

# Depression, Anxiety, and Stress among Vitiligo Patients and Healthy Controls at A Tertiary Hospital: A Comparative Cross-Sectional Study

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## ABSTRACT

### Introduction

Vitiligo is often associated with stigma, leading to emotional distress and increased vulnerability to mental health disorders such as depression, anxiety, and stress. This study aimed to compare the levels of these psychological issues between vitiligo patients and healthy controls, while also examining the impact of socio-demographic and clinical factors.

### Methods

This hospital-based cross-sectional study included 42 vitiligo patients and 42 healthy controls. The Vitiligo Area Scoring Index (VASI) was used to assess the severity of vitiligo, and the Depression Anxiety Stress Scale (DASS-21), comprising three subscales: Depression (DASS-D), Anxiety (DASS-A), and Stress (DASS-S), was used to evaluate depression, anxiety, and stress. Descriptive statistics and non-parametric tests were used for data analysis.

### Results

Among vitiligo patients, 50% (n=21) exhibited depressive symptoms [median DASS-D score 9 (IQR 1.5-18.0)], compared to 19% (n=8) of controls. Anxiety symptoms were present in 54.8% (n=23) of the vitiligo group [median DASS-A score 8 (IQR 2.0-16.5)], compared to 21.4% (n=9) of controls. Stress was reported in 31% (n=13) of the vitiligo group [median DASS-S score 11 (IQR 2.0-16.5)], compared to 7.1% (n=3) in controls. Significant differences were found in depression, anxiety, and stress between the two groups ( $p = 0.005$ ,  $p = 0.003$ ,  $p = 0.02$ ). A negative correlation between vitiligo duration and anxiety/stress was observed ( $p=0.03$ ,  $p=0.01$ ). Positive correlations existed among the DASS-D, DASS-A, and DASS-S scores.

### Conclusion

Patients with vitiligo were more susceptible to psychological distress, including symptoms of depression, anxiety, and stress, and experienced these issues at significantly higher rates compared to healthy controls.

### Keywords

Anxiety; depression; stress; vitiligo seeking

## INTRODUCTION

Vitiligo is a chronic, acquired pigmentary disorder characterized by the development of often symmetrical depigmented patches, resulting from significant loss of functional epidermal melanocytes and in many cases, hair follicle melanocytes. It is one of the most common skin pigmentary conditions, with a global prevalence ranging from 0.06% to 2.28%.<sup>1,2</sup>

Vitiligo and mental health have a bidirectional relationship, where intense emotional stress can trigger or worsen the condition.<sup>3</sup> Stress-related neuroendocrine dysregulation, particularly through the hypothalamic-pituitary-adrenal axis, influences stress hormones that contribute to both mental health issues and skin depigmentation.<sup>4</sup> Medications like corticosteroids used in treating vitiligo may also have psychological side effects.<sup>5</sup> Furthermore, people with vitiligo face psychological challenges such as stigma, discrimination, difficulties in employment, and relationship issues, making them more vulnerable to stress, anxiety, and depression. Despite the significant mental health impact, the psychological aspects of vitiligo are often overlooked in clinical practice. Research on the psychosocial implications of vitiligo is limited, mainly focusing on quality of life and social well-being.<sup>6,7</sup> In Nepal, there are no comparative studies between vitiligo patients and healthy individuals to explore psychological issues systematically. The study aimed to assess and compare depression, anxiety, and stress levels between vitiligo patients and healthy controls while examining the association between socio-demographic and clinical factors with these psychological conditions in vitiligo patients.

## METHODS

This was a hospital-based cross-sectional comparative study, conducted at the Department of Dermatology and Venereology, Tribhuvan University Teaching Hospital, over one-year (May 2022 to April 2023) after approval from the institutional ethical committee [505(6-11) E<sup>2</sup> 078/079]. Clinically diagnosed cases of vitiligo and healthy controls were selected by a convenience sampling method. After obtaining informed consent, 42 vitiligo patients and 42 matched healthy control groups meeting the inclusion criteria including those between 18-65 years of age and those able to read and understand Nepali were included in the study. People with any other dermatological disorders or severe medical co-morbidities were excluded.

