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Serum Vitamin D Levels In Oral Lichen Planus Patients: A Cross-Sectional Study

[1] Dr. Shreeyam Mohapatra
Associate Professor, Department Of Oral Medicine And Radiology .Scb Dental College & Hospital, Cuttack, Odisha
Email - Shreeyam080@Gmail.Com. Phone No-8952085196
[2] Dr. Shubhangi Pareek
Assistant Professor, Department Of Oral Pathology & Microbiology
Scb Dental College & Hospital, Cuttack, Odisha
Email - Pareek.Shubhi@Gmail.Com
[3]Dr Sebati Murmu
Senior Resident, Department Of Oral Medicine And Radiology, Scb Dental College And Hospital
[4] Dr. Akshay Verma
Professor, Department Of Oral Pathology And Microbiology, Rajasthan Dental Collage And Hospital Jaipur Rajasthan 302026

Corresponding Author-
Dr. Shubhangi Pareek
Assistant Professor, Department Of Oral Pathology & Microbiology
Scb Dental College, Cuttack-753007
- pareek.shubhi@gmail.com

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Abstract:
Background: Oral Lichen Planus (OLP) is a chronic, immune-mediated mucocutaneous disorder characterized by T-cell–mediated destruction of basal keratinocytes. Vitamin D, known for its immunomodulatory and anti-inflammatory properties, may influence OLP pathogenesis by regulating keratinocyte proliferation and cytokine expression [1,2].

Aim: To evaluate serum vitamin D levels in patients with oral lichen planus compared to healthy controls, and to assess correlation with clinical severity and disease duration.

Methods: A cross-sectional study was conducted on 78 clinically and histologically confirmed OLP patients and age- and sex-matched healthy controls. Serum levels of calcium, phosphorus, parathyroid hormone (PTH), alkaline phosphatase (ALK), and 25-hydroxyvitamin D3 [25(OH)D3] were measured. Statistical analysis was

performed using SPSS v17.0.

Results: Vitamin D deficiency was found in 64.1% of OLP patients and 56.4% of controls (P = 0.37). Severe deficiency (<10 ng/mL) was significantly higher among OLP patients (28.2%) compared to controls (12.8%) (P = 0.018). Other biochemical parameters showed no significant intergroup differences.

Conclusion: A significant association was observed between OLP and severe vitamin D deficiency. Routine vitamin D screening and supplementation should be considered in clinical practice.

Keywords: Oral Lichen Planus, Vitamin D, Immune Modulation, 25(OH)D3, Calcium

INTRODUCTION

Oral Lichen Planus (OLP) is a chronic inflammatory disorder with an autoimmune pathogenesis. It affects approximately 1–2% of the global population and is more common in middle-aged women [3]. The disease involves CD8+ T-cell–mediated apoptosis of basal keratinocytes and manifests as reticular, atrophic, or erosive oral lesions.

Vitamin D plays a crucial role in immune modulation through its interaction with the vitamin D receptor (VDR) on keratinocytes, dendritic cells, and T-lymphocytes. It downregulates pro-inflammatory Th1 cytokines like IFN-γ and TNF-α and promotes regulatory T-cell activity [4,5]. Previous studies have implicated vitamin D deficiency in autoimmune conditions including systemic lupus erythematosus, psoriasis, and rheumatoid arthritis [6,7].

MATERIALS AND METHODS

Study Design: Cross-sectional, observational.
Duration: February 2022 – January 2023.
Setting: Dermatology, SCB MEDICAL COLLEGE

Participants: 78 histopathologically confirmed OLP patients and 78 age- and sex-matched healthy controls.

Inclusion Criteria:
- Age >18 years
- Clinically and histologically confirmed OLP
- No systemic illness affecting vitamin D metabolism

Exclusion Criteria:
- Current vitamin D supplementation
- Pregnancy/lactation
- Co-existing autoimmune/systemic disease

Laboratory Investigations: Serum levels of calcium, phosphorus, PTH, ALK, and 25(OH)D3 were analyzed using standard biochemical methods.

Ethics: Approved by the Institutional Ethics Committee (Ref No: [Insert Reference]).

Statistical Analysis: Data were analyzed using SPSS v17.0. t-tests and Chi-square tests were applied. A p-value <0.05 was considered statistically significant.

RESULTS

Demographics:

- Total participants: 156 (78 OLP, 78 controls)
- Mean age: 43.7 ± 11.3 years
- Gender distribution: 56.4% female, 43.6% male

Biochemical Parameters: No statistically significant differences in calcium, phosphorus, PTH, or ALK levels between groups.

