Content available at: https://www.ipinnovative.com/open-access-journals

IP Indian Journal of Clinical and Experimental Dermatology

Journal homepage: https://ijced.org/

Original Research Article

Prolonged high dose daily oral vitamin D3 in the management of psoriasis: A retrospective chart analysis

Renu Mahtani[1], Sudhir Singh[2]*, Pradeep MK Nair[3], Satya Prakash Singh[4], Mankul Goyal[5]

[1]Dept. of Medicine, Param Health Centre, Pune, Maharashtra, India
[2]Dept. of Plastic Surgery, Getwell Hospital, Varanasi, Uttar Pradesh, India
[3]Dept. of Integrative Oncology, Mirakle Integrated Health Centre, Coimbatore, Tamil Nadu, India
[4]Dept. of Mathematics & Statistics, Indian Institute of Technology, Kanpur, Uttar Pradesh, India
[5]Dept. of Dermatology, Sitaram Bhartia Institute of Science and Research, New Delhi, India

Abstract

Background: Autoimmune disorders, particularly psoriasis, are often associated with vitamin D deficiency and vitamin D resistance. Higher daily doses of vitamin D3 are considered effective in overcoming vitamin D resistance and reversing psoriasis symptoms. This study was conducted to evaluate the safety and efficacy of individualized, prolonged high-dose daily oral vitamin D3 therapy in patients with moderate-to-severe psoriasis.

Materials and Methods: In this study, we present data from 95 patients with moderate-to-severe psoriasis who underwent individualized high-dose daily oral vitamin D3 (cholecalciferol) therapy. From this cohort, six representative cases are described in detail to illustrate the approach to personalized dosing and the monitoring process using biochemical markers such as parathyroid hormone (PTH) and ionized calcium. The efficacy of the intervention was assessed using Psoriasis Area and Severity Index (PASI) scores, while safety was evaluated through regular monitoring of serum creatinine and ionized calcium levels. Statistical analyses were conducted to examine the relationship between vitamin D3 dosage, serum 25(OH)D levels, PTH suppression, and clinical improvement.

Results: Significant clinical improvement or remission was noted, without hypercalcemia or toxicity. PTH levels consistently declined in parallel with clinical response, suggesting vitamin D action.

Conclusion: Monitored oral vitamin D3 therapy in higher than supplemental dose, can be a safe and effective treatment for psoriasis.

Keywords: Vit D3 therapy, Parathyroid hormone, Vitamin D resistance, Ionized calcium.

Received: 03-07-2025; **Accepted:** 11-08-2025; **Available Online**: 26-09-2025

1. Introduction

Psoriasis is an autoimmune skin disease with enormous physical, emotional and psychosocial distress in affected patients along with limited long-term relief. Managing this condition remains a clinical challenge, as many current treatments offer temporary relief or come with side effects. The understanding that psoriasis is a systemic disease rather than a skin disorder alone, has shown the way for therapies to correct the dysregulated cells of the immune system.

There is growing evidence of an inverse link between vitamin D levels and the severity of autoimmune diseases, including psoriasis.[1,2] Research shows that people with psoriasis often have low vitamin D levels, and this deficiency may make the disease worse.[3] In recent years, vitamin D has gained special attention in psoriasis due to it's important role in skin health and immune regulation.[4] Vitamin D helps control the growth of skin cells (keratinocytes) and reduces inflammation—both of which are key problems in psoriasis. Vitamin D is a key regulator of immune homeostasis, which exerts its biological effect by binding to the vitamin D

*Corresponding author: Sudhir Singh
Email: s.sulekha@gmail.com

https://doi.org/10.18231/j.ijced.89447.1758864688

receptor (VDR). The VDR is a nuclear receptor expressed in nearly all human cells, particularly immune cells. Through VDR activation, vitamin D modulates the transcription of immune and inflammatory genes and is found to suppress Th17-mediated autoimmunity and promote T-regulatory cell differentiation.[5]

Further, genetic polymorphisms have been found in the vitamin D receptors in those with autoimmune disorders. This creates a state of "vitamin D resistance" which refers to a reduced physiological response to standard vitamin D3 doses, despite adequate serum levels.[6] Vitamin D resistance can significantly impair the immunomodulatory and genomic functions of vitamin D, contributing to chronic inflammatory and autoimmune conditions, and warrant the use of higher doses of vitamin D to achieve meaningful clinical effects.

Vitamin D resistance can be assessed by periodically monitoring the level of parathyroid hormone. Elevated or poorly suppressed parathyroid hormone (PTH) despite sufficient vitamin D blood level points towards vitamin D resistance. Low vitamin D levels lead to an elevation of the parathyroid hormone as a natural feedback mechanism of the body. With vitamin D3 therapy, the PTH levels are expected to come down. Due to vitamin D resistance found in autoimmunity, the drop in parathyroid hormone is lesser or suboptimal. A poor PTH suppression to vitamin D3 supplementation would indicate higher vitamin D resistance and indicate the need to increase the dose of vitamin D, to combat this resistance and better biological actions.[7] The magnitude of drop in serum parathyroid hormone levels would be a marker for the biological response to vitamin D action. Thus, monitoring of parathyroid hormone serum levels becomes the biological indicator to estimate the optimal therapeutic dose of vitamin D3, which is found to be higher than supplemental doses when used for treating autoimmune disorders including psoriasis.

