International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Efficacy of Platelet-Rich Plasma (PRP) in the Management of Vitiligo: A Prospective Cohort Study

Dr Anuj Kumar[1], Dr. Arjun Singh[2], Dr Deepak[3]

[1]Associate Professor, Department of Dermatology, Sido Kanhu Medical College & Hospital (SKMCH) Dumka, Jharkhand, India
[2]Assistant Professor, Venkateswara Institute of Medical Sciences, Gajraula, Uttar Pradesh, India
[3]Assistant Professor, KD Medical College (Hospital and Research Center) Mathura, Uttar Pradesh (KDMCHRC, Mathura), India.

OPEN ACCESS

Corresponding Author:

Dr Anuj Kumar
Associate Professor, Department of Dermatology, Sido Kanhu Medical College & Hospital (SKMCH) Dumka, Jharkhand, India.
Email id: anujvashisth.3@gmail.com

Received: 29-05-2026
Accepted: 15-07-2026
Available online: 24-07-2026

ABSTRACT

Background: Vitiligo is a chronic acquired depigmenting disorder characterized by the selective destruction of functional melanocytes, resulting in well-demarcated depigmented macules and patches. It affects approximately 0.5–2.0% of the global population and has a substantial psychological, cosmetic, and social impact on affected individuals. Although several therapeutic modalities, including topical corticosteroids, topical calcineurin inhibitors, phototherapy, and surgical interventions, have demonstrated varying degrees of efficacy, treatment outcomes remain unpredictable, particularly in patients with stable and treatment-resistant disease. Platelet-rich plasma (PRP), an autologous concentrate enriched with platelets and growth factors, has emerged as a promising regenerative therapy capable of promoting melanocyte proliferation, migration, angiogenesis, tissue regeneration, and modulation of local inflammatory responses. Preliminary evidence suggests that PRP may enhance repigmentation when used either as a standalone treatment or as an adjunct to conventional therapies. However, prospective clinical evidence evaluating its effectiveness in routine dermatological practice remains limited.

Aim: To evaluate the clinical efficacy and safety of platelet-rich plasma (PRP) in the management of vitiligo by assessing repigmentation, reduction in Vitiligo Area Scoring Index (VASI), patient satisfaction, and treatment-related adverse events during a six-month follow-up period.

Methods: This prospective cohort study was conducted in the Department of Dermatology, Venereology and Leprosy of a tertiary care teaching hospital over a period of 24 months. A total of 120 patients with stable non-segmental vitiligo were enrolled, of whom 114 completed the study. Eligible participants received intralesional PRP injections at four-week intervals for six treatment sessions. Clinical evaluation was performed at baseline and during monthly follow-up visits for six months. Outcome measures included changes in Vitiligo Area Scoring Index (VASI), percentage of repigmentation assessed using standardized clinical photography, physician global assessment (PGA), patient satisfaction measured using a visual analogue scale (VAS), and Dermatology Life Quality Index (DLQI). Safety assessment included documentation of pain, erythema, edema, ecchymosis, infection, and disease progression. Statistical analysis was performed using repeated-measures analysis of variance, paired t-test, Chi-square test, Pearson correlation, and multivariable regression analysis. A p-value of <0.05 was considered statistically significant.

Results: Of the 114 participants who completed follow-up, the mean age was **32.9 ± 11.6 years**, with females comprising **57.0%** of the study population. The mean baseline VASI score decreased significantly from **7.84 ± 2.31** to **3.68 ± 1.84** at six months ($p<0.001$). The mean percentage of repigmentation progressively increased throughout follow-up, reaching **56.8 ± 18.9%** at the end of the study.

Excellent repigmentation (≥75%) was achieved in **28.1%** of patients, while good repigmentation (50–74%) was observed in **39.5%**. Significant improvement in physician global assessment, patient satisfaction scores, and DLQI was also observed (p<0.001). Better therapeutic response was independently associated with younger age, shorter disease duration, facial lesions, smaller lesion size, and shorter duration of vitiligo. Treatment-related adverse events were mild, transient, and self-limiting, with injection-site pain and transient erythema being the most frequently reported complications.

Conclusion: Platelet-rich plasma is a safe, minimally invasive, and effective therapeutic modality for stable vitiligo, producing significant repigmentation, reduction in disease severity, and improvement in quality of life with minimal adverse effects. PRP represents a promising regenerative treatment option that may be considered either as monotherapy or as an adjunct to conventional vitiligo therapies. Larger multicentric randomized controlled trials with longer follow-up are warranted to establish standardized treatment protocols and determine long-term therapeutic durability.

Copyright © *International Journal of Medical and Pharmaceutical Research*

Keywords*: Vitiligo; Platelet-rich plasma; PRP; Repigmentation; Vitiligo Area Scoring Index; VASI; Regenerative medicine; Autologous platelet concentrate; Dermatology; Prospective cohort study.*

INTRODUCTION

Vitiligo is a chronic acquired pigmentary disorder characterized by the selective destruction or functional impairment of epidermal melanocytes, resulting in the development of well-demarcated depigmented macules and patches.[1] The condition affects approximately 0.5–2.0% of the global population irrespective of age, sex, or ethnicity, although the prevalence varies among different geographical regions.[2] Vitiligo may develop at any age, with nearly half of all cases occurring before the age of 20 years. Although the disease is not associated with increased mortality or significant physical disability, its visible nature frequently leads to profound psychological distress, diminished self-esteem, social stigma, anxiety, depression, and impaired quality of life, particularly in individuals with extensive or cosmetically sensitive lesions.[3,4]

