

Assessment of the Psychosocial and Economic Burden of Vitiligo Management Among Patients in a Community Based Cross Sectional Study

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Abstract

Background

Vitiligo is a chronic acquired skin disorder that significantly affects patients' psychosocial well-being and may impose a substantial economic burden, particularly in populations with darker skin tones where lesions are more visible. Despite being non-life-threatening, the stigma associated with vitiligo can severely compromise quality of life.

Objectives

To characterise the psychosocial impact of vitiligo on self-esteem, social functioning, emotional well-being, and daily activities, and to document the economic burden from the patient's perspective, and also to evaluate participant satisfaction with treatment.

Methods

A cross-sectional study was conducted over a period of six months (February–August 2025) among 100 clinically diagnosed patients with vitiligo recruited from urban areas of Raichur District, Karnataka. A validated, interview-administered questionnaire covering five domains (Cronbach's $\alpha = 0.84$) was used. Data were analysed using descriptive statistics using SPSS v20.0, and inferential statistics, such as Chi-Square, were used. P-value < 0.05 is considered statistically significant.

Results

Participants had a mean age of 40.79 years (Standard Deviation (SD) ± 14.92); 51% were male. High or very high psychosocial impact was reported by 67% of respondents. Social avoidance was persistent or extreme in 64%, and 65% described feeling insecure or very insecure about their appearance. Daily functioning was significantly or extremely impaired in 58%. A combined 86% fell in the low or very low Health Related Quality of Life (HRQoL) categories. Economic burden was moderate-high or very high in 66%. Treatment response was mixed: 31% reported significant improvement, while 21% saw no change and 12% experienced worsening.

Conclusion

Vitiligo places a heavy and largely unaddressed burden on patients outside clinical settings. Integrated care that brings dermatology, psychological support, and pharmacy practice to the community level is needed.

1. Introduction

Vitiligo is a chronic acquired skin disorder characterized by loss or destruction of epidermal melanocytes, resulting in sharply demarcated, depigmented patches on the skin, hair follicles, and mucous membranes. Lesions under one centimetre are classified as macules; larger areas as patches.

The condition is not new; the name *Kilasa* appears in records from roughly 2200 BCE, and the Egyptian Ebers Papyrus documented similar presentations in 1550 BCE. What is new, or rather what remains overdue, is rigorous community-level epidemiology. Most data still come from hospital clinics, which tend to capture a biased slice of the true patient population [1, 2].

Global prevalence estimates range from 0.06% to 2.28% in adults and 0.0% to 2.16% in children. India reports the highest national figure at 9.98%, ahead of Nigeria (2.8%) and Romania (2.28%). Within India, prevalence among dermatology outpatients sits between 0.25% and 4.0%, rising to 8.8% in Gujarat and Rajasthan. Males and females are affected roughly equally, though female predominance in some studies may reflect greater health-seeking rather than true biological difference. Most patients develop symptoms before age 30; about half notice them by age 20 [3–6].

The disease results from overlapping genetic, autoimmune, oxidative, and neural factors. Susceptibility genes among them *FOXD3*, *NLRP1*, *HLA*, *TYR*, and *CTLA-4* lower the threshold for CD8 + T cell-mediated melanocyte destruction, a process amplified by interferon-gamma signalling and deficient regulatory T cell activity. Reactive oxygen species accumulate because antioxidant systems in vitiligo-affected skin are measurably impaired. Neurochemical factors, including catecholamines released at cutaneous nerve endings, add a further layer of complexity that is still being worked out. Clinically, vitiligo is classified into segmental (unilateral, dermatomal, usually stable within a year), non-segmental (bilateral, progressive, often co-occurring with thyroid disease or type 1 diabetes), and unclassified or mixed forms [7–10].

The skin is visible. That is obvious, and it matters more for vitiligo than almost any other non-scarring dermatosis. Systematic reviews place depression prevalence at up to 62.3% and anxiety at up to 67.9% among patients. The VALIANT study among 3,500 patients across 17 countries found 59.4% of the patients regularly concealing the patches, 55.2% letting the condition decide daily choices like what to wear, and over 40% reporting interference with relationships or careers. Patients with darker skin tones (Fitzpatrick types IV–VI), facial or hand involvement, and more than 5% body surface area affected carry the largest burden. In India, where visible skin discoloration has historically carried social and matrimonial consequences, the distress is amplified further, particularly for women and adolescents [11–14].

