as frequency and percentage. The chi-square test was used for expressing the categorical data. Student independent sample t-test was used for comparison of means. All subjective analyses with P < 0.05 were considered statistically significant.

**RESULTS**

A total of 120 patients were included in the study. In the present study, out of 60 childhood vitiligo patients, 28 (46.67%) were males and 32 (53.33%) were females with a female to male ratio of 1.14: 1. Out of 60 patients with adult vitiligo, 33 (55 %) were males and 27 (45 %) were females with a male to female ratio of 1.22: 1. The mean age of patients in the childhood group and adult groups was 9.8 yrs (SD - 1.2 years) and 32.7 yrs (SD-1.9 years) respectively. In the present study, the duration of disease ranged from 1-5 years in 73 patients (60.83 %). Mean duration of the disease was 2.73 years. In the childhood group, the most number of patients (35) were between the ages of 0-10 years, whereas in the adult group most of the patients (33) were in the age range of 16-30 years.

A family history of vitiligo was present in 9 (15 %) patients with childhood vitiligo and 9 (15 %) patients with adult vitiligo. A family history of diabetes mellitus was present in 9 (15 %) patients with childhood vitiligo and 10 (16.66 %) patients with adult vitiligo. A family history of thyroid abnormalities was present in 3 (5 %) patients with childhood vitiligo.

In the present study, the most common clinical subtypes observed in the childhood group were vitiligo vulgaris seen at n=22 (36.67 %) followed by segmental vitiligo n= 18 (30 %), acral vitiligo n=13 (21.67 %), focal vitiligo n=5 (8.33 %), and mucosal vitiligo n=2 (3.35 %) (Figure 1 a & b). The most common clinical subtypes observed in adult vitiligo were...
vitiligo vulgaris n=22 (36.67 %) followed by mucosal n=18 (30 %), acral n= 11 (18.33 %), focal n= 6 (10 %), segmental vitiligo n= 3 (5 %) (Figure 2 a & b). There was a statistically significant higher prevalence of segmental vitiligo in children than in adults (P=0.000). There was a statistically significant higher prevalence of mucosal vitiligo in adults than in children (P= 0.000). (Table 1). In the present study, most of the patients had a percentage of body surface area involvement between 1-10 % seen in 55 (91.67 %) patients with childhood vitiligo and 42 (70 %) patients with adult vitiligo. In the present study, leukotrichia was seen in 21 (35 %) childhood vitiligo patients and 12 (20 %) adult vitiligo patients. The Koebners phenomenon was seen in 7 (11.67 %) patients with childhood vitiligo and 4 (6.67 %) adult vitiligo patients. Trichrome vitiligo was seen in 7 (11.67 %) patients with childhood vitiligo and 4 (6.67 %) adult vitiligo patients. Anaemia was seen in 9 (15 %) children and 18 (30 %) adult patients and thyroid abnormalities in 4 (6.66 %) children and 12 (20 %) patients with adult vitiligo. Diabetes mellitus was seen in 1 (1.67 %) children and 24 (42.24 %) adult patients with adult vitiligo. Anaemia was observed in 3 (14.28 %) patients with segmental vitiligo and 24 (24.24 %) patients with non-segmental vitiligo. Diabetes mellitus was seen in 1 (4.76 %) patient with segmental and 8 (8.08 %) patients with non-segmental vitiligo. Thyroid abnormalities were not seen in segmental vitiligo but were present in 15 (15.15 %) patients with non-segmental vitiligo. There was a statistically significant higher prevalence of anaemia, diabetes mellitus and thyroid abnormalities in non-segmental vitiligo than in segmental vitiligo.

A thorough analysis of many previous clinico epidemiological studies revealed that childhood vitiligo has many features which are prominently distinct from features of adult vitiligo. In view of the paucity of studies on clinical and epidemiological features of vitiligo in our region, the present study was taken up. This study focussed mainly on the salient features of vitiligo in childhood and its differences from features of adult vitiligo.

The most common pattern of vitiligo observed in childhood was vitiligo vulgaris seen in 22 (36.67 %) patients followed by segmental vitiligo in 18 (30 %), acral vitiligo in 13 (21.67 %), focal vitiligo in 5 (8.33 %) and mucosal vitiligo in 2 (3.35 %). In a study by Manali Jain et al,[7] the most common pattern observed in childhood vitiligo was vitiligo vulgaris in 17 (48.57 %) patients followed by focal vitiligo in 9 (25.71 %) patients and other less common patterns were segmental vitiligo in 4 (11.42 %) patients, mucosal vitiligo in 2 (5.71 %)

**DISCUSSION**

Vitiligo is a common acquired skin disorder characterized by localized or generalized depigmentation of the body and mucous membranes. Adults and children of both sexes are equally affected and almost half the patients present before the age of 20 years and nearly 70-80 % before the age of 30 years. Vitiligo is recognized to have a major impact on quality of life and previous studies have shown that psychosocial effects of vitiligo correlate poorly with the extent of depigmentation and clinical improvement following treatment.