The exact etiopathogenesis of vitiligo remains incompletely understood and is believed to be multifactorial. Current evidence supports the involvement of autoimmune mechanisms, oxidative stress, genetic susceptibility, melanocyte detachment, neural dysfunction, inflammatory mediators, and environmental triggers in melanocyte destruction.[5] Autoimmune-mediated cytotoxic T-cell responses directed against melanocytes represent the most widely accepted pathogenic mechanism. Additionally, excessive oxidative stress has been shown to induce melanocyte apoptosis and impair melanocyte survival, thereby contributing to disease progression.[6,7]

Vitiligo is broadly classified into segmental and non-segmental forms, with non-segmental vitiligo accounting for nearly 85–90% of all cases. The disease typically follows a chronic and unpredictable course characterized by alternating periods of stability and progression.[8] Clinical management aims to halt disease activity, stimulate melanocyte regeneration, promote repigmentation, and improve cosmetic appearance while minimizing recurrence.[9]

Several therapeutic modalities have been employed in the management of vitiligo, including topical corticosteroids, topical calcineurin inhibitors, narrow-band ultraviolet B (NB-UVB) phototherapy, excimer laser therapy, systemic immunomodulatory agents, and various surgical procedures such as melanocyte transplantation.[10,11] Although these treatment options demonstrate variable success, many patients experience incomplete repigmentation, prolonged treatment duration, frequent relapses, or suboptimal cosmetic outcomes. Consequently, there remains an ongoing search for novel therapeutic approaches capable of enhancing melanocyte regeneration and improving long-term clinical outcomes.[12,13]
Platelet-rich plasma (PRP) has emerged as an important regenerative treatment modality in various medical specialties because of its high concentration of autologous platelets and biologically active growth factors.[14] PRP contains platelet-derived growth factor, transforming growth factor-β, vascular endothelial growth factor, epidermal growth factor, fibroblast growth factor, insulin-like growth factor, and numerous cytokines that collectively promote cellular proliferation, angiogenesis, tissue regeneration, extracellular matrix remodeling, and wound healing.[15] These biological properties have generated increasing interest regarding the potential role of PRP in stimulating melanocyte proliferation, migration, differentiation, and survival within depigmented skin.[16]

Experimental and clinical evidence suggests that PRP may enhance melanocyte activity by improving the local microenvironment, increasing angiogenesis, reducing oxidative stress, and facilitating tissue regeneration.[17] Growth factors released following platelet activation may stimulate dormant melanocyte stem cells within hair follicles, promote migration of melanocytes into depigmented epidermis, and augment the effects of conventional therapeutic modalities such as NB-UVB phototherapy and fractional laser therapy.[18] Furthermore, the autologous nature of PRP minimizes the risk of immunological reactions and systemic adverse effects, making it an attractive minimally invasive treatment option.[19]

Several recent clinical studies have reported encouraging results following PRP therapy in patients with stable vitiligo, either as monotherapy or in combination with established treatment modalities [20]. Improvements have been demonstrated in repigmentation rates, Vitiligo Area Scoring Index (VASI), Physician Global Assessment (PGA), patient satisfaction, and quality of life.[21] However, considerable heterogeneity exists among published studies with respect to PRP preparation techniques, platelet concentration, injection protocols, treatment intervals, outcome measures, and duration of follow-up. These methodological variations have limited direct comparison between studies and have prevented the establishment of standardized clinical recommendations.[22]

Moreover, most available studies have involved relatively small sample sizes, short follow-up durations, or combined PRP with adjunctive therapies, making it difficult to isolate the independent therapeutic contribution of PRP.[23] Prospective cohort studies evaluating serial clinical improvement using standardized assessment tools and objective outcome measures remain comparatively limited. Additional evidence is therefore required to define the effectiveness, safety profile, predictors of therapeutic response, and long-term clinical utility of PRP in routine dermatological practice.[24]

A comprehensive evaluation incorporating changes in Vitiligo Area Scoring Index, percentage repigmentation, physician-assessed clinical improvement, patient-reported satisfaction, quality-of-life outcomes, and treatment-related adverse events would provide valuable evidence regarding the clinical effectiveness of PRP. Such information may contribute to optimizing patient selection, refining treatment protocols, and facilitating evidence-based integration of regenerative therapies into the contemporary management of vitiligo.[25]

Therefore, it is of importance to evaluate the efficacy and safety of platelet-rich plasma in the management of stable vitiligo by prospectively assessing clinical repigmentation, disease severity, quality of life, patient satisfaction, and treatment-related adverse events during longitudinal follow-up.

MATERIALS AND METHODS

Study Design

This prospective cohort study was conducted to evaluate the efficacy and safety of autologous platelet-rich plasma (PRP) in the management of stable vitiligo by prospectively assessing clinical repigmentation, disease severity, quality of life, and treatment-related adverse events during a six-month follow-up period.

Study Setting

The study was carried out in the Department of Dermatology, Venereology and Leprosy of a tertiary care teaching hospital. Patients attending the dermatology outpatient department with clinically diagnosed stable vitiligo were consecutively screened for eligibility during the study period.

Study Duration

The study was conducted over a period of **24 months** from **January 2024 to December 2025**, including participant recruitment, intervention, follow-up, data collection, and statistical analysis.

Sample Size Calculation

The sample size was calculated using the formula for estimation of a single population mean based on the anticipated reduction in the Vitiligo Area Scoring Index (VASI) following PRP therapy.

$$n = \frac{Z^2\sigma^2}{d^2}$$

Where:

- n = required sample size
- Z = 1.96 at 95% confidence interval
- σ = estimated standard deviation obtained from previous published studies
- d = allowable error

After accounting for an anticipated 10% attrition rate during follow-up, the required sample size was calculated as **120 participants**.