Relevant history and examination of patients were noted. The Vitiligo Area Scoring Index (VASI) was used to assess the extent and severity of vitiligo (Possible range, 0-100). VASI divides the body into five regions (hands, upper extremities (excluding

hands), trunk, lower extremities (excluding feet), and feet) and assesses the percentage of skin affected by vitiligo in each. Severity is scored based on the percentage of depigmentation, ranging from 0% (no involvement) to 75-100% (full depigmentation). The total VASI score is the sum of individual region scores, weighted by their significance, with a maximum score of 100 representing total depigmentation.<sup>8</sup>

A translated and validated version of the Depression Anxiety Stress Scale (DASS-21) in the Nepali language was utilized. The DASS-21 is a structured, questionnaire-based psychological assessment tool designed to measure the severity of depression, anxiety, and stress in individuals. It consists of three subscales- Depression (DASS-D), Anxiety (DASS-A), and Stress (DASS-S) with seven items in each subscale. Respondents assess their experience of various symptoms over the past week using a 4-point Likert scale, ranging from 0 (not at all) to 3 (very much or most of the time). The scale generates a total score for each component, with scores categorized as normal, mild, moderate, severe, or extremely severe for each subscale.<sup>9</sup>

Socio-demographic and clinical data were tabulated and descriptive analyses, including frequencies, percentages, and other applicable descriptive measures, were calculated. Tests for normal distribution were performed initially. For the group comparison, a non-parametric test, the Mann-Whitney U test was applied. Spearman's correlation analysis was employed to evaluate the relationship between sociodemographic, clinical variables, anxiety, depression, and stress. A p-value <0.05 was considered significant. The final data were analyzed using IBM SPSS Statistics for Windows, version 26 (IBM Corp., Armonk, N.Y., USA).

## RESULTS

The median age of the participants in the vitiligo group was 29.0 (IQR 22.75-9.50), and male to female ratio was 4:3, which was matched in the control group.

In the vitiligo group, the median age of onset of vitiligo was 144.0 (IQR 96.0-231.0) months, while the median duration of vitiligo was 162.0 (IQR 72.0-278.0) months. The majority, 74.4% (n=32) of cases had generalized vitiligo followed by acrofacial in 25.6% (n=11) of cases. The majority, 81% (n=34) of patients had lesions located in both exposed and unexposed areas. While 69% (n=29) of the vitiligo patients had stable disease, 31% (n=13) reported active vitiligo. The most common areas affected by vitiligo were the head and neck in 22%(n=27), followed by the lower extremities in 20.3% (n=25), acral areas in 19.5% (n=24), trunk in 17.9% (n=22), upper extremities in 17.1% (n=21), and bony prominence areas in 3.3%(n=4). The median VASI

**Table 1.** Distribution of Depression, anxiety, and stress symptoms in patients with vitiligo and healthy controls

Variables	Vitiligo patients (n=42)			Healthy control (n=42)			
	Median (IQR)	Min	Max	Median (IQR)	Min	Max	
Depressive symptoms	9(1.5-18.0)	0	36	2(1.5-6.5)	0	16	
Severity	Normal	21(50.0)	-	-	34(81.0)	-	-
	Mild	4(9.5)	-	-	3(7.1)	-	-
	Moderate	10(23.8)	-	-	5(11.9)	-	-
	Severe	2(4.8)	-	-	0	-	-
	Extremely severe	5(11.9)	-	-	0	-	-
Anxiety symptoms	8.0(2.0-16.5)	0	26	2.0(0.0-6.0)	0	22	
Severity	Normal	19(45.2)	-	-	33(78.6)	-	-
	Mild	4(9.5)	-	-	3(7.1)	-	-
	Moderate	8(19.0)	-	-	4(9.5)	-	-
	Severe	2(4.8)	-	-	1(2.4)	-	-
	Extremely severe	9(21.4)	-	-	1(2.4)	-	-
Stress Symptoms	11.0(2.0-16.5)	0	32	6.0(2.0-10.0)	0	20	
Severity	Normal	29(69.0)	-	-	39(92.9)	-	-
	Mild	5(11.9)	-	-	2(4.8)	-	-
	Moderate	0	-	-	1(2.4)	-	-
	Severe	2(4.8)	-	-	0	-	-
	Extremely severe	6(14.3)	-	-	0	-	-

