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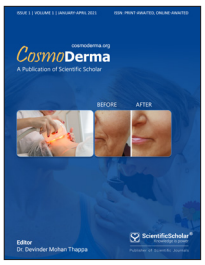

Original Article

Exploring the spectrum of vitiligo: Clinical and demographic perspectives – A cross-sectional study

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ABSTRACT

Objectives: Vitiligo is an acquired depigmentation skin disorder caused by the progressive loss of melanocytes and melanin, characterized by white macules on the skin. This study aimed to understand a specific population's demographic and clinical characteristic factors associated with vitiligo.

Materials and Methods: This cross-sectional study consists of 50 patients undergoing treatment for vitiligo at the RSV Clinic, Chennai, for a period of six months. Our study included comprehensive sociodemographic, clinical, and vitiligo profile examinations. Vitiligo disease activity score and vitiligo area scoring index were assessed in all patients, and their treatment approaches were noted.

Results: The results showed that vitiligo was most common in adolescents and young adults (66%), followed by children under 10 (18%) and adults over 50 (20%). There was a nearly equal gender distribution, with 52% females and 48% males. Education levels varied, and no specific association with vitiligo was found. The onset of symptoms ranged widely, with lips (28%) and face other than lips (24%) as common initial sites. Coexisting conditions included premature canities (10%) and psoriasis (6%). Treatment approaches varied, with 26% undergoing topical steroids and other therapies. Various triggers were identified, such as trauma (10%) and stress (6%). Clinical manifestations included leukotrichia (18%) and trichrome lesions (10%).

Conclusion: This study confirms vitiligo's prevalence in adolescents and young adults, emphasizing its link to autoimmune disorders. It also underscores complex triggering factors and diverse clinical manifestations among those with vitiligo, enhancing our understanding of its demographics and clinical characteristics in this population.

Keywords: Vitiligo, Risk factors, Autoimmune, Hypothyroidism

INTRODUCTION

Vitiligo is a widespread, acquired condition characterized by progressive skin depigmentation due to the depletion of melanocytes. Its etiology is multifaceted, with contributing factors including genetics, ethnicity, environmental influences, occupational exposures, metabolic issues, and autoimmune conditions.[1] Various theories involving mechanisms ranging from neural, microvascular, degenerative, and autoimmunity to the altered redox theory have been presented.[2] Despite its polygenic inheritance, all the reported multi-dimensional studies agree that the autoimmune destruction of melanocytes is the primary driver for vitiligo.[3,4] For precise management and monitoring of this intricate condition, scoring systems such as the vitiligo area scoring index (VASI),[5] vitiligo extent scale, vitiligo European task force, and vitiligo disease activity (VIDA) scores are employed. With a lower mortality rate, the impact of vitiligo

on psychosocial and quality of life is significantly higher, burdening those affected.[6]

MATERIALS AND METHODS

The present study was conducted at the outpatient department of dermatology, RSV skin and laser clinic located in Chennai, India, for six months starting from January 2023. Qualified dermatologists implemented this cross-sectional research study by clinically recruiting patients diagnosed with vitiligo.

Investigators randomly sampled and enrolled vitiligo patients with no exclusions based on age, sex, and city of residence or socioeconomic status to neutralize any biases in the study. The study excluded all the patients, who presented with depigmented patches due to infections, chemical injury, burns, and inflammatory dermatosis.

Before recruiting, patients were briefed about this study's goal. Those who expressed interest in participating received the informed consent form, and their signed approval was obtained. For the patients under 18 years, consent was taken from their parents. Our study was designed to follow the ethical considerations and the principles of the Declaration of Helsinki. A total of 50 subjects of different age groups and genders were recruited for this study, presenting with segmental vitiligo (SV) and non-SV (NSV) cases.

The authors conducted a detailed examination of each subject, recording their data. Sociodemographic characteristics such as age, gender, marital status, job, and educational status were collected for epidemiological evaluation. From a clinical standpoint, variables comprising age at onset (in years), duration of disease (in years), comorbidities, other dermatological conditions, and type of associated autoimmune disorders in patients and their families were recorded.

Clinical assessment for vitiligo diagnoses, such as family history, site of onset, vitiligo type, and vitiligo trigger factor, other clinical findings and treatment methods were recorded. The disease activity was assessed using VIDA, which is a six-point score and assesses the activity of vitiligo based on the presence of new lesions or expansion of existing lesions. The repigmentation for each body region was assessed using VASI, determined by the product of the area of vitiligo (in hand units) and the extent of depigmentation within each hand unit measured patch.