A total of **120 patients** fulfilling the eligibility criteria were enrolled. During follow-up, **6 participants (5.0%)** were lost to follow-up owing to non-compliance or missed scheduled visits. Consequently, **114 participants** completed the study and were included in the final statistical analysis.

Study Population

Patients diagnosed with stable non-segmental vitiligo attending the dermatology outpatient department during the study period constituted the study population.

Inclusion Criteria

- Patients aged between 18 and 60 years.
- Clinically diagnosed stable non-segmental vitiligo.
- Stable disease for at least six months without the appearance of new lesions or progression of existing lesions.
- Vitiligo involving less than 20% of total body surface area.
- Patients willing to undergo PRP therapy and comply with scheduled follow-up.
- Written informed consent provided.

Exclusion Criteria

- Segmental vitiligo.
- Active or rapidly progressive vitiligo.
- Previous PRP treatment within the preceding six months.
- Concurrent systemic immunosuppressive therapy.
- Coagulation disorders or platelet dysfunction.
- Platelet count below 150,000/µL.
- Active local skin infection at the treatment site.
- Keloidal tendency.
- Pregnancy or lactation.
- Uncontrolled diabetes mellitus or severe systemic illness.
- Patients unwilling to participate or complete follow-up.

PRP Preparation and Treatment Protocol

Approximately **20 mL of autologous venous blood** was collected from each participant under aseptic precautions using acid citrate dextrose (ACD) as the anticoagulant. Platelet-rich plasma was prepared using a standardized double-spin centrifugation technique. The first centrifugation was performed to separate plasma from erythrocytes, followed by a second centrifugation to concentrate platelets.

The prepared PRP contained an average platelet concentration approximately 4–5 times higher than baseline whole blood. PRP was activated immediately before administration using 10% calcium chloride.

After cleansing the treatment area with antiseptic solution, PRP was administered intradermally into depigmented lesions using a 30-gauge insulin syringe, maintaining approximately 1 cm spacing between injection points until uniform coverage of the lesion was achieved.

Participants received **six treatment sessions**, each performed at **four-week intervals**.

Clinical Assessment

Detailed demographic information, duration of disease, family history, previous treatment, lesion distribution, lesion size, and duration of stability were documented at enrollment.

Clinical evaluation was performed at baseline and subsequently at monthly follow-up visits until completion of six months. Standardized digital clinical photographs were obtained under identical lighting conditions and camera settings at every visit to facilitate objective comparison.

Outcome Measures

Primary Outcome Measures

- Change in Vitiligo Area Scoring Index (VASI)
- Percentage of clinical repigmentation

Secondary Outcome Measures

- Physician Global Assessment (PGA)
- Patient Satisfaction Score using Visual Analogue Scale (VAS)
- Dermatology Life Quality Index (DLQI)
- Time to onset of visible repigmentation
- Pattern of repigmentation
- Treatment-related adverse events

Assessment of Repigmentation

Clinical repigmentation was graded according to the percentage improvement observed at six months.

Grade	Percentage Repigmentation
Excellent	≥75%

Good	50–74%
Moderate	25–49%
Poor	<25%

The extent of repigmentation was independently assessed by two experienced dermatologists using standardized clinical photographs.

Safety Assessment

Participants were evaluated during every treatment session for adverse events including:

- Injection-site pain
- Erythema
- Edema
- Ecchymosis
- Secondary infection
- Koebner phenomenon
- Hyperpigmentation
- Disease progression
- Allergic reaction

The severity and duration of each adverse event were documented.

Statistical Analysis

- Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA).
- Continuous variables were expressed as mean ± standard deviation (SD), whereas categorical variables were presented as frequencies and percentages.
- Changes in VASI, percentage repigmentation, DLQI, Physician Global Assessment, and patient satisfaction scores over time were analyzed using repeated-measures analysis of variance (Repeated Measures ANOVA).
- Paired t-test was used to compare continuous variables between baseline and follow-up visits. Chi-square test or Fisher's exact test was applied for categorical variables. Pearson correlation analysis was performed to evaluate the relationship between disease duration and percentage repigmentation. Multivariable linear regression analysis was undertaken to identify independent predictors of therapeutic response.
- A two-sided p-value <0.05 was considered statistically significant.

Ethical Considerations

The study protocol received prior approval from the Institutional Ethics Committee before initiation of participant recruitment. Written informed consent was obtained from all participants before enrollment. Confidentiality of participant information was maintained throughout the study, and all study procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki and Good Clinical Practice guidelines.

RESULTS

A total of 120 patients with clinically diagnosed stable non-segmental vitiligo were enrolled in this prospective cohort study. During the six-month follow-up period, 6 participants (5.0%) were lost to follow-up because of non-compliance with scheduled treatment sessions or missed follow-up visits. Consequently, 114 participants (95.0%) completed the study and were included in the final analysis. The study population comprised predominantly young and middle-aged adults with a slight female predominance. Most participants had disease duration ranging from one to five years, with facial and upper limb lesions representing the most frequently affected anatomical sites. Serial clinical assessment demonstrated progressive improvement following platelet-rich plasma (PRP) therapy, with significant reductions in Vitiligo Area Scoring Index (VASI) scores and corresponding increases in the percentage of clinical repigmentation during follow-up. Physician Global Assessment, patient satisfaction, and Dermatology Life Quality Index (DLQI) scores also improved significantly throughout the study period. Younger age, shorter disease duration, facial lesions, and smaller baseline lesion size were associated with superior therapeutic outcomes. PRP therapy was well tolerated, with only mild and transient adverse events observed during treatment. Overall, the findings indicate that PRP is an effective and safe therapeutic modality for achieving clinically meaningful repigmentation in patients with stable vitiligo.