In the present study, most of the patients had a percentage of body surface area involvement between 1-10 % seen in 55 (91.67 %) patients with childhood vitiligo and 42 (70 %) patients with adult vitiligo. In the present study, leukotrichia was seen in 21 (35 %) childhood vitiligo patients and 12 (20 %) adult vitiligo patients. The Koebners phenomenon was seen in 7 (11.67 %) patients with childhood vitiligo and 4 (6.67 %) adult vitiligo patients. Trichrome vitiligo was seen in 7 (11.67 %) patients with childhood vitiligo and 4 (6.67 %) adult vitiligo patients. Anaemia was seen in 9 (15 %) children and 18 (30 %) adult patients and thyroid abnormalities in 4 (6.66 %) children and 12 (20 %) patients with adult vitiligo. Diabetes mellitus was seen in 1 (1.67 %) children and 24 (42.24 %) adult patients with adult vitiligo. Anaemia was observed in 3 (14.28 %) patients with segmental vitiligo and 24 (24.24 %) patients with non-segmental vitiligo. Diabetes mellitus was seen in 1 (4.76 %) patient with segmental and 8 (8.08 %) patients with non-segmental vitiligo. Thyroid abnormalities were not seen in segmental vitiligo but were present in 15 (15.15 %) patients with non-segmental vitiligo. There was a statistically significant higher prevalence of anaemia, diabetes mellitus and thyroid abnormalities in non-segmental vitiligo than in segmental vitiligo.

**Figure 1. Common Clinical Patterns in Childhood Vitiligo**

(a) Vitiligo Vulgaris

(b) Segmental Vitiligo

**Figure 2. Common Clinical Patterns in Adult Vitiligo**

(a) Acral Vitiligo

(b) Adult Mucosal Vitiligo

**Table 1. Patterns of Vitiligo**

<table>
<thead>
<tr>
<th>Pattern of Vitiligo</th>
<th>Childhood</th>
<th>Adult</th>
<th>Z-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitiligo Vulgaris</td>
<td>22 (36.67%)</td>
<td>22 (36.67%)</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Acral vitiligo</td>
<td>13 (21.67%)</td>
<td>11 (18.33%)</td>
<td>0.46</td>
<td>0.048</td>
</tr>
<tr>
<td>Mucosal Vitiligo</td>
<td>2 (3.55%)</td>
<td>10 (30%)</td>
<td>-4.20</td>
<td>0.000</td>
</tr>
<tr>
<td>Focal Vitiligo</td>
<td>5 (8.33%)</td>
<td>6 (10%)</td>
<td>-0.32</td>
<td>0.752</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2. Systemic Associations of Childhood and Adult Vitiligo**

<table>
<thead>
<tr>
<th>Systemic Associations</th>
<th>Childhood</th>
<th>Adult</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaemia</td>
<td>9 (15%)</td>
<td>18 (30%)</td>
<td>0.004</td>
</tr>
<tr>
<td>Thyroid Abnormalities</td>
<td>4 (6.66%)</td>
<td>11 (20%)</td>
<td>0.00</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>0 (0%)</td>
<td>9 (15%)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

| DISCUSSION |

Vitiligo is a common acquired skin disorder characterized by localized or generalized depigmentation of the body and mucous membranes. Adults and children of both sexes are equally affected and almost half the patients present before the age of 20 years and nearly 70-80 % before the age of 30 years. Vitiligo is recognized to have a major impact on quality of life and previous studies have shown that psychosocial effects of vitiligo correlate poorly with the extent of depigmentation and clinical improvement following treatment.

A thorough analysis of many previous clinico epidemiological studies revealed that childhood vitiligo has many features which are prominently distinct from features of adult vitiligo. In view of the paucity of studies on clinical and epidemiological features of vitiligo in our region, the present study was taken up. This study focussed mainly on the salient features of vitiligo in childhood and its differences from features of adult vitiligo.

The most common pattern of vitiligo observed in childhood was vitiligo vulgaris seen in 22 (36.67 %) patients followed by segmental vitiligo in 18 (30 %), acral vitiligo in 13 (21.67 %), focal vitiligo in 5 (8.33 %) and mucosal vitiligo in 2 (3.35 %). In a study by Manali Jain et al,[7] the most common pattern observed in childhood vitiligo was vitiligo vulgaris in 17 (48.57 %) patients followed by focal vitiligo in 9 (25.71 %) patients and other less common patterns were segmental vitiligo in 4 (11.42 %) patients, mucosal vitiligo in 2 (5.71 %)
patients and acrofacial vitiligo in 1 (2.85%) patient. Preeti Keyur Sheth et al.[9] have reported the most common pattern of vitiligo as vitiligo vulgaris (46%), followed by focal vitiligo (36%), mucosal vitiligo (8%), acrofacial vitiligo (7%) and segmental vitiligo (3%).