RESULTS

A total of 50 subjects covering all the selection criteria were recruited into the study. Their sociodemographic characteristics are listed in Table 1. For reporting results, the participants were grouped in ranges of multiples of tens without specific grouping criteria. About 30% belonged to the age group 31–40 years, followed by 24% aged 11–20. Out of the 50 participants, 66% were adolescents and young adults aged between 11 and 40. In contrast, 18% were children under 10 years, and a further 20% were aged above 50. For the gender breakdown, the participants were nearly evenly split, with 52% females and 48% males.

Table 1: Sociodemographic characteristics of the study participants.

Study variable	Frequency (*n*=50)	Percentage
Age		
0–10	8	16
11–20	12	24
21–30	6	12
31–40	15	30
41–50	3	6
>50	6	12
Sex		
Male	24	48
Female	26	52
Marital status		
Unmarried	30	60
Married	20	40
Education status		
Illiterate	3	6
Primary school	6	12
Secondary school	4	8
Higher secondary	14	28
Graduate	17	34
Postgraduate	6	12
Job status		
Housewife	7	14
Software	20	40
Student	17	34
Unemployed	6	12

Among the participant's marital status, 40% were married, while a more significant portion, 60%, were single. The study found that only 6% of the respondents were illiterate regarding education status. Meanwhile, 20% had completed primary or secondary education, followed by 28% who had attained higher secondary education. Furthermore, 34% of the patients were university graduates, and 12% held postgraduate degrees. Study participants were also asked about their job status, and the results showed that most of them work in the software sector with 40%, followed by students with 34%. About 14% of patients were homemakers, and 12% were unemployed.

The clinical profile of the study participants is shown in Table 2. The age of onset of vitiligo symptoms was found to be highest with 44% in the age group of 11–20 years, followed by 26% for the age group of 21–40 years. About 16% of participants observed the symptoms at <10 years old. An identical portion of 2% of participants exhibited

Table 2: Clinical profile of the study participants.

Study variable	Frequency (*n*=50)	Percentage
Age of onset (in years)		
<6 months	1	2
6 months–1 year	1	2
<10 years	8	16
11–20	22	44
21–40	13	26
>40	5	10
Duration of disease (in years)		
<1 year	12	24
1–5 years	22	44
6–10 years	7	14
>10 years	9	18
Comorbidities in patients		
Diabetic	4	8
Hypertension	4	8
Hypertriglyceridemia	2	4
Gout	1	2
Appendicectomy	5	30
No other comorbidities	34	68
Other dermatological conditions associated with patients		
Premature canities	5	10
Palmoplantar hyperhidrosis	1	2
Hidradenitis suppurativa	2	4
Psoriasis	3	6
Polymorphic light eruption	2	4
No other conditions	37	74
Type of associated autoimmune disorders in patients		
Hypothyroidism	8	16
Alopecia areata	4	8
Autoimmune hemolytic anemia	1	2
No association	37	74
Type of associated autoimmune disorders in the family of patients		
Hypothyroidism in 1^{sto} relative	3	6
Psoriasis in 2^{ndo} relative	2	4
Psoriatic arthritis in 1^{sto} relative	1	2
Type 1 diabetes in 2^{ndo}	1	2
No association	43	86

symptoms <6 months and six months to one year. About 10% of participants started showing symptoms after the age of 40.

The duration of disease in years of the subjects was studied to provide a disease burden perspective. The majority of the subjects diagnosed with the disease are in the duration of disease for five years with 44%, followed by the age group of <1 year with 24%. The 18% of the patients had a disease duration of more than 10 years, and 14% were in the age bracket of 6–10 years.

Patients were studied for any disease comorbidities, and 68% had no other comorbid diseases. Hypertriglyceridemia was found to be the most comorbid disease among the participants, with 30%, followed by both diabetics and hypertension, contributed equally with 8%. Gout was the least observed comorbid disease, accounting for 2% of participants.

Apart from any existing comorbid diseases, patients were also examined to study other dermatological conditions for clinical and treatment purposes. The study's results revealed various associated dermatological conditions among the participants. Premature canities, which indicate early onset of grey hair, were observed in 10% of the participants. Palmoplantar hyperhidrosis, marked by excessive sweating of the hands and feet, was seen in 2%. Another 4% had hidradenitis suppurativa, which leads to painful lumps on the skin. In addition, psoriasis, an autoimmune skin disorder, was diagnosed in 6%, while polymorphic light eruptions, which are reactions to sunlight, were found in 4%. No other dermatological conditions were found in 74% of cases.