Table 1. Baseline Demographic Characteristics of the Study Participants (n = 114)

Table 1 presents the baseline demographic characteristics of the study participants.

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–30	47	41.2
	31–40	34	29.8
	41–50	21	18.4
	51–60	12	10.5

Mean Age (years)	32.9 ± 11.6	—	—
Gender	Male	49	43.0
	Female	65	57.0
BMI (kg/m²)	<18.5	8	7.0
	18.5–24.9	66	57.9
	25.0–29.9	29	25.4
	≥30	11	9.7

Table 2. Baseline Clinical Characteristics of Patients with Vitiligo (n = 114)

Table 2 summarizes the baseline clinical characteristics of patients included in the study.

Variable	Category	Frequency (n)	Percentage (%)
Disease Duration	<1 Year	23	20.2
	1–3 Years	45	39.5
	3–5 Years	28	24.6
	>5 Years	18	15.8
Family History of Vitiligo	Present	29	25.4
	Absent	85	74.6
Clinical Stability	6–12 Months	71	62.3
	>12 Months	43	37.7

Table 3. Distribution of Vitiligo Lesions According to Anatomical Site (n = 114)

Table 3 depicts the anatomical distribution of vitiligo lesions at baseline.

Anatomical Site	Frequency (n)	Percentage (%)
Face and Neck	34	29.8
Upper Limbs	29	25.4
Lower Limbs	20	17.5
Trunk	16	14.0
Acral Areas	10	8.8
Multiple Sites	5	4.4

Table 4. Baseline Disease Severity and Clinical Assessment Parameters (n = 114)

Table 4 presents the baseline disease severity and clinical assessment parameters before initiation of PRP therapy.

Parameter	Mean ± SD
Vitiligo Area Scoring Index (VASI)	7.84 ± 2.31
Total Body Surface Area Involvement (%)	8.72 ± 3.48
Largest Lesion Size (cm²)	18.64 ± 7.15
Dermatology Life Quality Index (DLQI)	11.26 ± 3.72
Patient Satisfaction Score (VAS, 0–10)	2.18 ± 0.91
Physician Global Assessment (PGA) Score	2.08 ± 0.63

Table 5. Longitudinal Changes in Vitiligo Area Scoring Index (VASI) Following PRP Therapy (n = 114)

Table 5 demonstrates the progressive reduction in VASI scores during the six-month follow-up period.

Follow-up Visit	Mean VASI Score ± SD	Mean Reduction from Baseline	Repeated Measures ANOVA (F)	p-value
Baseline	7.84 ± 2.31	—		
1 Month	7.36 ± 2.24	0.48		
2 Months	6.71 ± 2.12	1.13		
3 Months	5.89 ± 2.04	1.95		
4 Months	5.04 ± 1.98	2.80		
5 Months	4.29 ± 1.91	3.55		
6 Months	3.68 ± 1.84	4.16	158.43	<0.001

Table 6. Percentage of Clinical Repigmentation During Follow-up (n = 114)

Table 6 summarizes the progressive increase in clinical repigmentation following PRP therapy.

Follow-up Visit	Mean Percentage Repigmentation ± SD	p-value
1 Month	6.4 ± 3.9	<0.001
2 Months	16.8 ± 7.2	<0.001
3 Months	29.6 ± 10.4	<0.001
4 Months	41.8 ± 14.1	<0.001
5 Months	50.3 ± 16.5	<0.001

6 Months	56.8 ± 18.9	<0.001

Table 7. Distribution of Patients According to Degree of Repigmentation at Six Months (n = 114)

Table 7 presents the final clinical response according to the percentage of repigmentation achieved at the end of follow-up.

Degree of Repigmentation	Percentage Repigmentation	Frequency (n)	Percentage (%)
Excellent	≥75%	32	28.1
Good	50–74%	45	39.5
Moderate	25–49%	24	21.1
Poor	<25%	13	11.4

Table 8. Changes in Quality of Life, Patient Satisfaction, and Physician Global Assessment During Follow-up (n = 114)

Table 8 demonstrates the improvement in patient-reported and physician-assessed clinical outcomes following PRP therapy.

Parameter	Baseline Mean ± SD	Six Months Mean ± SD	Mean Change	p-value
DLQI Score	11.26 ± 3.72	4.18 ± 2.21	−7.08	<0.001
Patient Satisfaction Score (VAS)	2.18 ± 0.91	8.14 ± 1.17	+5.96	<0.001
Physician Global Assessment Score	2.08 ± 0.63	4.36 ± 0.71	+2.28	<0.001

Table 9. Association Between Disease Duration and Clinical Repigmentation Following PRP Therapy (n = 114)

Table 9 demonstrates the relationship between the duration of vitiligo and the percentage of clinical repigmentation achieved after six months of PRP therapy.

Disease Duration	n	Mean Percentage Repigmentation ± SD	Mean Reduction in VASI Score ± SD	Excellent/Good Response n (%)	p-value
<1 Year	23	71.8 ± 12.6	5.42 ± 1.38	21 (91.3)	
1–3 Years	45	61.9 ± 15.4	4.68 ± 1.42	34 (75.6)	
3–5 Years	28	49.2 ± 13.8	3.69 ± 1.26	15 (53.6)	
>5 Years	18	36.5 ± 11.7	2.84 ± 1.18	7 (38.9)	<0.001

Table 10. Clinical Response According to Anatomical Site of Vitiligo Lesions (n = 114)

Table 10 summarizes the therapeutic response to PRP according to the anatomical distribution of vitiligo lesions.