As vitamin D facilitates calcium absorption from the gut, high dose vitamin D intake can lead to secondary hypercalcemia and pose a health risk. High serum levels of vitamin D have not been found to pose a threat as long as hypercalcemia can be prevented.[8,9] This can be achieved by restricting the intake of calcium rich foods and adequate hydration. The safety of using high doses of vitamin D can be ensured by monitoring the ionized calcium levels periodically and preventing hypercalcemia from occurring. These safety practices have been validated while utilizing high-dose vitamin D termed as the "Coimbra Protocol," with patient monitoring and dietary management applied.[10]

While vitamin D3's immunomodulatory effects are well-established, most clinical trials have used conservative doses (1,000–10,000 IU/day) with modest or inconsistent outcomes. Little or no benefits are reported, though studies do confirm that lower vitamin D levels are associated with more severe disease. Identifying the reason for low response is vital in autoimmune conditions, where significantly higher doses may be necessary to achieve therapeutic effects. Newer studies have tested higher doses up to 35,000 IU per day in psoriasis, with promising results, without causing harmful increases in calcium levels in the blood [10]. In our clinical setup, we have used high-dose daily oral vitamin D3 therapy (30,000 to 60,000 IU per day) tailored to individual needs in patients with moderate-to-severe psoriasis.[11]

In this paper, we are sharing the analysis of the data of 95 patients, aiming to shed light on the potential of daily, oral, higher than usual dose, vitamin D3 therapy, as a safe and effective treatment option for psoriasis. As serum 25(OH)D levels alone offer limited insight into vitamin D's biological response, due to vitamin D resistance in autoimmunity, the drop in parathyroid hormone (PTH) level is the marker central to our individualized high dose vitamin D therapy dosing strategy, and safety monitoring with periodic checking of ionized calcium to prevent hypercalcemia. Six sample cases from the cohort are being shared in detail to exemplify the monitoring methodology.

2. Materials and Methods

This study evaluated the safety and efficacy of individualized high-dose daily oral vitamin D3 therapy in 95 adult patients (aged ≥18 years) diagnosed with moderate-to-severe psoriasis. Patients included in the study were not under phototherapy, systemic corticosteroids, immunosuppressive agents, biologics, or any other complementary therapies during the intervention period. All participants were adequately informed about the principles of the therapeutic approach through educational pamphlets, videos, and relevant published research. Written informed consent was obtained from all patients prior to initiation of therapy. The study was approved by Institutional Ethics Committee of Indian Academy of Scientific Writing and Research, Pune via F.No: 1-2/ IASWAR-IEC-2025-26/P16.

To illustrate clinical effectiveness and individualization of therapy, six representative cases were randomly selected from the cohort. These cases exemplify the rationale for dosing adjustments based on regular monitoring of biochemical parameters including parathyroid hormone (PTH) and ionized calcium levels.

2.1. Intervention

Initial vitamin D3 (cholecalciferol) dosing was stratified based on body weight:

1. Patients weighing 60–75 kg received 30,000 IU daily.
2. Patients weighing >75 kg received 40,000 IU daily.

For patients with insufficient baseline serum 25(OH)D levels, a loading dose was administered prior to initiating the daily regimen:

1. Patients with 25(OH)D levels <20 ng/ml received a loading dose of 600,000 IU over 10 days (60,000 IU/day).
2. Patients with 25(OH)D levels between 20–29 ng/ml received a loading dose of 300,000 IU over 5 days (60,000 IU/day).

Vitamin D3 dosing was reduced if ionized calcium levels exceeded 1.33 mmol/L or if serum PTH levels dropped below 12 pg/ml.

2.2. Monitoring and safety measures

Clinical and biochemical monitoring was conducted throughout the 12-month study period:

1. Baseline testing included: serum 25(OH)D, PTH, ionized calcium, and serum creatinine.
2. Follow-up blood tests for PTH and ionized calcium were conducted every 2–3 months.
3. PASI scoring and 25(OH)D measurement were repeated at baseline, 3-4 months, and 12 months.
4. A minimum of four clinic visits with corresponding laboratory assessments were scheduled for each patient over the study period.

All patients received tailored dietary counseling to moderate the intake of calcium-rich foods (e.g., dairy, seeds, and nuts) based on individual ionized calcium levels. Supportive nutritional cofactors known to aid vitamin D metabolism—such as magnesium glycinate, selenium, zinc, and omega-3 fatty acids—were co-administered. Patients were encouraged to engage in regular aerobic and weight-bearing exercises to support bone health.

2.3. Outcomes

1. Efficacy Endpoint: The primary efficacy outcome was the proportion of patients achieving a 50% or greater reduction in Psoriasis Area and Severity Index (PASI 50) from baseline. PASI 50 is recognized as a clinically meaningful indicator of symptom improvement.[12]
2. Safety Endpoint: Safety was assessed based on the number and percentage of patients experiencing adverse events, defined as any new or worsening signs, symptoms, abnormal laboratory findings, or medical conditions emerging during the study period (up to 12 months), irrespective of causality.