Vitiligo is an autoimmune disorder that can lead to other diseases or affect a person in various ways. Various types of associated autoimmune disorders were studied in patients, and the results showed that hypothyroidism was the most significant disorder, with a 16% prevalence. Alopecia areata, characterized by patchy hair loss on the scalp, was found in 8% of individuals. A sporadic type of anemia, autoimmune hemolytic anemia was found in one patient. Remarkably, 76% of patients reported no association with other autoimmune conditions.

While examining the patients, the authors noted the various types of autoimmune disorders in family members of patients. Hypothyroidism in 1st-degree relatives was found in 6%, followed by psoriasis in 2nd-degree relatives with 4% found in the study results. Type 1 diabetes in 2nd-degree relatives and psoriasis arthritis were identically found in 2% of the patient's family. The remaining 86% have reported no associated type of autoimmune disease in family relatives.

The vitiligo profile consisting of family history, site of onset, type of vitiligo, other clinical findings, trigger factors, treatment methods, VASI, and VIDA scores is mentioned in Table 3. This study considers the family history of subjects to evaluate any family-related connections. A total of 74% reported having no family history related to vitiligo, and the rest 26% had an association with the disease within the family.

Study participants were examined to find the initial manifestation sites of the body, and the results were as follows. A higher portion of 28% reported lip as their initial depigmentation site, followed closely by 24% whose first signs appeared on their faces other than lips. Neck and lower limb equally contributed with 6%, and upper limb and other body parts equally reported 16%. The least initial manifested site was found to be the scalp, with 4%.

The authors studied different clinical subtypes of vitiligo, showing that vitiligo vulgaris was the most common type with 42%. Next to vitiligo vulgaris, localized and acrofacial

Table 3: Vitiligo profile of the study participants.

Study variable	Frequency (*n*=50)	Percentage
Family history of vitiligo		
Present	13	26
Absent	37	74
Site of onset		
Lip	14	28
Face	12	24
Neck	3	6
Upper limb	8	16
Lower limb	3	6
Scalp	2	4
Other parts	8	16
Type of vitiligo		
Pure mucosal	3	6
Facial	3	6
Segmental	3	6
Generalized	4	8
Liptip	4	8
Acrofacial	5	10
Localized	6	12
Vitiligo vulgaris	21	42
Undetermined	1	2
Other clinical findings		
Confetti lesions	2	4
Halo phenomenon	1	2
Perifollicular pigmentation	1	2
Trichrome	5	10
Kobner's	2	4
Leucotrichia	9	18
No other findings	30	60
Vitiligo trigger factors		
Teeth brace	1	2
Sour food	1	2
Chemical/irritant exposure	2	4
Itching	4	8
Stress	3	6
Trauma	5	10
Unidentified	34	68
VASI (%)		
10	13	26
25	32	64
50	5	10
75	0	0
100	0	0
VIDA score		
Active 6 weeks or less (+4)	0	0
Active 6 weeks to 3 months (+3)	0	0
Active 3–6 months (+2)	0	0
Active 6–12 months (+1)	18	36
Stable 1 year or more (0)	25	50
Stable with spontaneous repigmentation 1 year or more (−1)	7	14
Vitiligo treatment methods		
Topical steroid and therapy agents	13	26
Topical JAK inhibitors	4	8
Phototherapy methods	23	46
Oral JAK inhibitors	10	20

VASI: Vitiligo area scoring index, VIDA: Vitiligo disease activity, JAK: Janus Kinase

(Contd...)

contributed to 12% and 10%, respectively. Other types, such as pure mucosal, facial, and segmental, accounted each for 6% of patients. Generalized vitiligo and liptip were found in 8% each. A mixed form of various vitiligos was present in only 2% of patients.

The investigation further highlighted a range of clinical manifestations among the patients. Leucotrichia was observed in 18% of the participants, while Kobner's phenomenon was identified in 4%. Trichrome lesions were evident in 10% of the individuals – additionally, 2% showcased perifollicular pigmentation, and an equal percentage presented with the halo phenomenon. Confetti lesions were evident in 4% of the patients. The remaining 60% of patients did not find any other clinical findings.