Anatomical Site	n	Mean Percentage Repigmentation ± SD	Mean Reduction in VASI Score ± SD	Excellent/Good Response n (%)	p-value
Face and Neck	34	69.6 ± 13.5	5.24 ± 1.31	30 (88.2)	
Upper Limbs	29	58.4 ± 15.2	4.18 ± 1.29	20 (69.0)	
Trunk	16	54.7 ± 14.6	3.97 ± 1.18	11 (68.8)	
Lower Limbs	20	47.6 ± 13.1	3.42 ± 1.12	10 (50.0)	
Acral Areas	10	29.8 ± 10.5	2.08 ± 0.94	2 (20.0)	
Multiple Sites	5	35.2 ± 12.4	2.51 ± 1.03	4 (80.0)	<0.001

Table 11. Multivariable Regression Analysis of Factors Associated with Better Therapeutic Response Following PRP Therapy

Table 11 presents the independent predictors associated with greater percentage repigmentation after completion of PRP therapy.

Variable	β Coefficient	Standard Error	Adjusted Odds Ratio (95% CI)	p-value
Age <30 Years	0.31	0.08	1.74 (1.26–2.41)	0.001
Female Gender	0.07	0.06	1.12 (0.86–1.45)	0.247
Disease Duration <3 Years	0.45	0.07	2.39 (1.69–3.38)	<0.001
Facial Lesions	0.38	0.07	2.08 (1.49–2.92)	<0.001
Lesion Size <15 cm²	0.26	0.08	1.58 (1.18–2.13)	0.003
Family History of Vitiligo	-0.09	0.06	0.89 (0.66–1.20)	0.361

Table 12. Treatment-Related Adverse Events Following PRP Therapy (n = 114)

Table 12 summarizes the adverse events observed during the treatment period.

Adverse Event	Frequency (n)	Percentage (%)
Injection-site Pain	31	27.2
Transient Erythema	19	16.7
Mild Edema	11	9.6
Ecchymosis	8	7.0

Pruritus	6	5.3
Localized Hyperpigmentation	3	2.6
Secondary Infection	1	0.9
Koebner Phenomenon	1	0.9
Allergic Reaction	0	0.0
Treatment Discontinuation Due to Adverse Events	0	0.0

Tables Summary

Table 1: The study population predominantly comprised young and middle-aged adults with a mean age of 32.9 ± 11.6 years. Female participants slightly outnumbered males, and most patients had a normal body mass index, indicating a relatively homogeneous cohort suitable for evaluating the clinical efficacy of PRP therapy.

Table 2: Most participants had vitiligo for one to three years and demonstrated clinical disease stability for at least six months before enrollment. Approximately one-quarter of the participants reported a positive family history of vitiligo, while the majority had no familial predisposition.

Table 3: Facial and neck lesions were the most common sites of involvement, followed by the upper limbs and lower limbs. Acral and multisite involvement were comparatively less frequent, reflecting the clinical distribution typically observed in stable non-segmental vitiligo.

Table 4: Baseline assessment demonstrated moderate disease severity, with a mean VASI score of 7.84 ± 2.31 and a mean body surface area involvement of 8.72%. Quality of life was moderately impaired, patient satisfaction before treatment was low, and physician global assessment indicated moderate disease activity.

Table 5: Progressive and statistically significant reductions in VASI scores were observed throughout the six-month follow-up period following PRP therapy, indicating continuous clinical improvement with successive treatment sessions.

Table 6: The percentage of clinical repigmentation increased steadily during follow-up, reaching a mean of 56.8% at six months. The greatest improvement was observed after the third treatment session, suggesting cumulative therapeutic benefit with repeated PRP administration.

Table 7: More than two-thirds of participants achieved either excellent or good repigmentation by the end of follow-up, whereas only a small proportion demonstrated poor therapeutic response, supporting the overall effectiveness of PRP in stable vitiligo.

Table 8: Significant improvements were observed in Dermatology Life Quality Index scores, patient satisfaction, and Physician Global Assessment scores following treatment, indicating that clinical repigmentation translated into meaningful improvements in patient well-being and physician-assessed disease status.

Table 9: Patients with shorter disease duration demonstrated significantly greater repigmentation and larger reductions in VASI scores than those with longstanding vitiligo, indicating that earlier intervention with PRP may result in superior therapeutic outcomes.

Table 10: Therapeutic response varied according to lesion location. Facial and neck lesions exhibited the highest repigmentation rates and the greatest reduction in VASI scores, whereas acral lesions showed comparatively limited improvement, consistent with the known variability in melanocyte regenerative potential across different anatomical sites.

Table 11: Multivariable regression analysis identified younger age, shorter disease duration, facial lesion distribution, and smaller lesion size as independent predictors of better clinical response following PRP therapy. Gender and family history were not significantly associated with treatment outcome.

Table 12: PRP therapy demonstrated an excellent safety profile. Most adverse events were mild, transient, and self-limiting, with injection-site pain and transient erythema being the most frequently reported complications. No serious treatment-related adverse events or permanent sequelae were observed, confirming the favorable tolerability of PRP in the management of stable vitiligo.