The financial cost is poorly appreciated by clinicians but acutely felt by patients. Direct expenses include consultations, topical corticosteroids, calcineurin inhibitors, phototherapy sessions, surgical procedures, camouflage makeup, and sunscreen, none of which are cheap. A retrospective US analysis found mean annual healthcare costs of \$15,551 in vitiligo patients, versus \$7,735 in matched controls; vitiligo-specific costs were \$3,490 against \$54. Indirect costs include lost workdays, reduced productivity, and career choices shaped by stigma, which considerably add to the total. Italian estimates put the annual social cost at approximately €0.5 billion, over half of which patients bear personally [15, 16].

Community-level data on vitiligo burden in India are limited. Most studies recruit from dermatology outpatient departments, leaving out the sizable number of patients who discontinue care due to cost, distance, or therapeutic dissatisfaction. Structured, patient-reported data on both the psychosocial and

economic dimensions, collected in a community-representative cross-sectional design, are largely absent from the Indian literature. This study was conducted in Raichur district, Karnataka, a socioeconomically mixed, predominantly agricultural region in the northeast of the state, to document what vitiligo actually costs its patients in terms of well-being and money, from their own perspectives.

2. Materials and Methods

2.1 Study Design and Setting

This was a questionnaire-based cross-sectional study conducted over six months (February–August 2025) in Raichur District, Karnataka, India. Raichur lies in north-eastern Karnataka between the Krishna and Tungabhadra rivers, with a population of approximately 2 million, literacy rates below the state average, and most of the working population is involved in agriculture and manual labour. These conditions directly affect healthcare access and financial resilience, a context that matters when interpreting economic burden data.

2.2 Study Population and Sampling Strategy

Eligible participants were adults (≥ 18 years) with a clinical diagnosis of vitiligo who had been on treatment for at least six months and provided written informed consent. Excluded were patients with co-existing psychiatric illness, other chronic dermatological conditions, or systemic diseases.

Sample size was calculated using $N = Z^2 \times p(1 - p)/e^2$, with $Z = 1.96$, $p = 0.12$ (prior study prevalence), and $e = 0.05$. This gave 162.26; halved for a six-month study window (i.e., 81), rounded up, the target was 100 participants.

2.3 Data Collection Instrument

A structured questionnaire in English, Hindi, and Kannada was developed and administered by an interviewer. Section A recorded demographic information. Sections B to E covered emotional well-being, social life and relationships, self-esteem and body image, and daily functioning. An additional section assessed economic burden, estimating both direct costs (consultations, medications, phototherapy) and indirect costs (travel, absenteeism, cosmetic expenditure). Internal consistency was adequate (Cronbach's $\alpha = 0.84$).

2.4 Outcome Measures

Psychosocial impact: 0–20 scale (0–4 none; 5–8 low; 9–12 moderate; 13–16 high; 17–20 very high). Social avoidance: same five-tier scale (none to extreme). Self-esteem/body image: five levels from very confident to very insecure. Daily functioning: no impairment to extreme impairment. Economic burden: 1–4 (very low to very high). HRQoL: 0–76, higher = worse (0–19 high; 20–38 moderate; 39–57 low; 58–76 very low). Treatment satisfaction: 1–4 (worsening to significant improvement).

2.5 Study Variables

2.5.1 Dependent variables

- Age
- Gender
- Marital status
- Occupation
- Duration of treatment (≥ 6 months inclusion criteria)

2.5.2 Independent variables

- Psychosocial impact score
- Social avoidance level
- Self-esteem
- Health-Related Quality of Life (HRQoL)
- Economic Burden

2.6 Data collection procedure

The project team visited community centers, dermatology clinics, and households to

collect data. The purpose of the study was clearly explained to all participants, and informed consent was obtained before participation. The questionnaire was interviewer-administered, where trained interviewers asked the questions and recorded the participants' responses.

Data collected included:

- Demographic details
- Psychosocial assessment
- Economic burden analysis

The project team collaborated with dermatologists, psychologists, and social workers to ensure comprehensive and accurate data collection.

2.7 Statistical Analysis

Descriptive statistics (frequencies and percentages) were computed using SPSS v. 20.0, and inferential statistics, such as Chi-Square, were used. P-value < 0.05 is considered statistically significant.

2.8 Ethical Consideration

Institutional Ethical Clearance (IEC) was obtained from the Institutional Ethics Committee, Navodaya Medical College Hospital and Research Centre (NMCH&RC), Raichur, before the commencement of the study. The study was conducted in accordance with the principles of the Declaration of Helsinki.