The study results show a detailed picture of the triggering factors linked to vitiligo. About 10% of participants pointed to trauma as a critical trigger, often due to actions such as scratching or manual labor. Stress, a well-acknowledged factor that encompasses both physical and emotional strains, was pinpointed by 6% of those surveyed. Another 8% of patients traced their vitiligo back to chronic itchiness, emphasizing the significance of this discomfort. A small yet significant 4% of respondents reported chemical exposure as a potential offender. Moreover, 2% attributed their vitiligo to the consumption of sour foods, highlighting an intriguing correlation between certain dietary habits and the disease. Another 2% revealed that they had undergone orthodontic procedures involving teeth braces, raising questions about a possible link between these treatments and vitiligo.

The patient characteristics according to VIDA and VASI scores are presented in Table 3. As per the VIDA scale to assess stability, the disease activity score of +4, +3, and +2 has 0% of patients in the study. A stable activity from one year or more with a score of 0 is found to be highest in 50% of patients followed by 36% with a +1 score. The rest, 14% of patients, are stable with spontaneous repigmentation for one year or more with a score of −1. The extent of residual pigmentation and depigmentation is expressed in percentages using VASI scores. Five patients showed a 50% area of involvement when evaluated based on the VASI score. In contrast, 32 patients had a 25% area affected, and 13 had <10% of their skin involved.

The goals of vitiligo treatments are repigmentation of the depigmented lesions and prevention of further disease progression. Regarding treatments, 26% of patients underwent topical steroids and other topical therapy agents. Topical Janus Kinase (JAK) inhibitors, specifically ruxolitinib and tofacitinib, were administered to 8% of participants. Phototherapy methods such as psoralen ultraviolet-A (PUVA) and narrow-band ultraviolet-B (NBUVB) were used for 46% of the patients, while 20% were treated with oral JAK inhibitors.

DISCUSSION

Vitiligo is an acquired, persistent pigmentary disorder influenced by multiple factors, not just limited to autoimmune conditions. This condition is characterized by the progressive loss of pigmentation, affecting the melanocytes in the basal layer of the epidermis. While it is not life-threatening, vitiligo can bring about considerable psychosocial challenges, often leading to societal stigmatization and a diminished quality of life for the afflicted. This intricate skin condition arises from genetic and environmental triggers, resulting in the loss of functional melanocytes due to pigment breakdown.[7] The disfigurement caused by vitiligo often results in profound emotional stress for patients, significantly impacting their overall well-being and self-confidence.[8,9]

The participants in our study covered a broad age spectrum, ranging from 5 to 70 years, with an average age of 30 years. Only a minor portion (5%) manifested vitiligo at a very young age, with some cases reporting onset as early as one-and-a-half to four months. This shows that vitiligo may present anytime in life, including the neonatal period and childhood as investigated in childhood vitiligo.[10] The most common age for the onset was observed during the second decade, while the age of presentation was most frequent during the fourth decade. Vitiligo in two patients after age 50 highlights the possibility of the condition manifesting much later in life.[11] According to our survey results, the onset age for SV tended to be earlier than that for NSV.

The male-to-female ratio in our study was observed to be nearly equal showing that vitiligo has no prejudice for any gender. Various other studies[12,13] conducted by recruiting patients in parts of the Indian subcontinent had a similar observation. All these studies presented a slightly higher female ratio probably due to greater cosmetic awareness and social stigma among females. However, other clinical investigation studies[14,15] showed a higher percentage of males than females in their studies. This brings us to an obscure state of vitiligo presence based on gender. Our data showed no significant links with educational level, profession or marital status.

Manifestation of vitiligo can be attributed to genetic factors and as postulated by the genetic model on the family data,[16] it shows that family history can be polygenic. In our study, we found that 26% of patients presented a history of their family members being diagnosed with vitiligo. Our results are supportive of the reported data of 5–32% of family history in other studies.[17,18] Patients with a familial history of vitiligo and other autoimmunity typically had an earlier disease onset and a more resistant progression. For example, all five patients with onset on the eyelids had a family history of vitiligo.

Vitiligo is associated with other systemic diseases, and our study results revealed that diabetes mellitus and hypertension were reported at 8%. Substantial number of patients 30% reported appendicectomy and 68% reported no other comorbidities in patients in our study. Other conditions mechanisms involving inflammatory and autoimmune diseases such as hypertriglyceridemia and gout are present in our study. Many studies[16,19-21] have reported diabetes, hypertension, and hypothyroidism and autoimmune thyroiditis are the commonly observed systemic diseases besides cutaneous diseases like vitiligo.

