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Comparison of serum levels of vitamin B12 and vitamin D3 in patients with oral lichen planus with healthy individuals

Abstract

Background: Lichen planus or skin moss is a relatively common inflammatory disease of the skin and mucous membranes. Since lichen planus is a lesion that may sometimes have malignant changes, and more importantly, it can be differentiated from some of our premalignant and malignant lesions, so the present study aims to investigate the patients' B12 and D3 vitamins. patients with oral lichen planus and compared with healthy people.

Methods: The present study was conducted as a case-control using data from the Lichen Plan Registry of Kermanshah University of Medical Sciences. For this purpose, 43 people with oral lichen planus as a case group with a clinical diagnosis of oral lichen planus and 43 healthy people who were age- and sex-matched with the group of patients were compared in terms of serum vitamin D3 and vitamin B12 levels. The control group was randomly selected from those who referred to the Kermanshah Dental School and did not have lichen planus or other autoimmune diseases. The vitamin B12 vitamin D3 test was requested for both groups and the results of the patients' tests were compared with healthy people. The obtained information was analyzed by the Mann-Whitney test or T-test and logistic regression.

Results: In this study, 43 lichen planus patients and 43 healthy individuals were investigated as a control group. 60.5% of lichen planus patients and 58.1% of healthy people were women, which did not have a significant difference in gender distribution (P=0.826). The mean ± standard deviation of the age of lichen planus patients was 50.28 ± 15.78 years and in the control group it was 47.84 ± 15.66 years, which had no significant difference (P=0.473). The mean ± standard deviation of BMI in lichen planus patients was 24.08 ± 4.01 and in the control group it was 24.13 ± 3.01, which were not significantly different (P=0.562). The mean ± standard deviation of vitamin D level in lichen planus patients was 31.99 ± 15.42 ng/ml and in the control group it was 35.18 ± 17.31 ng/ml, which had no significant difference (=0.563). P) The mean ± standard deviation of the level of vitamin B in lichen planus patients was 498.49 ± 452.97 pg/ml and in the control group it was 472.42 ± 370.53 pg/ml, which had no significant difference (=0.660). P)

Conclusion: The effects of this look at showed that there may be no significant relationship between vitamin D level and lichen planus.

Keywords: *Vitamin D, Vitamin B, Lichen Plan*

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Introduction

One of the important chronic inflammatory mucosal diseases is oral lichen planus (OLP), which rarely undergoes spontaneous improvement. OLP is relatively common, affecting approximately 1 to 2 percent of populations, and it is resistant to treatment (1). This condition predominantly affects women, with an average age of diagnosis being around 55 years. The posterior buccal mucosa is the most commonly involved site in OLP, followed by the tongue, gingiva, labial mucosa, and the lower vermilion border of the lip (2-5). OLP can be considered as a precancerous lesion, although the risk is very low, and only about one percent of cases can progress to oral cancer if left untreated (1, 6). It has been suggested that deficiencies in vitamins and micronutrients may also play a role in the initiation or exacerbation of the disease. Vitamins are categorized based on their roles in the body, and vitamin B-12 (cobalamin) plays a fundamental role in the formation of red blood cells, cellular metabolism, nervous system function, and DNA production – the molecules within cells carrying genetic information (7). An average adult requires about 1-2 micrograms of vitamin B12 per day, as it is not synthesized within the body, and when body stores fall below 0.1 milligrams, megaloblastic anemia can occur. Mucosal changes in the mouth occur in 50 to 60 percent of patients with megaloblastic anemia. Oral symptoms may manifest with or without overt anemia and macrocytosis, which indicate a deficiency of B12 (8-10). Previous studies have demonstrated that vitamin B12 deficiency is associated with OLP in the Indian population (11), but an Iranian study by Nasratzahi and colleagues did not find a significant difference in serum vitamin B12 levels in OLP patients (12). Therefore, investigating this vitamin in different populations appears to be of great importance.