3. Results

We are sharing the representative cases first to showcase the treatment methodology, dynamics between PTH levels and vitamin D dose, variable individualized dose requirement for each till the lowering to the maintenance dose for each of them.

Then we are sharing the statistical analyses done on the data of the entire cohort of 95 patients treated – PASI scores, vitamin D levels, PTH levels and vitamin D dose dynamics, safety monitoring with ionized calcium and the outcome.

3.1. Representative cases

Patients with varying durations and types of psoriasis, including palmo-plantar, plaque, and erythrodermic forms, as well as comorbid autoimmune conditions such as lupus, vitiligo, and hypothyroidism are being projected to represent the methodology of treatment. While all patients were initially started on 30,000 IU of vitamin D3 per day, the dosage was subsequently adjusted on an individual basis, depending on their clinical response and changes in parathyroid hormone (PTH) levels, as discussed earlier.

3.1.1. Case 1

32-year-old male with plantar psoriasis for 3 years presented with itching and thick scaly eruptions (PASI 4.3). The vitamin D level was 94 ng/ml (he was taking 20000 IU Vit D daily) and PTH was 37.5 pg/ml. His vitamin D dose was made 30000 IU daily. After 3 months, the PASI score had reduced to 3 with reduction in itching and scaling by about 50%. His PTH levels had not changed much (35.5 pg/ml) and the ionized calcium remained within normal range (1.26 mg/dl). So the vitamin D dose was increased to 40000 IU daily. He showed more than 90% control of disease by the end of the 8th months (PASI 0.7) with PTH dropping down to 27.7 pg/ml and no hypercalcemia (Ionized calcium 1.27 mg/dl). The dose of vitamin D was reduced and by the end of 1 year, he was on a maintenance dose of 25000 IU daily, with periodic follow-ups, there is no relapse over 3 years. (**Figure 1**)

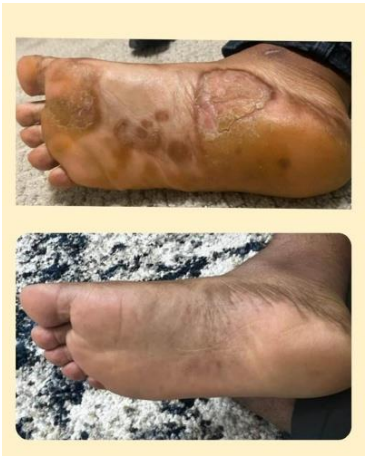


Figure 1: Case 1 - Plantar psoriasis

3.1.2. Case 2

77-year-old lady, case of lupus and hypothyroidism, came for her extremely itchy and inflamed psoriatic skin (PASI 12.6) over legs and hands for 3 years. Her Vitamin D level was 37.52 ng/ml and treatment was started with 24000 IU of Vitamin D3 daily. After a month, the dose was increased to 30000 IU per day. After 3 months, the PTH level had reduced

to 19.6 pg/ml from 28 pg/ml indicating vitamin D response and ionized calcium was 1.1 mg/dL indicating normo-calcemia. By eighth month, the patient presented with a complete control of the disease (PASI= 0.4) and the dose of vitamin D was tapered off over a period of 3 months to 60000 IU per week. Remission was reported and the patient has been on the same maintenance dose for 3 years. (**Figure 2**)

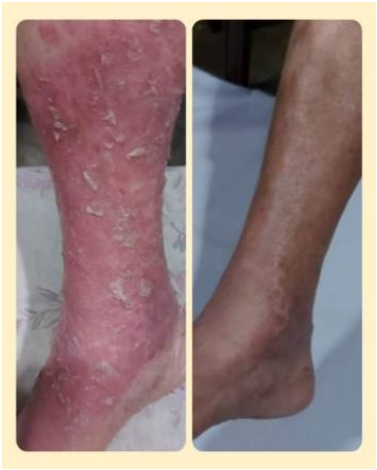


Figure 2: Case 2 psoriasis – legs (with Lupus and hypothyroidism)

3.1.3. Case 3

43-year-old male with psoriasis on his trunk (PASI 8.8) for 6 years, reported exacerbation for 2 years, with eruptions and erythematous scaly plaques. He had very low vitamin D levels as 10 ng/ml and PTH levels 23 pg/ml at baseline. Owing to the severe vitamin D deficiency, he was given 600000 IU of Vitamin D over 10 days, followed by 30000 IU daily for the first 2 months. After 4 months, there was significant improvement (PASI 3). The vitamin D dose was reduced to 20000 IU daily and the patient continued the therapy under monitoring until complete control (PASI=0.6) was achieved by the end of 10 months. The dose was reduced he is under a maintenance dose of 60000 IU of Vitamin D per week and in remission. (**Figure 3**)