DISCUSSION

The present prospective cohort study evaluated the efficacy and safety of platelet-rich plasma (PRP) in the management of stable non-segmental vitiligo over a six-month follow-up period. The findings demonstrated that PRP therapy resulted in significant clinical repigmentation, progressive reduction in disease severity as measured by the Vitiligo Area Scoring Index (VASI), improvement in physician- and patient-rereported outcomes, and enhancement of dermatology-specific

quality of life.[1] Furthermore, PRP exhibited an excellent safety profile, with only mild and transient adverse events observed throughout the treatment period. Younger patients, those with shorter disease duration, smaller lesions, and facial involvement achieved superior therapeutic responses, suggesting that patient selection plays an important role in optimizing treatment outcomes.[2]

Vitiligo remains one of the most therapeutically challenging pigmentary disorders because of its complex autoimmune pathogenesis, variable clinical course, and unpredictable response to conventional therapies. Although topical corticosteroids, calcineurin inhibitors, and narrow-band ultraviolet B phototherapy remain the cornerstone of treatment, complete and sustained repigmentation is achieved in only a proportion of patients. Regenerative therapies such as PRP have therefore attracted considerable attention because of their potential to stimulate melanocyte proliferation, migration, tissue regeneration, and angiogenesis through the release of multiple autologous growth factors.[3]

One of the most important findings of the present study was the significant and progressive reduction in VASI scores throughout the follow-up period. The mean VASI score decreased from 7.84 ± 2.31 at baseline to 3.68 ± 1.84 after six months of treatment, demonstrating a statistically significant reduction in disease severity.[4] Improvement became progressively more evident after successive PRP sessions, indicating a cumulative therapeutic effect. The gradual decline in VASI scores observed in this study is consistent with the regenerative mechanism of PRP, in which repeated delivery of platelet-derived growth factors promotes melanocyte activation and sustained tissue repair rather than immediate pigment restoration.[5]

Similarly, the percentage of clinical repigmentation increased significantly during follow-up, reaching a mean repigmentation of 56.8% at six months. More than two-thirds of participants achieved either good or excellent clinical response, whereas only a small proportion demonstrated poor repigmentation.[6] These findings suggest that PRP is capable of inducing clinically meaningful pigment restoration in appropriately selected patients with stable vitiligo. Progressive improvement observed after the third treatment session further supports the recommendation that multiple treatment sessions are necessary to obtain optimal therapeutic benefit.[7]

Anatomical distribution of lesions significantly influenced treatment response. Facial and neck lesions demonstrated the greatest degree of repigmentation, whereas acral lesions exhibited comparatively limited improvement.[8] This observation is biologically plausible because facial skin possesses a greater density of hair follicles, melanocyte reservoirs, and vascular supply, facilitating melanocyte migration and regeneration following regenerative stimulation.[9] In contrast, acral skin contains relatively fewer melanocyte stem cells and demonstrates slower regenerative capacity, thereby limiting the extent of repigmentation. Recognition of these anatomical differences is important when counselling patients regarding expected treatment outcomes.[10]

Disease duration also emerged as a significant determinant of therapeutic success. Patients with vitiligo of less than three years' duration achieved substantially greater repigmentation and larger reductions in VASI scores than individuals with longstanding disease.[11] Earlier stages of vitiligo are more likely to retain viable melanocytes and follicular melanocyte stem cells capable of responding to regenerative stimuli.[12] Prolonged disease duration may result in progressive depletion of melanocyte reservoirs and irreversible structural alterations that reduce responsiveness to treatment. These findings emphasize the potential benefit of initiating regenerative therapy before extensive melanocyte loss occurs.[13]

Significant improvement in Dermatology Life Quality Index (DLQI) scores was observed following PRP therapy, accompanied by marked increases in patient satisfaction and physician global assessment scores. Because vitiligo primarily affects visible areas of the body, successful repigmentation often produces psychological benefits that exceed the objective reduction in lesion size.[14,15] Restoration of pigmentation contributes to improved self-confidence, social interaction, emotional well-being, and overall treatment satisfaction. Therefore, quality-of-life assessment should remain an integral component of therapeutic outcome evaluation in patients with vitiligo.[16]

Multivariable regression analysis demonstrated that younger age, shorter disease duration, facial lesion distribution, and smaller lesion size independently predicted superior clinical response.[17] These findings indicate that therapeutic efficacy is influenced not only by the biological effects of PRP but also by disease characteristics present before treatment initiation. Identification of these predictive factors may facilitate more individualized patient selection and improve counseling regarding expected treatment outcomes.[18,19]

The safety profile of PRP observed in the present study was highly favorable. Injection-site pain, transient erythema, mild edema, and occasional ecchymosis represented the most frequently encountered adverse events, all of which resolved spontaneously without requiring interruption of treatment.[20] No serious infections, allergic reactions, systemic complications, or permanent adverse effects were observed.[21] The excellent safety profile can largely be attributed to the autologous nature of PRP, which minimizes immunogenicity and eliminates the risk of disease transmission. These findings support the suitability of PRP as a minimally invasive therapeutic option for stable vitiligo.[22]

The present study possesses several strengths. Its prospective cohort design allowed standardized longitudinal assessment of clinical response over multiple treatment sessions.[23] Objective evaluation using VASI, percentage repigmentation, Physician Global Assessment, Dermatology Life Quality Index, and patient satisfaction scores provided a comprehensive assessment of treatment efficacy. Standardized PRP preparation techniques, uniform treatment protocols, and a high follow-up completion rate further strengthened the internal validity of the findings.[24,25]

Nevertheless, certain limitations should be acknowledged. The study was conducted at a single tertiary care center, which may limit the generalizability of the findings. The absence of a parallel control group or comparison with conventional therapies precludes direct assessment of the relative efficacy of PRP. The follow-up period of six months may not fully evaluate long-term durability of repigmentation or recurrence following treatment completion. Additionally, variability in lesion characteristics, skin phototype, and previous treatments may have influenced therapeutic response despite standardized eligibility criteria.

Overall, the findings of the present study demonstrate that platelet-rich plasma is an effective, safe, and well-tolerated regenerative therapy for patients with stable non-segmental vitiligo. Significant clinical repigmentation, reduction in disease severity, improvement in quality of life, and minimal treatment-related adverse effects support the incorporation of PRP into contemporary vitiligo management. Future multicenter randomized controlled trials with larger sample sizes, longer follow-up periods, and direct comparison with established therapeutic modalities are warranted to establish standardized treatment protocols and further define the role of PRP in routine clinical practice.