score of vitiligo patients was 3.36 (IQR 1.44-6.23). All participants denied having a family history of mental illness or vitiligo.

Among the study population, 50%(n=21) of the patients in the vitiligo group had depressive symptoms compared to 19%(n=8) of the controls. In the vitiligo group, 54.8%(n=23) had anxiety symptoms compared to 21.4%(n=9) of the control group, while 31%(n=13) had symptoms of stress in the vitiligo group compared to a mere 7.1%(n=3) of the control group. (Table 1) The symptoms of depression, anxiety, and stress were significantly more pronounced in patients with vitiligo compared to healthy controls (Mann-Whitney U;  $p=0.005$ ,  $p=0.003$ ,  $p=0.02$ , respectively).

A statistically significant negative correlation of the duration of vitiligo with DASS-A and DASS-S scores among vitiligo patients was observed, ( $p=0.03$ ,  $p=0.01$ , respectively). The DASS-D score showed a significant positive correlation with the DASS-A ( $r=0.790$ ,  $p=0.001$ ) and DASS-S ( $r=0.862$ ,  $p=0.001$ ) scores. Similarly, the DASS-A score significantly correlated with both DASS-D ( $r=0.790$ ,  $p=0.001$ ) and DASS-S ( $r=0.810$ ,  $p=0.001$ ), while the DASS-S score had a significant positive correlation with both DASS-D ( $r=0.862$ ,  $p=0.001$ ) and DASS-A ( $r=0.810$ ,  $p=0.001$ ). No statistically significant correlations were observed between the degree of vitiligo and

DASS-D ( $r = -0.172$ ,  $p = 0.277$ ), DASS-A ( $r = -0.301$ ,  $p = 0.053$ ), or DASS-S ( $r = -0.195$ ,  $p = 0.217$ ) scores.

## DISCUSSION

In our study, vitiligo patients exhibited significantly higher levels of depression, anxiety, and stress compared to healthy controls. These findings are consistent with numerous other studies, which also show that vitiligo patients experience elevated levels of depression, anxiety, and stress compared to the general population, as assessed by various measurement tools.<sup>10,11</sup> Balaban et al. used Structured Clinical Interviews for DSM-IV Axis I Disorders (SCID-I) and found a significantly higher prevalence of psychiatric disorders in the vitiligo group (31%) compared to the control group (9.1%).<sup>12</sup> Nasser et al. in a case-control study using the DASS-21 scale, showed that vitiligo substantially impacts the quality of life(QoL), with Dermatology Life Quality Index(DLQI) scores ranging from moderate to severe. They also observed a significant positive correlation between stress, embarrassment from vitiligo, and clothing choices.<sup>2</sup> A study conducted by Do Bú et al. utilizing the DASS-21 scale found a lower prevalence but a higher severity of stress, anxiety, and depression scores in patients with vitiligo.<sup>13</sup> Similarly, Karia et al. conducted a case-control study using the Hamilton