Vitamin D Status:

Parameter	OLP Patients (%)	Controls (%)
Vitamin D <20 ng/mL	64.1	56.4
Vitamin D <10 ng/mL	28.2	12.8

A statistically significant difference was observed in the frequency of severe deficiency (<10 ng/mL), being higher in OLP patients (*P* = 0.018).

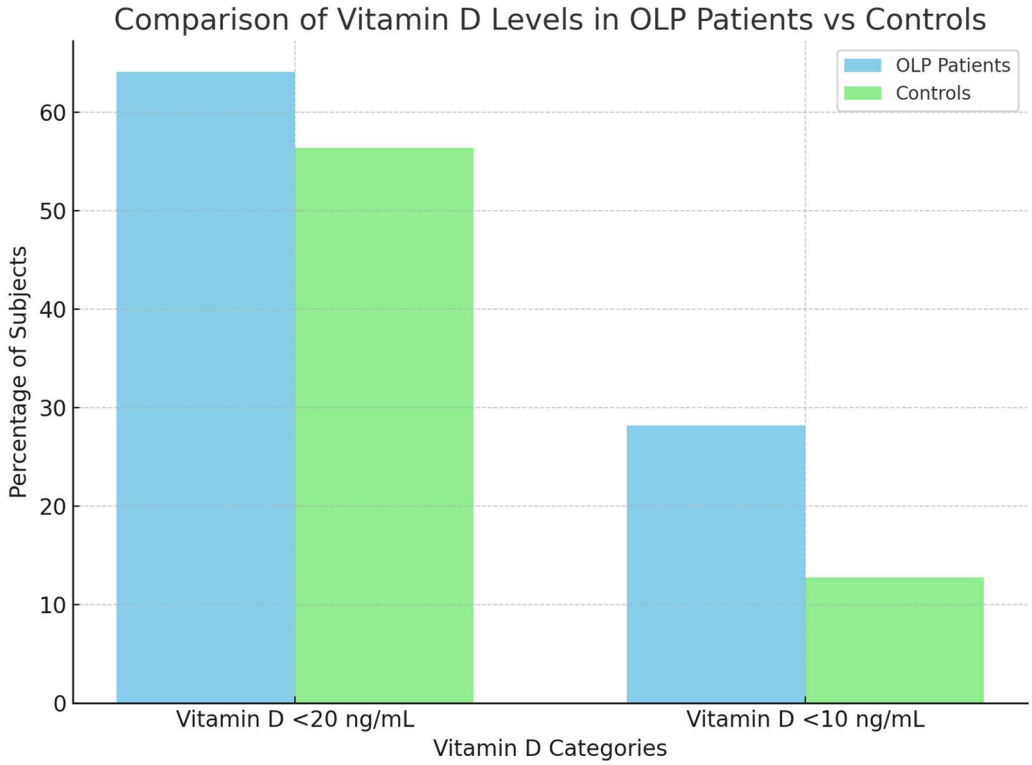

Figure: Percentage distribution of vitamin D levels among OLP patients and healthy controls.

DISCUSSION

This study reinforces the hypothesis that severe vitamin D deficiency is more prevalent in patients with oral lichen planus (OLP) compared to healthy individuals. Although overall vitamin D deficiency (<20 ng/mL) did not differ significantly, the proportion of patients with severe deficiency (<10 ng/mL) was notably higher in the OLP group (28.2% vs. 12.8%, *P* = 0.018), supporting previous findings [1,2].

Vitamin D regulates immune responses by suppressing pro-inflammatory cytokines (e.g., TNF-α, IFN-γ), inhibiting dendritic cell maturation, and enhancing regulatory T-cell populations, thereby potentially

counteracting the autoimmune destruction of basal keratinocytes in OLP [4,5,8].

Reduced sun exposure, oral pain, and chronic inflammation may all contribute to vitamin D deficiency in OLP patients [2,7]. Interventional studies have shown symptom improvement in OLP patients following vitamin D supplementation, especially in erosive forms [1,9].

Further longitudinal and interventional studies are needed to confirm the causal role and therapeutic benefits of vitamin D in OLP.

CONCLUSION

There is a significant association between oral lichen planus and severe vitamin D deficiency. Screening for vitamin D levels in OLP patients is recommended. Supplementation may be beneficial as part of comprehensive management, especially in patients with erosive lesions or prolonged disease duration.

RECOMMENDATIONS

- Screen all OLP patients for vitamin D deficiency
- Initiate vitamin D supplementation in deficient individuals
- Conduct prospective studies to explore therapeutic outcomes

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the authors.

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