Another vital vitamin for human beings is vitamin D, that is a crucial detail for a huge range of biological techniques. Vitamin D is a set of fat-soluble steroids responsible for improving the intestinal absorption of calcium, magnesium, and phosphate, among many different biological consequences. The maximum important compounds on this organization for human beings are vitamin D3 and vitamin D2 (13-15). Recent research has shown that vitamin D has an endocrine impact on immune gadget cells, displaying anti-inflammatory and regulatory results at the immune device (16). Additionally, it has capacity healing results on autoimmune

sicknesses, psoriasis, and neoplasms (17). Although the fundamental mechanisms of vitamin D in autoimmune sicknesses are not properly understood, vitamin D deficiency has been tested in some autoimmune sicknesses along with rheumatoid arthritis, systemic lupus erythematosus, kind I diabetes, a couple of sclerosis, inflammatory bowel diseases, autoimmune thyroid issues (e.G., Hashimoto's and Graves' illnesses), and autoimmune gastritis (18). Limited research has been carried out at the role of vitamin D as an associated component in OLP. One look at on this context suggests that vitamin D stages ought to be investigated, in particular whilst OLP sufferers have chance factors for vitamin D deficiency, inclusive of restricted sun publicity (19). Furthermore, Saif and co-workers in Shiraz have proven that a higher percentage of OLP patients have a vitamin D deficiency compared to the manage group (20). However, Bahramian and co-workers in Tabriz located no widespread distinction in serum vitamin D degrees among OLP patients and the manipulate group (21). This research emphasize the importance of investigating vitamin D levels in exceptional populations and ethnicities.

Since OLP is a lesion that may have malignant transformations in some cases and, more importantly, can be differentially diagnosed from some premalignant and malignant lesions, this present study aims to examine vitamins B12 and D3 in patients with OLP and compare them with healthy individuals.

METHODOLOGY

The present investigation was a case-control study that was conducted to compare the serum levels of vitamin B12 and vitamin D3 in patients with oral lichen planus with healthy individuals. The steps of conducting the study are shown in Figure 1.

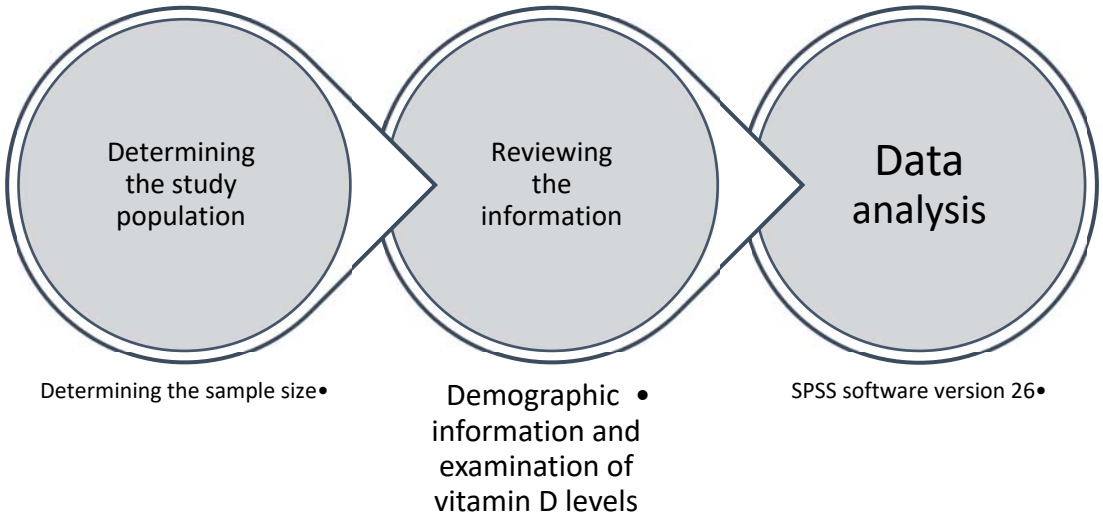

Figure 1. Overview of the study methodology

The present study was conducted as a case-control study using data from the Lichen Planus Registry at Kermanshah University of Medical Sciences, where 40 patients with oral lichen planus (OLP) have been registered to date. OLP was confirmed based on modified WHO criteria. Individuals with systemic or autoimmune diseases, bone metabolism disorders, vitamin deficiencies, pregnant and lactating women, and those with a history of any medication use in the past 2 months were excluded from the study. After obtaining informed consent forms, blood samples were collected from all participants using standard methods. The levels of vitamin D3 and B12 were measured using ELISA kits (Padtan Gostar Eisar Company).

Data related to hematological and demographic indices, including age, gender, place of residence, education level, body mass index, blood type, and oral disease history of patients, were extracted from their medical records, and information from healthy individuals was obtained through questionnaires administered in the clinic.

Blood samples were collected from all participants according to standard procedures. The levels of vitamin D3 and B12 were measured using *ELISA* kits (Padtan Gostar Eisar Company).