Anxiety and Depression Rating Scales (HAM-A and HAM-D), finding a statistically significant negative correlation between QoL (measured by WHO-QoL) and both body surface area and HAM-A/HAM-D scores.<sup>14</sup> A case-control study by Hamidizadeh et al. found significantly higher levels of anxiety and hopelessness in vitiligo patients compared to healthy controls.<sup>15</sup> Similarly, Lacerda et al. reported that vitiligo patients experienced higher perceived stress compared to control with mild impairment of quality of life.<sup>16</sup> Additionally, a study by Abdelmaguid et al. revealed a highly significant difference in both the Hamilton Depression Rating Scale and Hamilton Anxiety Rating Scale between the vitiligo and control groups.<sup>17</sup>

In our study, the duration of vitiligo showed a significant negative correlation with anxiety and stress levels among patients. Social support, coping strategies, and ongoing treatment over time help may mitigate the psycho-social impact. This contrasts with the findings of studies by Karia et al. and Henning et al., which reported no significant association between the duration of vitiligo and psychiatric comorbidity.<sup>14,18</sup> Unlike our study, different scales and methodologies were used to measure psychiatric comorbidities, such as an online survey in the case of Henning et al. Additionally, Karia et al. did not exclude other dermatological conditions, which could have influenced their results.

The age of onset of vitiligo did not correlate to depression, anxiety, and stress. The finding is reciprocated in a study from Egypt.<sup>2</sup> In contrast, a study by Vallerand et al. reported that vitiligo patients diagnosed before the age of 30 had a higher risk of developing the major depressive disorder (MDD) compared to those diagnosed at 30 years or older when compared to the reference cohort.<sup>19</sup> In contrast to our study, a systematic review by Salema et al. found that gender was significantly linked to stress, anxiety, and depression, with females having vitiligo being more impacted than males.<sup>20</sup>

In our study, the degree of vitiligo (VASI) did not correlate to depression, anxiety, and stress. Similarly, perceived stress calculated by the perceived stress scale (PSS) was not associated with disease progression, stage, or the extent of disease in the study by Henning et al.<sup>18</sup> In contrast, Dabas et al. reported a positive correlation between the severity of vitiligo and the point prevalence of anxiety and depression, while Nasser et al. reported a significant relationship between the degree of vitiligo and anxiety. Additionally, a significant positive correlation was observed between the VASI score and both the Hamilton Anxiety and Hamilton Depression scores.<sup>2,17,21</sup> The differences in results may be attributed to factors such as the smaller sample size in our study, the use of different

tools to assess vitiligo severity, and the different analytical methods employed in global studies.

A noteworthy observation in our study is the positive correlation between depression, anxiety, and stress among vitiligo patients, which share underlying risk factors as described by the biopsychosocial model which highlights the intricate relationship between biological, psychological, and social elements in the onset of psychiatric disorders. Unsurprisingly, anxiety and depression are interconnected, given their shared genetic predispositions, brain alterations, and psychological factors. Furthermore, stress appears to play a role in mediating the link between neuroticism and both depression and anxiety in vitiligo patients.<sup>13,22</sup>

The study is limited by its cross-sectional design preventing causality establishment. Furthermore, depression, anxiety, and stress were self-reported using the DASS-21 and not clinically diagnosed. It did not consider confounding factors like treatment effects, stigma, or socio-occupational functioning. Future research should include community-based samples, standardized tools, and larger studies to better understand the psychological impact of vitiligo across cultures.

## CONCLUSION

The study found that patients with vitiligo experience higher levels of psychological distress, including depression, anxiety, and stress, compared to healthy controls. These symptoms are positively correlated, while the duration of vitiligo is negatively correlated with anxiety and stress. The study highlights the need for dermatologists to acknowledge mental health concerns in vitiligo patients, integrate mental health evaluations into regular assessments, and make timely referrals when necessary.

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## CONFLICT OF INTEREST

None

## AUTHORS CONTRIBUTION

Authors 1, 3, and 4 contributed to the research concept, study design, and literature review. Author 2 contributed to the literature review and manuscript preparation. Author 1 was responsible for data collection and analysis, while authors 3 and 4 performed statistical analysis and were responsible for review, supervision and overall approval of manuscript.

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