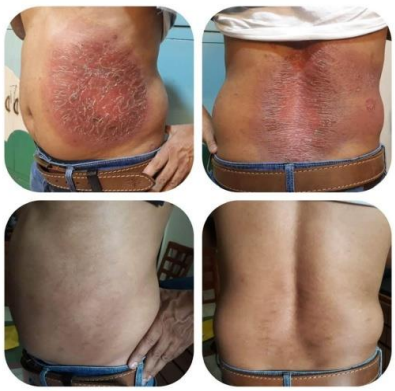


Figure 3: Case 3 psoriasis trunk

3.1.4. Case 4

26-year-old male with 6 years history of psoriasis, presented with erythematous itchy plaques over 60% of his body. His PASI score was 22.7, vitamin D and PTH levels were 17.6 ng/ml and 54 pg/ml respectively. He was put on a daily dose of 30000 IU vit D for the first 4 months. Considering 50% improvement with not a very significant drop in PTH (48 pg/ml) along with well-maintained ionized calcium, the same dose of Vitamin D3 was continued for another 2 months. Almost complete control of the disease was achieved by the end of 8th month (PTH 37 pg/ml, ionized calcium 1.06 mg/dL). Vit D dose was reduced and he is on a daily dose of 15000 IU as the maintenance dose. He has shown almost complete remission PASI (0.6) with just some discoloration of skin. (no erythema, scaling). (**Figure 4**)

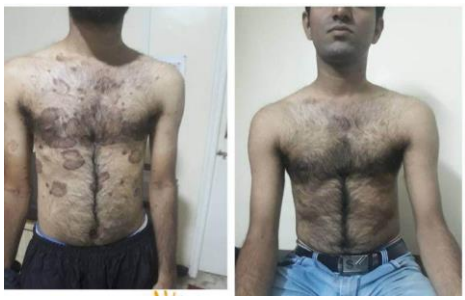


Figure 4: Case 4 psoriasis – whole body

3.1.5. Case 5

A 42-year-old heavily built male diagnosed with psoriasis for 10 years presented with well demarcated, extremely dry and scaly plaques involving the extensor surface of the knees, elbows and hands (PASI 18.4). His tests revealed Vitamin D levels of 15.1 ng/ml and high level (83 pg/ml) of PTH. He was started on 40000 IU daily considering his high BMI of >35. After 4 months, the daily dose of vitamin D3 was further increased to 50000 IU daily as the PTH was 57 pg/ml with Ionized calcium as 1.02 mg/dl. There was 90% remission (PASI 2.4 from 18.4). No further relapse was reported and the patient is under a dose of 40000 IU of Vitamin D daily. He periodically gets the PTH, Ionized calcium checked and his kidney functions are normal. (**Figure 5**)

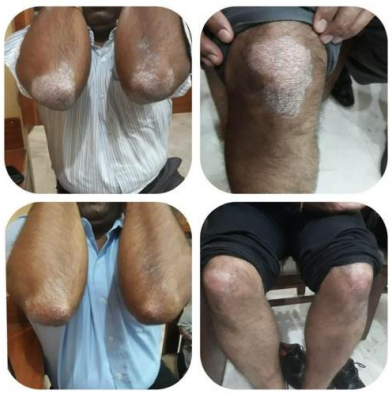


Figure 5: Case 5 psoriasis (extensor aspect of joints)

3.1.6. Case 6

27 years old female with 11 years history of psoriasis and vitiligo presented with severe erythema involving the arms and legs (vitamin D 22.8 ng/ml and PTH 44 pg/ml, PASI

score of 26.8). She was put on 30000 IU daily and the dose was increased to 45000 IU daily after 4 months (marginal change in PTH 35 pg/ml, with Ionized calcium 1.22 mg/dl within normal range (no hypercalcemia), which was further increased to 60000 IU daily with strict restriction of calcium rich foods. PTH checked after 2 months of 60000 IU daily was 18.9 pg/ml and ionized calcium levels within normal range. There was significant improvement in the skin condition (PASI 4.2 from 26.8) and then the dose of vitamin D3 was reduced at a rate of 10000 per month to reach 40000 IU daily by the end of the 1st year of treatment. She is doing well on 30000 IU daily as her maintenance dose. (**Figure 6**)

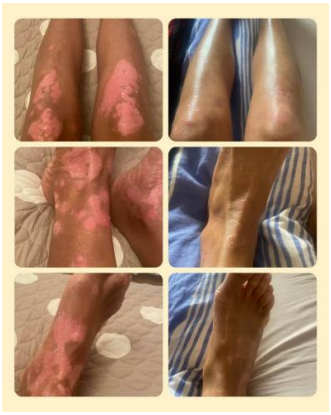


Figure 6: Case 6 Psoriasis – with vitiligo, hypothyroidism

All six patients experienced significant clinical improvement (PASI 90) with individualized high-dose vitamin D3 therapy. Doses ranged from 30,000 to 60,000 IU/day, with treatment durations at maximum dose varying from 4 to 8 months followed by a lower maintenance dose. No patient developed hypercalcemia or vitamin D toxicity with appropriate monitoring and safety measures taken. All patients showed marked reductions in PASI [PASI:90 achieved], indicating near or complete remission. Maintenance doses varied between 20,000 IU/day to 60,000 IU/week (8500 IU per day), depending on individual response and PTH normalization. All were found to be in remission over a period of 3 years of follow up, with no adverse influence on renal parameters or any hyper calcemic toxicity. (**Table 1**)

3.2. Statistical analysis of the cohort of 95 patients of psoriasis treated with high dose oral vitamin D3

Continuous variables have been reported as Mean ± Standard Error (SE). Longitudinal changes have been assessed using the Wilcoxon signed-rank test for paired comparisons between consecutive time points and significance defined as $p<0.05$.