Among those with other autoimmune conditions, hypothyroidism was the most frequently associated. A unique case involved a patient with autoimmune hemolytic anemia, who underwent splenectomy – a rarity in contemporary literature.[22] There is ample evidence to support the notion that vitiligo is an autoimmune disease.

The presence of psoriasis, alopecia areata, hemolytic anemia, and hypothyroidism favors the involvement of an autoimmune pathway that coexists with vitiligo. The presence of other dermatoses presenting direct and indirect evidence of autoimmune etiology has been published by various authors.[23,24] Premature greying of hair is the most frequently associated dermatological condition with vitiligo.[25] Literature shows the correlation between premature hair greying and vitiligo introduced by Ezzedine *et al.* in 2012,[26] follicular vitiligo has distinct clinical, histopathologic, and dermoscopic characteristics. It is marked by the absence of follicular melanocytes in biopsied depigmented hair follicles, retained melanocytes in the surrounding normal-appearing skin, and an absence of perifollicular inflammation.

In corroboration to other studies[27-29] reported on the degree of relation of family history, our study confirms that vitiligo occurs more frequently in patients with a first-degree family history of this condition.

These varied coexisting conditions offer critical insights into the complex nature of vitiligo, suggesting its possible links with different dermatological and physiological conditions. Such information enhances our broader comprehension of the challenges surrounding vitiligo.

We found a broad spectrum of affected anatomical sites. In our study, the face and lips are the commonly involved sites in the majority of cases, which supports the findings of other

studies.[18,30-32] However, studies[16,18,29] show that the lower extremities are the most common sites of the body involved with depigmentation. This draws to a condition that the primary sites of disease development vary and depend on the autoimmune activity and the trigger factors exposed to these areas.

Vitiligo vulgaris was the predominant subtype, representing 42%, with only four patients indicating generalized vitiligo. It is followed by other types as reported in results, which are similar to other studies.[16,21,28] This indicates that the process of depigmentation occurs simultaneously or subsequently at various unrelated distant sites of the body.

Other clinical findings such as leukotrichia and trichomes were found in 18% and 10% of patients, respectively. Various other studies[16,28] show a higher prevalence around 9–16%. Trauma was the most common precipitating factor (10%) in our study followed by itching, stress, and chemical exposure. There was increasing evidence suggesting an association between exposure to chemicals and the development of vitiligo.[3] The various triggers reported in this study emphasize the nuanced roles that various factors play in vitiligo's onset. By highlighting these multifaceted contributors, the study offers a more profound understanding of the disease's intricacy, spanning physical, psychological, environmental, and dietary domains.

Effectively treating vitiligo requires a patient's dedication, regular follow-ups, and thorough documentation of patient comorbidities. This study documented the use of different modalities in the treatment of vitiligo. Treatment approaches encompass vetted vitiligo research products, topical steroids, topical JAK inhibitors,[9] PUVA/PUVAsol, and NBUVB light therapy. Sunscreen with sunblock is essential to protect vitiliginous areas from sunburn photodamage and to prevent the Koebner phenomenon. Most of the patients had been treated with systemic and topical therapies. Successful repigmentation is attained in over half of the treated patients, with fewer than a third demonstrating resistance to treatment.

The results suggest that the local epidemiological behavior of vitiligo need not be the same across different regions. Variations did exist with regard to certain vitiligo clinical parameters with other regions and studies.

CONCLUSION

This study achieved our stated purpose of exploring the clinical and demographic patterns of vitiligo in the region of Chennai, India. The findings in our study correlate with other studies, and this clearly establishes that the etiology of vitiligo is complex and systemic. Most participants were adolescents and young adults, exhibiting a wide range of ages when vitiligo symptoms first appeared and diverse initial manifestation sites. Age and gender are not associated with any specific type of vitiligo. Hypothyroidism emerged as the most associated autoimmune condition, followed by premature hair greying and alopecia areata.

This study reaffirmed vitiligo's prevalence within distinct age groups and its correlation with autoimmune disorders. Authors suggest that all vitiligo patients be investigated for other autoimmune diseases such as hypothyroidism, psoriasis, and diabetes to rule out other comorbidities. Many patients reported a family history of vitiligo, with 68% unable to identify specific triggers. The prevalent vitiligo subtype was vitiligo vulgaris, and treatment approaches included both systemic and topical therapies. These findings contribute to an improved understanding of vitiligo's demographics, clinical characteristics, and potential risk factors within the studied population.

Ethical approval

The Institutional Review Board approval is not obtained, as it is an observational study.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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