Descriptive information, which includes frequency (percent) and imply (popular deviation), have been used to describe the records. Independent t-exams and logistic regression had been hired to examine effects between the case and control groups. An importance level of 5% ($P < 0.05$) became taken into consideration. All analyses were carried out the use of SPSS version 26.

RESULTS:

In this study, 43 patients with lichen planus and 43 healthy individuals were included as the control group.

Among lichen planus patients, 60.5% were female, while among healthy individuals, 58.1% were female, and there was no significant difference in gender distribution between the two groups (P = 0.826) (Table 1).

Table 1: Gender Distribution

		Healthy		Lichen planus		Test Statistic	P value
Variable		Frequency	Frequency Percentage (%)	Frequency	Frequency Percentage (%)		
Gender	male	18	41.9	18	41.9	0.05	0.826
	female	25	58.1	26	60.50		

*Chi-square test

To evaluate the suggest age among the 2 groups, a t-test changed into applied. The imply age ± widespread deviation for patients with oral lichen planus (OLP) was 50.26 ± 15.78 years, and for the manipulate organization, it changed into 47.84 ± 15.66 years, with no huge difference between them (P = 0.473) (Table -1). To compare the suggest BMI between the 2 companies, the Mann-Whitney check changed into hired. The mean BMI ± standard deviation for patients with lichen planus was 24.08 ± four.01, and for the control institution, it became 24.13 ± 3.01, and not using a full-size difference between them (P = 0.562) (Table 2).

Table 2: Comparison of Age and BMI in Two Groups

variable	**Class**	**Count**	**minimum**	**maximum**	**mean**	**Standard deviation**	**P value**
Age(year)	lichen planus	43	10	76	50.28	15.78	0.473*
	Healthy	43	14.00	74.00	47.84	15.66	
BMI	lichen planus	43	18.80	37.00	24.08	4.01	0.562#
	Healthy	43	20.05	35.00	24.13	3.01	

* T-test

Mann-Whitney test

Assessment of Vitamin D Levels

To compare the mean serum vitamin D levels between the two groups, the Mann-Whitney test was used. The mean ± standard deviation of serum vitamin D levels for patients with lichen planus was 31.99 ± 15.42 nanograms per milliliter, and for the control group, it was 35.18 ± 17.31 nanograms per milliliter, with no significant difference between them (P = 0.563) (Table 3).

Table 3: Comparison of Vitamin D Levels in Two Groups

variable	**Class**	**Count**	**minimum**	**maximum**	**mean**	**Standard deviation**	**P value**
Vitamin D level (ng/ml)	lichen planus	43	3.80	72.80	31.99	15.42	0.563*
	Healthy	43	9.40	75.50	35.18	17.31	

* Mann-Whitney test

Furthermore, the categorization of vitamin D levels in both groups was done using the Chi-square test, showing that 55.8% of the control group and 48.8% of lichen planus patients had sufficient vitamin D levels, with no significant difference between them (P = 0.541) (Table 4).

Table 4: Classification of Vitamin D Levels in Two Groups

		Healthy		Lichen planus		Test Statistic Variable	P value Frequency
Variable		Frequency	Frequency Percentage (%)				
Vitamin D	Deficient	1	2.3	3	7.0	1.23	0.541*
	Insufficient	18	41.9	19	44.2		
	Sufficient	24	55.8	21	48.8		

* Chi-square test

Assessment of Vitamin B12 Levels

To compare the mean serum vitamin B12 levels between the two groups, the Mann-Whitney test was used. The mean ± standard deviation of serum vitamin B12 levels for patients with lichen planus was 498.49 ± 452.97 picograms per milliliter, and for the control group, it was 472.42 ± 370.53 picograms per milliliter, with no significant difference between them (P = 0.660) (Table 5).

Table 5: Comparison of Vitamin B12 Levels in Two Groups

variable	Class	Count	minimum	maximum	mean	Standard deviation	P value
Vitamin B12 level (ng/ml)	lichen planus	43	102.10	2000.0	498.49	452.97	0.660*
	Healthy	43	175.00	1965.00	472.42	370.53	

* Mann-Whitney test

Additionally, the categorization of vitamin B12 levels in both groups was done using the Chi-square test, revealing that 86.0% of the control group and 81.4% of lichen planus patients had normal vitamin B12 levels, with no significant difference between them (*P* = 0.559) (Table 6).