Table 2 reports the basic summary statistics. The average duration of psoriasis ± SE was 10.82 ± 7.89 years in a group of 54 males and 43 females with psoriasis. The mean age was 45.17 ±14.61 years. The estimated weight range was between 58.50 kg and 83.72 kg.

Out of 95 subjects, the predominant form of psoriasis observed - 60 subjects (65%) had plaque psoriasis, 20 (22%) had palmoplantar psoriasis, 8 had erythrodermic, 5 had scalp psoriasis while 2 had the guttate variety. There were some overlaps with more than one variety of psoriasis present in some patients.

Table 3 summarizes the distribution of patients by vitamin D levels. Among the participants, 62 subjects (65%) were vitamin D deficient (vitamin D level <30 ng/ml). Out of them, 37 subjects had vitamin D levels below 20 ng/ml (7 had levels lower than 10 ng/ml) and 25 subjects had vitamin D levels between 20 and 29 ng/ml.

33 subjects (35%) had vitamin D levels of >30 ng/ml. Notably, subjects with vitamin D levels above 30 ng/ml were all taking vitamin D before the onset of treatment. These findings suggest that the routine lifestyle is unlikely to maintain optimal vitamin D level and supplementation seems to be the way to keep levels in range of normalcy (30-100 ng/ml).

Table 1: Outlines the maximum dose administered to each of the six-representative cases, the time point at which the therapeutic endpoint was reached, and the maintenance dose for each.

Case	Age/Sex	Disease Duration	Max Dose (IU/day)	Therapeutic Endpoint	Maintenance Dose
1	32/M	3 years	40,000	8 months	25,000 daily
2	77/F	3 years	30,000	5 months	60,000 weekly
3	43/M	6 years	30,000	4 months	60,000 weekly
4	26/M	6 years	30,000	8 months	15,000 daily
5	42/M	10 years	50,000	6 months	40,000 daily
6	27/F	11 years	60,000	6 months	30,000 daily

Table 2: A summary of age, sex, duration, and weight

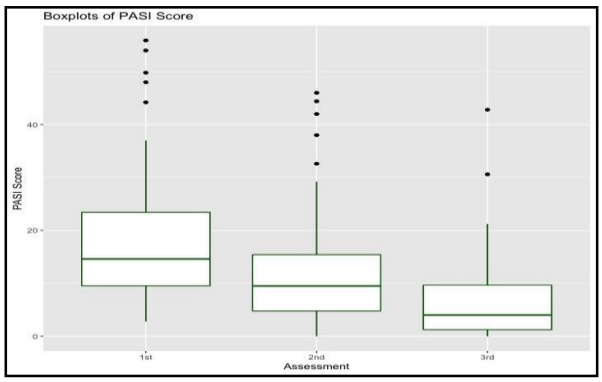
Age (Years) (Mean ± SD)	Weight (Kg) (Mean ± SD)	Duration (Years) (Mean ± SD)	Male	Female
45.17 ± 14.61	71.11 ± 12.61	10.82 ± 7.89	53	42

Table 3: Summary of vitamin D level at onset

Vitamin D levels at the onset	Number of Subjects
<10 ng/ml	07 (7.4%)
10-19 ng/ml	30 (31.5%)
20-29 ng/ml	25 (26.3%)
>30 ng/ml	33 (34.7%)

3.2.1. The psoriasis area and severity index (PASI) score assessment

PASI score was assessed at three different time points (entry, after 3-4 months and after 12 months of treatment). At baseline, the mean PASI score was the highest, with a value of 17.83 (SE = 11.34). In the subsequent assessments, the PASI scores decreased significantly to 11.82 and 6.52, respectively. A corresponding decline was also observed in the associated standard errors (**Graph 1**). These results indicate that the treatment led to a substantial reduction in the affected area over time.



Graph 1: Box plot of PASI scores

Table 4: Relative Decrease (RD) in PASI Scores from Baseline to 12 Month - Post-Treatment Values in parentheses indicate the percentage of cases out of the 95 eligible measurements.

Reduction in PASI score	Count
RD<=25%	7 (7.3%)
25%<RD<50%	15 (15.5%)
RD<50%	22 (23.1%)
RD>=50%	73 (76.8%)
50%<RD<=75%	32 (32.7%)
75%<RD<=90%	23 (24.2%)
RD>90%	18 (18.94%)

Table 4 presents the substantial clinical benefit of vitamin D therapy in managing psoriasis symptoms. During evaluation after 12 months of vitamin D therapy, 76% of the subjects (73 out of 95) had experienced a reduction of 50% or more in their PASI scores (PASI 50 or more) compared to baseline. If PASI 75 or more is assessed, 43% (41 out of 95 subjects) achieved 75% or more reduction in their symptoms. Remarkably, 19% (18/95) had near or complete remission (PASI 90 or more) 22 out of 95 subjects (23.1%) showed improvement of less than 50% with only 7 showing less than <25 % change.

3.2.2. The daily Vit D Dose assessment

The daily Vitamin D dose at the start was 30000 IU for 84 subjects (88.4%) with body weight 60 to 75 kg and 40000 IU daily was the starting dose for 11 subjects (11.6%) with body weight above 75 kg.