2.9 Consent to Participate

Written informed consent was obtained from all participants before inclusion in the study.

3. Results

3.1 Demographic Characteristics

A total of 100 patients were enrolled. The sample was 51% male and 49% female (the male-to-female ratio was 1.04:1), with a mean age of 40.79 years (SD $\pm$ 14.92). The largest age group was 30–39 years (29%); participants aged 60 and above made up 14%. Sixty-four percent were married. The most common occupations were private or government employment (26%) and daily wage labour (23%), followed by housewives (21%), farmers (13%), students (9%), and others (8%).

Table 1. Sociodemographic Characteristics of Participants (n=100)

Sl. No.	Variables	Category	No. of Participants (n)	Percentage (%)
1	Age Group (Years)	<20	4	4
		20–29	19	19
		30–39	29	29
		40–49	19	19
		50–59	15	15
		60+	14	14
		Mean: 40.79 yrs (SD ± 14.92)		
2	Gender	Male	51	51
		Female	49	49
3	Marital Status	Married	64	64
		Unmarried	36	36
4	Occupation	Private/Govt. Job	26	26
		Wage Worker/Labour	23	23
		Housewife	21	21
		Farmer	13	13
		Student	9	9
		Others*	8	8

*Clerk, Tailor, Teacher, Businessman, etc .

3.2 Psychosocial Burden and Social Avoidance

Sixty-seven percent of participants reported high (39%) or very high (28%) psychosocial impact; only 2% reported none. Social avoidance was persistent in 41% and extreme in 23%, with just 4% reporting no avoidance. Sixty-five percent described feeling insecure (40%) or very insecure (25%) about their appearance. Family support, while present for most, was strong in 39% and consistent in 30%; 12% received minimal support, and 19% only occasional support. Data were shown in **Table 2**.

Table 2. Psychosocial Impact and Social Avoidance (n = 100)

Score Range	Category	Psychosocial Impact n (%)	Social Avoidance n (%)
0–4	None / No avoidance	2 (2%)	4 (4%)
5–8	Low / Occasional	8 (8%)	10 (10%)
9–12	Moderate / Frequent	23 (23%)	22 (22%)
13–16	High / Persistent	39 (39%)	41 (41%)
17–20	Very High / Extreme	28 (28%)	23 (23%)

3.3 Self-Esteem/Body Image and Family Support Level

As shown in **Table 3**, self-esteem and body image were notably affected among the study participants. A substantial proportion of patients reported feeling insecure (40.0%) or very insecure (25.0%) about their appearance, while only a small minority described themselves as very confident (3.0%) or confident (11.0%). In contrast, family support appeared relatively better, with 39.0% of participants reporting strong support and 30.0% reporting consistent support. These findings suggest that although family support may provide an important emotional buffer, it does not fully offset the negative impact of vitiligo on self-esteem and body image.

Table 3. Self-Esteem/Body Image and Family Support Level (n = 100)

Category	Self-Esteem n (%)	Family Support n (%)
Very Confident / Minimal	3 (3%)	12 (12%)
Confident / Occasional	11 (11%)	19 (19%)
Neutral / Consistent	21 (21%)	30 (30%)
Insecure / Strong	40 (40%)	39 (39%)
Very Insecure / —	25 (25%)	—

3.4 Daily Functioning and Health-Related Quality of Life

Significant or extreme daily functioning impairment was reported by 58% (40% significant, 18% extreme); only 6% had no impairment. HRQoL was severely affected: 48% scored in the very low range (58–76) and 38% in the low range (39–57), totalling 86% with significant HRQoL impairment. Only 7% each fell in the moderate and high categories. Findings were shown in **Table 4**.

Table 4. Daily Functioning Impairment and HRQoL (n = 100)

Category	Daily Functioning n (%)	HRQoL Range	HRQoL n (%)
No Impairment / High HRQoL	6 (6%)	0–19	7 (7%)
Occasional / Moderate HRQoL	12 (12%)	20–38	7 (7%)
Regular / Low HRQoL	24 (24%)	39–57	38 (38%)
Significant / Very Low HRQoL	40 (40%)	58–76	48 (48%)
Extreme / —	18 (18%)	—	—

3.5 Economic Burden and Treatment Satisfaction

Economic burden was moderate-high in 30% and very high in 36% combined; two-thirds of the sample fell into the upper burden categories. Only 14% reported very low and 20% low-moderate burden. Treatment response was variable: 31% significant improvement, 36% moderate improvement, 21% no change, and 12% worsening; 2% had not yet begun treatment. Results were depicted in **Table 5**.