The pattern of vitiligo observed in adult patients in the present study was vitiligo vulgaris in 22 (36.67 %), followed by mucosal vitiligo in 18 (30 %), and acral vitiligo in 11 (18.33 %).

Menon was observed in 12 (34.28 %) and 21 (21 %) patients respectively, whereas leukotrichia was seen in 3 (8.5 %) and 25 %), focal vitiligo in 6 (10 %) and segmental vitiligo in 3 (5 %) cases respectively. In a previous study by Preethi Prakash et al.[9], vitiligo vulgaris was seen in 28 (63.63 %) patients, followed by focal vitiligo in 5 (11.36 %) patients, segmental vitiligo in 4 (9.09 %) patients and acrofacial vitiligo in 3 (6.8 %) patients. In the present study, the prevalence of segmental vitiligo was more in children (30 %) than in adults (5 %), which is statistically significant (P= 0.000). In adults, there was a statistically significant higher prevalence (P = 0.000) of mucosal vitiligo (30 %) than in children (3.35 %).

In the present study, the percentage of body surface area involved was between 1 and 10 % seen in 55 (91.67 %) patients with childhood vitiligo and 42 (70 %) patients with adult vitiligo. In an earlier descriptive study by Preethi Prakash et al.[9] most of the patients (52 %) had less than or equal to 5 % body surface area involvement. Agarwal S, et al.[10] have reported that 61 % of patients had a body surface area involvement of less than 2%; 27 % had a body surface area involvement of 2-5% and 12 % of patients had more than 5 % body surface involvement.

In our study, Koebner’s phenomenon was seen in 7 (11.67 %) patients with childhood vitiligo and 4 (6.67 %) adult vitiligo patients. Leukotrichia was seen in 21 (35 %) childhood vitiligo patients and 12 (2%) adult vitiligo patients. Trichrome vitiligo was seen in 7 (11.67 %) patients with childhood vitiligo and 4 (6.67 %) patients with adult vitiligo. In previous studies by Manali Jain et al.[7] and Preethi Keyur Sheth et al.[9] Koebner’s phenotype was seen in 25 % respectively. Pricci et al.[11] and Hann et al.[12] have observed a very high prevalence of poliosis, 55 % and 48 % respectively, in patients with segmental vitiligo though in the present study no patient had poliosis, halo nevus, premature greying of hair or alopecia areata.

In the present study, anaemia, diabetes mellitus and thyroid dysfunction were present in 9 (15 %), 0 (0 %) and 4 (6.66 %) children respectively whereas in the study by Preethi Prakash et al.[9] 16.67 % patients had thyroid dysfunction. In a previous laboratory study done by Lacovelli et al.,[8] 16 % of children with non-segmental vitiligo had thyroid dysfunction which was more common in females than in males. They observed that hypothyroidism was more common in children than hyperthyroidism. In the present study, anaemia, diabetes mellitus and thyroid dysfunction were seen in 18 (30 %), 9 (15 %) and 11 (18.33 %) patients of adult vitiligo. In comparison with Preethi Prakash et al.[9] thyroid dysfunction has been reported in 7 (15.9 %) patients, whereas KVT Gopal et al.[13] have reported hypothyroidism in 20 % of patients and Zettinig et al.[14] have reported autoimmune thyroiditis in 21 % of patients.

Diabetes mellitus was observed in 13.63 % and 16 % of patients by Preethi Prakash[9] and KVT Gopal et al.[13] respectively. Anaemia was reported in 20 % of patients by KVT Gopal et al.[13] Similar findings were reported earlier by Alkhateeb A, et al.[15] Huggins RH et al.[16] Schalleuter KU et al.[17] Narita T et al.[18] Dave S et al.[19] On performing statistical analysis, thyroid dysfunction and diabetes mellitus were found to be significantly more prevalent (P=0.00), (P=0.01) in adults than in children. On correlating the pattern of vitiligo with associated systemic abnormalities, it was observed that anaemia (P=0.004), thyroid dysfunction (P=0.00) and diabetes mellitus (P=0.01) were significantly more prevalent in non-segmental vitiligo than segmental vitiligo in both adult and children.

CONCLUSIONS

To conclude, the present study reveals that segmental vitiligo is significantly more prevalent in children and mucosal vitiligo is significantly more prevalent in adults. We also found that there was a significantly higher prevalence of thyroid dysfunction and diabetes mellitus in adult vitiligo patients compared to children. Our findings establish that it is very useful to screen all patients with non-segmental vitiligo for thyroid dysfunction and diabetes mellitus and prompt treatment in all detected cases will prevent long-term morbidity and complications.

Limitations of the Study

Larger studies enrolling more patients- both children and adults could be undertaken to further study the clinical and epidemiological features of vitiligo. Newer laboratory parameters could also be assessed to know the association of vitiligo with other autoimmune diseases such as Addison’s disease and pteriginous anaemia. Progress of disease and response to treatment could not be assessed as follow up visit was not included in the study protocol.

REFERENCES