The vitamin D dose was adjusted based on the reduction in parathyroid hormone (PTH) levels, assessed every 2–3 months, along with the degree of clinical improvement observed during the treatment period. At the first follow-up, the vitamin D3 dose had to be increased in 64 subjects (66%), of whom 54 were prescribed 40,000–45,000 IU daily. The remaining 10 subjects required even higher doses (50,000–60,000 IU daily) due to factors such as higher body mass index (BMI) and vitamin D resistance.

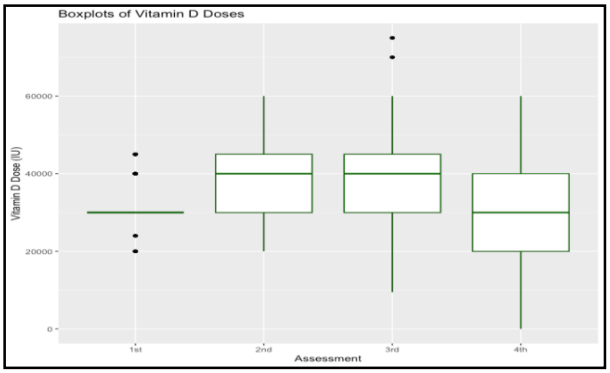
With significant improvement in PASI scores (from 17.83 at baseline to 6.52), after 11–12 months of daily vitamin D therapy, 11 (11.5%) were taking weekly dose of 60,000 IU, 23 (24.2%) were on 15000 - 20000 IU daily, 32 (33.6%) were taking 25000 - 30000 IU daily, 21 (22%) on 40000 - 45000 IU daily, 7 (7.3%) on 50000 IU daily and 1 (1.2%) on 60000 IU daily.

Thus, it is evident that each subject ultimately received a personalized dose of vitamin D, tailored according to several individual factors, including body weight, degree of vitamin D resistance observed through the degree of drop in parathyroid hormone (PTH) levels, and the degree of clinical improvement. However, for broader reference and clinical insight, we present summary statistics of the dosages administered throughout the treatment period.

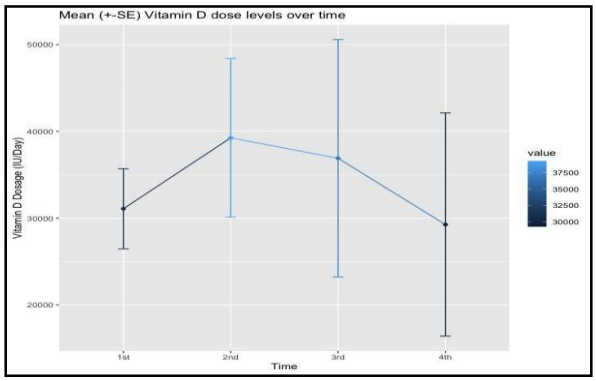
Table 5: The mean ±standard error (SE) of serum Vitamin D dosage (IU) across different assessment periods

	At the onset	3 to 4 months	7 to 8 months	11 to 12 months
Mean ± SE	31237.11 ± 4618.513	39252.87 ± 9134.930	36896.55 ± 13688.210	29258.84 ± 12865.277

Based on **Table 5**, **Graph 2,3,** at the start of treatment, the mean vitamin D dose was 31,237.11 IU, with a standard error (SE) of 4,618.51 IU. In the subsequent two assessments, the mean dosages were higher compared to the initial assessment, while the lowest mean dosage was observed in the final assessment. Additionally, the SE values were notably higher in the last two assessments, suggesting greater variability in prescribed doses, likely due to individualized adjustments made during treatment.



Graph 2: Box plot of vitamin D Doses



Graph 3: Mean ± SE of vitamin D Doses over different times of assessment.

3.2.3. Vitamin D level

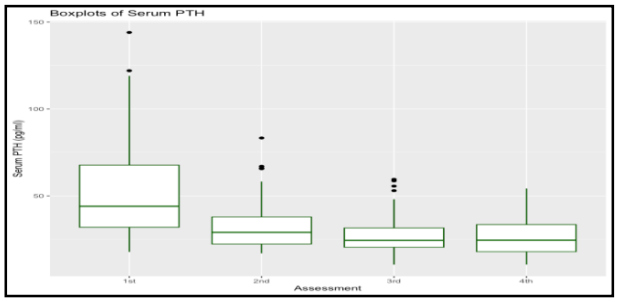
During the first follow up at 2-3 months, Vitamin D levels were found to reach/cross 100 ng/ml in 79 subjects (81.44%) with 43 out of these 79 subjects (54.43%) having vit D level of 150 ng/ml or more. No hypercalcemia was observed in any subject at this juncture. The vitamin D levels were not checked in the subsequent follow ups for the subjects who had reached >100 ng/ml earlier. Those who had not, were made to check Vitamin D levels again and by the second follow up around 5-6 months there, all the subjects were having vitamin D levels of above 100 ng/ml. Vitamin D levels were checked in the 4th follow-up at 11-12 months, and all had levels of >100 ng/ml with 49 subjects (50.5%) out of 95 with levels >150 ng/ml. Nobody was found to have hypercalcemia (Ionized calcium >1.33) at the 12th month follow-up and serum creatinine levels also remained within the normal range.