Table 5. Economic Burden and Treatment Satisfaction Level (n = 100)

Economic Burden Category	Score	n (%)	Treatment Outcome	Score	n (%)
Very Low Burden	1	14 (14%)	Significant Improvement	4	31 (31%)
Low-Moderate Burden	2	20 (20%)	Moderate Improvement	3	36 (36%)
Moderate-High Burden	3	30 (30%)	No Change	2	21 (21%)
Very High Burden	4	36 (36%)	Worsening	1	12 (12%)

3.6 Interdomain Associations of Psychosocial Burden Across all Four Domains in Vitiligo Patients

Table 6 shows that the high co-occurrence of psychosocial burden was observed across all domains with 77%–84% of patients being classified as high burden in both paired domains. There was the greatest overlap between Emotional Well-being and Daily Functioning (84%), followed by Emotional Well-being and Social Life (83%) and Social Life and Daily Functioning (83%). Discordant patterns were infrequent (0%–7%) with both-low burden between 14% and 16%. All interdomain associations were highly statistically significant ($p < 0.001$), indicating that the psychosocial burden in vitiligo is multidimensional and interconnected.

Table 6. Interdomain Associations of Psychosocial Burden Across all Four Domains in Vitiligo Patients

Domain A	Domain B	Both High n (%)	A High, B Low n (%)	A Low, B High n (%)	Both Low n (%)	χ^2	p-value
Emotional Well-being	Social Life	83 (83.0)	1 (1.0)	0 (0.0)	16 (16.0)	86.126	<0.001
Emotional Well-being	Self-esteem & Body Image	78 (78.0)	6 (6.0)	1 (1.0)	15 (15.0)	55.658	<0.001
Emotional Well-being	Daily Functioning	84 (84.0)	0 (0.0)	1 (1.0)	15 (15.0)	85.440	<0.001
Social Life	Self-esteem & Body Image	77 (77.0)	6 (6.0)	2 (2.0)	15 (15.0)	51.035	<0.001
Social Life	Daily Functioning	83 (83.0)	0 (0.0)	2 (2.0)	15 (15.0)	79.378	<0.001
Self-esteem & Body Image	Daily Functioning	78 (78.0)	1 (1.0)	7 (7.0)	14 (14.0)	50.644	<0.001

'Both High' = Patients scoring above threshold on both domains simultaneously. High burden thresholds: Emotional Well-being $\geq 10/20$; Social Life $\geq 10/20$; Self-esteem & Body Image $\geq 8/16$; Daily Functioning $\geq 10/20$. χ^2 calculated with Yates' correction. $p < 0.001$ (statistically significant at $p < 0.05$ threshold).

4. Discussion

The central finding is straightforward: vitiligo imposes a heavy burden on community-based patients that clinic-based studies tend to miss. Across every domain measured, emotional distress, social participation, self-esteem, daily function, finances, and treatment satisfaction, the majority of participants were in the unfavourable categories. For a condition routinely described as 'only cosmetic,' these numbers require attention.

The near-equal gender split (51% male, 49% female) is consistent with the established sex-neutral prevalence pattern. The mean age of 40.79 years is worth noting, this age group typically carries peak family and occupational responsibilities. Visible depigmentation in a 40-year-old married woman in a conservative district like Raichur carries social pressure that is different from the same lesion in a teenager or a retired person. The predominance of married participants (64%) and those in client-facing or public occupations amplifies this dynamic.

Those 67% of participants who reported high or very high psychosocial burden are not surprising in isolation; the VALIANT study showed comparable patterns globally, with over 55% of patients adjusting daily decisions because of vitiligo and over 40% citing impact on relationships and careers [16]. What is noteworthy is that the social avoidance figures in this community sample (64 persistent or extreme) exceed those from clinic-attending populations. Patients who have disengaged from care, as community

recruitment is more likely to capture, may simply have more severe psychosocial consequences: they have stopped seeking treatment partly because the emotional cost of repeat disappointment exceeds the benefit. Pahwa et al. conducted a study with Indian outpatients. They showed that psychosocial factors significantly influenced how patients experienced the disease. They also highlighted the importance of managing the disease with a team of different specialists. This advice is especially important for people who are not currently receiving care from the healthcare system [17].