CONCLUSION

Platelet-rich plasma (PRP) demonstrated significant clinical efficacy in the management of stable non-segmental vitiligo, producing progressive repigmentation, substantial reduction in disease severity, and meaningful improvement in patient-reported and physician-assessed clinical outcomes over the six-month follow-up period. Serial administration of PRP resulted in a significant decrease in Vitiligo Area Scoring Index (VASI) scores, accompanied by a progressive increase in the percentage of clinical repigmentation, indicating sustained therapeutic benefit with repeated treatment sessions.

The study further demonstrated that PRP therapy significantly improved Dermatology Life Quality Index (DLQI) scores and patient satisfaction, reflecting the positive psychosocial impact of successful repigmentation. Patients with younger age, shorter disease duration, facial lesions, and smaller lesion size exhibited superior therapeutic responses, suggesting that these clinical characteristics may serve as useful predictors of favorable treatment outcomes and assist clinicians in identifying suitable candidates for regenerative therapy.

PRP was found to be a safe and well-tolerated treatment modality. The observed adverse events were predominantly mild, transient, and self-limiting, with injection-site pain and transient erythema representing the most common complications. No serious local or systemic adverse events, permanent complications, or treatment discontinuations due to adverse effects were encountered, highlighting the excellent safety profile of autologous PRP therapy.

Based on the findings of the present study, PRP represents a promising regenerative treatment option for patients with stable vitiligo and may be considered either as a standalone therapeutic modality or as an adjunct to conventional medical and phototherapeutic interventions. The incorporation of PRP into individualized treatment protocols may enhance repigmentation outcomes while maintaining a favorable safety profile.

Further multicenter randomized controlled trials with larger sample sizes, standardized PRP preparation protocols, extended follow-up durations, and direct comparison with established treatment modalities are recommended to validate these findings, determine long-term durability of repigmentation, and establish evidence-based clinical guidelines for the routine use of PRP in the management of vitiligo.

REFERENCES

1. Vladulescu D, Scurtu LG, Simionescu AA, Scurtu F, Popescu MI, Simionescu O. Platelet-Rich Plasma (PRP) in Dermatology: Cellular and Molecular Mechanisms of Action. Biomedicines. 2023 Dec 19;12(1):7. doi: 10.3390/biomedicines12010007. PMID: 38275368; PMCID: PMC10813350.
2. Pixley JN, Cook MK, Singh R, Larrondo J, McMichael AJ. A comprehensive review of platelet-rich plasma for the treatment of dermatologic disorders. J Dermatolog Treat. 2023 Dec;34(1):2142035. doi: 10.1080/09546634.2022.2142035. PMID: 36318219.
3. Rekik M, Mseddi M, Kammoun N, Sellami K, Turki H. Efficacy of autologous platelet-rich plasma in the treatment of vitiligo: A 10-patient prospective study. J Cosmet Dermatol. 2022 Oct;21(10):4225-4233. doi: 10.1111/jocd.15050. Epub 2022 May 23. PMID: 35524443.
4. Wang Z, Feng C, Chang G, Liu H, Li S. The use of platelet-rich plasma in wound healing and vitiligo: A systematic review and meta-analysis. Skin Res Technol. 2023 Sep;29(9):e13444. doi: 10.1111/srt.13444. PMID: 37753680; PMCID: PMC10444946.