3.2.4. PTH assessment

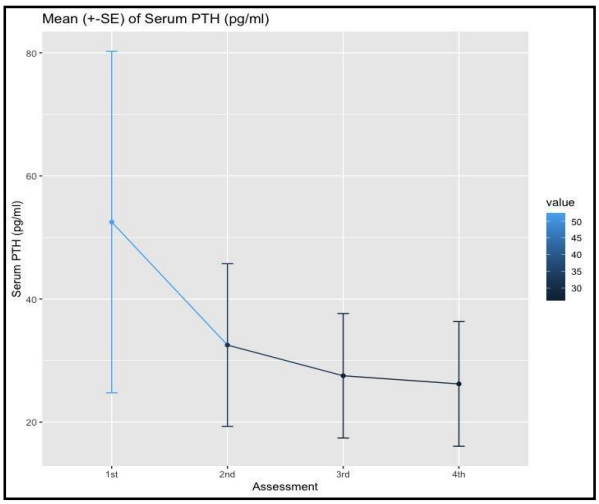
The following discussion is based on **Graph 4,5** and **Table 6**. At baseline, the mean serum PTH level was 52.50 pg/ml, with a SE of 27.74, falling within the normal reference range of 12–65 pg/ml. Over the course of the treatment, PTH levels were monitored at regular intervals, up to the third follow-up assessment.

A statistically significant decline in PTH levels was observed across follow-ups, with p-values < 0.0001, indicating a strong treatment effect. Furthermore, there was a notable reduction in variability: standard errors, which were elevated at baseline, consistently fell to below 14 pg/ml in subsequent assessments.

By the third follow-up, PTH levels had largely stabilized, with no statistically significant changes detected in later follow-ups (e.g., p = 0.09 when compared to the third assessment). This pattern suggests that the intervention led to a sustained and stable reduction in PTH levels, typically plateauing after the third follow-up visit.



Graph 4: Box plot of Serum PTH



Graph 5: Mean ± SE of serum PTH over different times of assessment.

Table 6: The first row displays the mean ±standard error (SE) of serum PTH levels across different assessment periods. The second row reports p-values from pairwise comparisons with the preceding time point, calculated using the Wilcoxon signed-rank test.

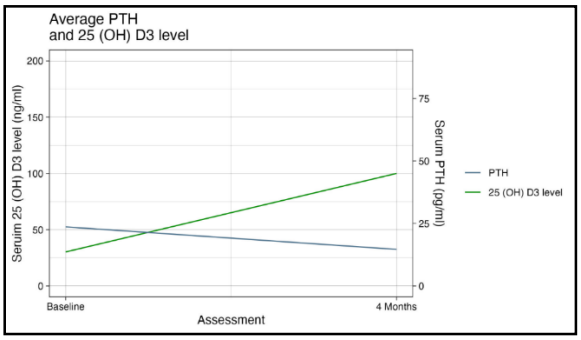
	1st	2nd	3rd	4th
Mean ± SE	52.50 ± 27.74	32.51 ± 13.23	27.53 ± 10.12	26.21 ± 10.13
p–value		< 0.0001	< 0.0001	0.090

3.2.5. Serum concentrations of 25(OH)D3 versus PTH

Vitamin D3 therapy has been shown to exert an inverse effect on serum PTH and vitamin D levels. Our findings are consistent with this observation. (**Graph 6**)

At baseline, the mean serum PTH level was 52.50 pg/ml, while the mean vitamin D3 level was 30.21 ng/ml. After four

months of vitamin D therapy, the PTH level decreased to 32.52 pg/ml, whereas the vitamin D3 level increased significantly to 100 ng/ml or more.



Graph 6: Serum concentrations of 25(OH)D3 and PTH respectively increased and decreased during treatment.

4. Discussion

These observations demonstrate the substantial clinical effectiveness and safety of oral vitamin D therapy in the management of psoriasis.[13] High doses were needed to alleviate the vitamin D resistance and induce clinically meaningful results and therapeutic efficacy.[14] As serum 25(OH)D levels alone offer limited insight into vitamin D's biological impact on the immune system, the drop in PTH levels were utilized as the guide for deciding the individual vitamin D dosage. Biochemical monitoring revealed a consistent pattern: The vitamin D serum levels went above 100 ng/ml for all subjects. Patients with initially elevated or unresponsive PTH levels required higher doses and longer duration of therapy. As PTH levels declined, disease control improved, correlating with resolution of skin symptoms. Ionized calcium levels remained within the normal range throughout treatment, indicating that vitamin D is not really toxic if hypercalcemia can be avoided.

PASI scores declined over a 12-month period from a mean of 17.83 at baseline to 6.52. More than 76% of subjects achieved 50% reduction in PASI scores, out of which 57% achieved more than 75% reduction in PASI scores and one-fifth reporting ≥90% improvement, highlighting a significant treatment response.

Vitamin D dosages were individualized based on body weight, changes in serum parathyroid hormone (PTH) levels, and clinical response. A flexible dosing strategy, ranging from 30,000 IU to 60,000 IU daily under monitoring was later tapered as disease control was achieved, with no adverse effects reported. Higher doses were needed for subjects with a high BMI or high vitamin D resistance (poor PTH response). PTH levels showed a statistically significant and sustained decline, stabilizing after the third follow-up, confirming the biological effectiveness of therapy.