The self-esteem findings show that sixty-five percent of patients reported feeling insecure or very insecure about their appearance. Nazar et al. found that body image and social stigmatisation were stronger predictors of QoL reduction than disease extent, suggesting that how patients feel when looked at matters more than how much skin is actually affected [18]. The 86% of this cohort with low or very low HRQoL is higher than figures typically reported in outpatient Indian studies. Patients outside clinics are, almost by definition, receiving less support and carrying more unresolved burden. Rosmarin et al. showed that facial involvement and greater BSA independently worsen HRQoL and anxiety scores [19]; the high proportion of socially and occupationally active adults in this sample makes facial and hand lesion visibility especially consequential.

Two-thirds of participants fell in the moderate-high or very high economic burden categories. For daily wage labourers and farmers who together made up 36% of the sample, even modest, recurring costs for consultations, topical medications, and phototherapy sessions can represent a significant fraction of monthly income. The US-based MarketScan analysis by Ezzedine et al. documented annual excess healthcare costs of around \$7,800 per patient in an insured, higher-income population [20]. In Raichur, where out-of-pocket expenditure dominates and incomes are considerably lower, the proportional burden is likely steeper, though direct comparison is not possible with the current data.

Only 31% reported significant improvement, and 33% collectively saw no change or worsening. This is not simply poor adherence. Vitiligo is genuinely difficult to treat as the response is unpredictable, relapse is common, and even effective therapies require months before results are visible. What these numbers do suggest is a failure of expectation management. Patients who entered treatment expecting resolution and experienced none are among the most likely to disengage. The clinical pharmacist, as someone patients interact with more frequently than the dermatologist, is well-positioned to address this: explaining realistic timelines, monitoring for side effects from topical corticosteroids, and keeping patients engaged across the gaps between specialist appointments [21]. This role is rarely performed in community pharmacy settings in Karnataka.

A notable finding was the strong correlation between psychosocial domains. High burden in one area rarely occurred alone, patients scoring poorly on emotional well-being also tended to report impaired daily functioning and social withdrawal. The two strongest overlaps were between emotional well-being and daily functioning, and between emotional well-being and social life; 77–84% of participants showed high burden across both paired domains, with all associations at $p < 0.001$.

This matters clinically. A patient distressed about visible depigmentation is often also struggling with reduced workplace confidence, social avoidance, or difficulty with routine tasks. The domains feed into each other. Treating vitiligo as a skin condition with occasional psychological side effects misses most of what patients are actually experiencing. Lesion severity scores reflect a fraction of that picture; tools covering emotional, social, and functional burden are needed to see the rest.

4.1 Limitations

The study has real limitations that should be stated. The sample is restricted only to the areas of Raichur district; it does not represent the whole state. Cross-sectional data cannot tell us how the burden changes over time or whether it precedes or follows treatment disengagement. Self-reported economic data are approximate. Future work should incorporate clinical severity scoring, a huge sample size, and longitudinal follow-up.

5. Conclusion

Among 100 vitiligo patients in a community setting in Raichur, Karnataka, the burden of the condition was prevalent and often severe. Most patients reported high psychosocial impact, persistent social avoidance, insecurity about their appearance, and meaningful impairment in daily function. Eighty-six percent had low or very low HRQoL. Two-thirds faced moderate to very high economic strain. Treatment satisfaction was poor for a large minority. These are not findings about a cosmetic condition. They describe a chronic disease process that affects how people move through the world, what they wear, where they go, what work they pursue, whether they marry, and the expenses that come up with which they often cannot afford. Addressing this requires more than a prescription. It requires community outreach, realistic patient counselling, and, at a policy level, some attention to whether the out-of-pocket costs of vitiligo care are appropriate for the populations that bear them.

Declarations

Ethics approval and accordance: Institutional Ethical Clearance (IEC) was obtained from the Institutional Ethics Committee, Navodaya Medical College Hospital and Research Centre (NMCH&RC), Raichur, before the commencement of the study. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Consent to participate: Written informed consent was obtained from all participants before inclusion in the study.

Consent for publication: Not Applicable (N/A).

Availability of data and materials: The dataset is available from the corresponding author on reasonable request.

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Mr. V Sougath Reddy and Mr. Krishnaprasad NN collected data, performed statistical analysis, and contributed to the literature review. Dr. H Doddappa drafted the manuscript, and Dr. Kallappa C. H critically reviewed the manuscript. All authors reviewed and approved the final manuscript.

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- [VitiligoPatientQuestionnaireResponses.xlsx](#)