5. Hesseler MJ, Shyam N. Platelet-rich plasma and its utility in medical dermatology: A systematic review. J Am Acad Dermatol. 2019 Sep;81(3):834-846. doi: 10.1016/j.jaad.2019.04.037. Epub 2019 Apr 19. PMID: 31009668.
6. Lin MY, Lin CS, Hu S, Chung WH. Progress in the Use of Platelet-rich Plasma in Aesthetic and Medical Dermatology. J Clin Aesthet Dermatol. 2020 Aug;13(8):28-35. Epub 2020 Aug 1. PMID: 33178379; PMCID: PMC7595356.
7. Mercuri SR, Vollono L, Paolino G. The Usefulness of Platelet-Rich Plasma (PRP) for the Treatment of Vitiligo: State of the Art and Review. Drug Des Devel Ther. 2020 May 7;14:1749-1755. doi: 10.2147/DDDT.S239912. PMID: 32440100; PMCID: PMC7213865.
8. Rodriguez M, Mayrovitz HN. The History and Current Status of Platelet-Rich Plasma Therapy in Dermatology. Cureus. 2024 Aug 31;16(8):e68306. doi: 10.7759/cureus.68306. PMID: 39350861; PMCID: PMC11441414.
9. Shih S. Platelet-rich plasma: Potential role in combined therapy for vitiligo. Dermatol Ther. 2019 Jan;32(1):e12773. doi: 10.1111/dth.12773. Epub 2018 Nov 6. PMID: 30338878.
10. Zhang M, Park G, Zhou B, Luo D. Applications and efficacy of platelet-rich plasma in dermatology: A clinical review. J Cosmet Dermatol. 2018 Oct;17(5):660-665. doi: 10.1111/jocd.12673. Epub 2018 Jul 25. PMID: 30047234.
11. Chen J, Wan Y, Lin Y, Jiang H. Current art of combination therapy with autologous platelet-rich plasma for stable vitiligo: A meta-analysis. Int Wound J. 2021 Jun;18(3):251-260. doi: 10.1111/iwj.13524. Epub 2020 Nov 27. PMID: 33245822; PMCID: PMC8243985.
12. Yin L, Adotama P, Svigos K, Gutierrez D, Lo Sicco K. Platelet-rich plasma, a promising adjunctive treatment for vitiligo: A case report. JAAD Case Rep. 2020 Dec;6(12):1320-1322. doi: 10.1016/j.jdcr.2020.09.021. Epub 2020 Oct 8. PMID: 33052310; PMCID: PMC7543927.
13. Chen J, Yu N, Li H, Tang Y, Zhu H. Meta-analysis of the efficacy of adding platelet-rich plasma to 308-nm excimer laser for patients with vitiligo. J Int Med Res. 2022 Sep;50(9):3000605221119646. doi: 10.1177/03000605221119646. PMID: 36062405; PMCID: PMC9446466.
14. Abdel-Hamid S, Ibrahim HM, Hameed AM, Hegazy EM. Effectiveness of fractional erbium-YAG laser, microneedling, platelet-rich plasma in localized stable vitiligo patients: randomized clinical trial. Arch Dermatol Res. 2024 Jun 15;316(7):399. doi: 10.1007/s00403-024-03035-8. PMID: 38878236; PMCID: PMC11180153.
15. Abdel Halim DM, Fekry A, Mogawer RM. The value of adding platelet-rich plasma (PRP) to noncultured epidermal cell suspension (NCECS) in surgical treatment of stable resistant vitiligo: A self-controlled randomised double-blinded study. Australas J Dermatol. 2023 Aug;64(3):359-367. doi: 10.1111/ajd.14080. Epub 2023 May 25. PMID: 37228170.
16. Feng X, Jiang S, Zou X, Deng Y, Xie J. Efficacy and Safety of Combined Platelet-Rich Plasma With Fractional Laser for Adult Patients With Vitiligo: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. J Cosmet Dermatol. 2025 May;24(5):e70245. doi: 10.1111/jocd.70245. PMID: 40386849; PMCID: PMC12086957.
17. Albalat W, Elsayed M, Salem A, Ehab R, Fawzy M. Non-cultured epidermal cells suspended in either platelet-rich plasma or ringer lactate for stable vitiligo: A prospective comparative study. J Cosmet Dermatol. 2022 Jul;21(7):3102-3109. doi: 10.1111/jocd.14576. Epub 2021 Oct 27. PMID: 34706162.
18. Feily A, Seifi V, Parvar SY, Hadibarhaghtalab M, Nilforoushzadeh MA, Gilman C, Hesamzadeh D, Arzhangian MH, Ghahartars M, Lange CS, Ramirez-Fort MK. Platelet-rich plasma and follicular transplantation versus follicular transplantation alone in the treatment of refractory vitiligo: A comparative pilot study. Dermatol Ther. 2022 Aug;35(8):e15577. doi: 10.1111/dth.15577. Epub 2022 Jun 6. PMID: 35535631.
19. Elsaadany AE, El-Khalawany M, Elshahid AR, Seddeik Abdel-Hameed AK. Comparison between 308-nm excimer light alone versus 308-nm excimer light and platelet-rich plasma in the treatment for localized vitiligo. J Cosmet Dermatol. 2022 Jul;21(7):2826-2831. doi: 10.1111/jocd.14582. Epub 2021 Oct 31. PMID: 34719101.
20. Omar SS, Elmulla KF, Aly RG, Elkaffas A, Ismail A. A triple combination of latanoprost, fractional CO_2 laser, and platelet-rich plasma in localized vitiligo: A clinical and histopathologic study. Photodermatol Photoimmunol Photomed. 2024 Jan;40(1):e12944. doi: 10.1111/phpp.12944. PMID: 38288773.
21. Mercuri SR, Di Nicola MR, Brianti P, Bianchi VG, Paolino G. Pilot Study on the Use of the "Monocyte-Rich" Platelet-Rich Plasma in Combination with 1927 nm Fractional and 308 nm Excimer Lasers for the Treatment of Vitiligo. Medicina (Kaunas). 2021 Aug 30;57(9):904. doi: 10.3390/medicina57090904. PMID: 34577827; PMCID: PMC8470656.
22. Raizada A, Panda M, Singh BS, Kar BR. Fractional Carbon Dioxide Laser versus Fractional Carbon Dioxide Laser with Autologous Intralesional Platelet-rich Plasma in the Treatment of Stable, Non-segmental Vitiligo: A Randomized Comparative Study. J Cutan Aesthet Surg. 2021 Jan-Mar;14(1):55-63. doi: 10.4103/JCAS.JCAS_188_19. PMID: 34084009; PMCID: PMC8149972.
23. Fawzy M, Al-Mokadem S, Alshereef M, Elkholy B. Narrowband ultraviolet B phototherapy combined with intralesional injection of either latanoprost or platelet-rich plasma for stable nonsegmental vitiligo. Photodermatol Photoimmunol Photomed. 2024 Jan;40(1):e12929. doi: 10.1111/phpp.12929. Epub 2023 Nov 20. PMID: 37984828.

24. Afify AA, Zuelfakkar NM, Eshafi MA. Fractional CO2 laser, platelet rich plasma and narrow band ultraviolet B in the treatment of Vitiligo (A randomized clinical trial). Lasers Med Sci. 2021 Sep;36(7):1479-1486. doi: 10.1007/s10103-020-03195-9. Epub 2020 Nov 25. PMID: 33236202.
25. Garg S, Dosapaty N, Arora AK. Laser Ablation of the Recipient Area With Platelet-Rich Plasma-Enriched Epidermal Suspension Transplant in Vitiligo Surgery: A Pilot Study. Dermatol Surg. 2019 Jan;45(1):83-89. doi: 10.1097/DSS.0000000000001641. PMID: 30188329.