Our results support the emerging view that vitamin D's immune modulatory effects get unlocked at higher-than-standard doses for treating autoimmune disorders.[14] The inverse relationship between serum 25(OH)D_3 and PTH was reinforced. The drop in PTH level has to be utilized as the guide for deciding the individual vitamin D dosage rather than vitamin D levels alone. With careful monitoring and appropriate nutritional safeguards to prevent hypercalcemia, the risk of adverse effects can be minimized as vitamin D is not really toxic as thought to be earlier.[15]

The data strongly supports the use of vitamin D as an effective and relatively safer individualized therapeutic strategy for psoriasis, with broader implications for managing other autoimmune conditions. Rethinking the vitamin D dosing strategies particularly in autoimmune cases, could significantly improve outcomes and reduce dependence on more expensive or toxic therapies.

5. Conclusions

The clinical response and the absence of adverse events in our patient cohort suggest that high-dose vitamin D3 therapy, under appropriate clinical supervision, could be a safe and a highly effective strategy for managing psoriasis, also challenging the conservative approach to supplementation. We urge the dermatology and immunology communities to revisit the dosing paradigms for vitamin D, and to explore its full therapeutic potential through large-scale, controlled studies. Vitamin D therapy, when properly monitored, offers a low-cost, accessible, and highly promising intervention for a disease that often requires complex and expensive medications.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Dai Q, Zhang Y, Liu Q, Zhang C. Efficacy and safety of vitamin D supplementation on psoriasis: A systematic review and meta-analysis. *PLoS ONE*. 2023;18(11): e0294239
2. Michelle A. Ingram et al. Oral vitamin D3 supplementation for chronic plaque psoriasis: a randomized, double-blind, placebo-controlled trial. *J Dermatol Treat*. 2018;29(7):648–57.
3. Formisano E, Proietti E, Borgarelli C, Pisciotta L. Psoriasis and Vitamin D: A Systematic Review and Meta-Analysis. *Nutrients*. 2023;15(15):3387.
4. Dankers W, Colin EM, van Hamburg JP, Lubberts E. Vitamin D in Autoimmunity: Molecular Mechanisms and Therapeutic Potentials. *Front Immunol*. 2017:7:697.
5. Joshi S, Pantalena LC, Liu XK, Gaffen SL, Liu H, Rohowsky-Kochan C, et al. Vitamin D3 Ameliorates Th17 Autoimmunity via Transcriptional Modulation of Interleukin-17A. *Mol Cell Biol*. 2011;31(17):3653-69.
6. Lemke D, Klement RJ, Schweiger F, Schweiger B, Spitz J. Vitamin D Resistance as a Possible Cause of Autoimmune Diseases: A Hypothesis Confirmed by a Therapeutic High-Dose Vitamin D Protocol. *Front Immunol*. 2021:12:655739.
7. Carlberg C, Haq A. The concept of the personal vitamin D response index. *J Steroid Biochem Mol Biol*. 2018;175:12–7.

8. Amon U, Yaguboglu R, Ennis M, Holick MF, Amon J. Safety Data in Patients with Autoimmune Diseases during Treatment with High Doses of Vitamin D3 According to the “Coimbra Protocol”. Nutrients. *Nutrients*. 2022;14(8):1575;
9. Glade MJ. A 21st century evaluation of the safety of oral vitamin D. Nutrition. 2012;28(4):344–56.
10. Finamor DC, Sinigaglia-Coimbra R, Neves LCM, Gutierrez M, Silva JJ, Torres LD, et al. A pilot study assessing the effect of prolonged administration of high daily doses of vitamin D on the clinical course of vitiligo and psoriasis. *Dermatoendocrinol.* 2013;5(1):222–34.
11. Mahtani R, Nair PMK. Daily Oral Vitamin D3 without Concomitant Therapy in the management of Psoriasis: A case series. *Clin Immunol Commun*. 2022;2:17–22.
12. Carlin CS, Feldman SR, Krueger JG, Menter A, Krueger GG. A 50% reduction in the Psoriasis Area and Severity Index (PASI 50) is a clinically significant endpoint in the assessment of psoriasis. *J Am Acad Dermatol*. 2004;50(6):859–66.
13. Stanescu AMA, Simionescu AA, Diaconu CC. Oral Vitamin D therapy in patients with Psoriasis. *Nutrients*. 2021;13(1):163.
14. Jarvelin UM, Järvelin JM. Significance of vitamin D responsiveness on the etiology of vitamin D-related diseases. *Steroids*. 2024;207:109437.
15. McCullough PJ, Lehrer DS, Amend J. Daily oral dosing of vitamin D3 using 5000 to 50000 Internation Units a day in long-term hospitalized patients: Insights from a seven-year experience. *J Steroid Biochem Mol Biol*. 2019;189:228–39.

Cite this article: Mahtani R, Singh S, Nair PMK, Singh SP, Goyal M. Prolonged high dose daily oral vitamin D3 in the management of psoriasis: A retrospective chart analysis. *IP Indian J Clin Exp Dermatol*. 2025;11(3):288-296.