Table 6: Classification of Vitamin B12 Levels in Two Groups

		Healthy		Lichen planus		Test Statistic Variable Variable	P value Frequency Frequency
Variable		Frequency	Frequency Percentage (%)				
Vitamin B12	Insufficient	6	14.0	8	18.6	0.34	0.559*
	Sufficient	37	86.0	35	81.4		

* Chi-square test

DISCUSSION:

Lichen planus is a relatively common mucocutaneous lesion and is considered a premalignant condition. Accumulating evidence over the years suggests the pivotal role of the immune system in the development of this condition (22, 23).

Vitamin D can play a significant role in the onset or severity of oral lichen planus (OLP) through its regulation of the body's immune system. Furthermore, the active form of vitamin D plays a role in regulating the expression of many important genes in various pathways, and its association with various cancers and autoimmune diseases has been demonstrated. Vitamin D deficiency leads to a reduction in the number of *Th2* cells compared to other *T* cells, especially those involved in inflammatory pathways such as *Th1* and *Th17* cells, resulting in more damage in inflammatory conditions like *LP*. Therefore, attention to vitamin D levels in the population, especially in those with *LP*, is essential. Interestingly, although Iran has a suitable geographical location for receiving sufficient ultraviolet radiation, vitamin D deficiency is prevalent, especially among Iranian women (24).

In the existing examine, serum degrees of vitamin D had been examined in both the control organization and a group of OLP sufferers. The outcomes indicated no statistically widespread difference in serum vitamin D ranges between the two agencies. To date, only some researches have as compared serum vitamin D tiers between lichen planus patients and healthful individuals. Therefore, this observe is considered pioneering in this regard. Different research has determined serum vitamin D tiers in diverse autoimmune diseases. However, there's still some controversy in this place, necessitating similarly studies inside the future. Bahramian et al. (21) as compared serum vitamin D ranges in sufferers with oral lichen planus and healthy people in a case-manage take a look at. In this observe, 18 sufferers with oral lichen planus who stated the Department of Oral and Dental Medicine of Tabriz University and 18 healthy individuals had been decided on because the manipulate institution. A five mL blood sample became taken from all contributors, and the serum vitamin D degrees had been assessed the use of an electrochemiluminescence approach with the vitamin D general package (25-hydroxyvitamin D). The outcomes of this examine showed that the mean serum vitamin D stage in sufferers with oral lichen planus was 20.38 ± 30.7 ng/mL, while in healthful individuals, it became 36.45 ± 15.33 ng/mL, without a statistically great difference (P = 0.346), consistent with our examiner's findings concerning the shortage of a sizeable distinction in serum vitamin D stages among healthy and lichen planus businesses. Other studies had no longer previously investigated the differences in vitamin D levels between lichen planus patients and healthy people.

Vitamin D possesses anticancer effects and induces apoptosis. It has also been said that vitamin D degrees are notably deficient in oral squamous cellular carcinoma and precancerous lesions (25). In our study, there was no significant distinction in vitamin D levels among the case and manipulate agencies. This locating is consistent with some preceding Iranian research. Bahramian et al. And Seif et al. Evaluated serum tiers of vitamin D3 in OLP sufferers and wholesome individuals and found no statistically giant distinction (21, 26). A recent examine in Tehran, Iran, assessed serum and salivary vitamin D tiers in OLP patients and suggested that serum stages of this vitamin did now not drastically vary as compared to the manage group. However, salivary degrees of vitamin D have been significantly lower in OLP patients (26). This distinction may be attributed to the high-quality regulation of vitamin D-binding protein (DBP) in inflammatory problems and immune-associated conditions, which increases the serum vitamin D stage however has no effect on salivary tiers. Despite the aforementioned research in Iran, a look at performed in India said notably lower serum vitamin D ranges in OLP sufferers (27). This shows the ability role of ethnicity and veterinary habits as influencing elements within the pathogenesis of OLP.

In another study, Rezazadeh et al. (28) examined serum vitamin characteristics in oral lichen planus (OLP) patients in southwestern Iran. Thirty-four OLP patients visiting the School of Dentistry in Shiraz were included in the study. Blood samples were collected, and serum levels of vitamins A, B12, C, D3, and E were measured. Additionally, 43 healthy individuals were recruited as the control group. Serum levels of vitamins were measured using HPLC (A, B12, D3, and E) and Cayman Chemical assay kits (vitamin C). Most of the patients were female (62.3%), and the average age of the patients was 62.3%. Serum levels of vitamins A, C, and E were lower in OLP patients compared to the healthy group; however, this difference was not statistically significant. Vitamins B12 and D3 levels were higher in the OLP group, but this difference was not statistically significant. The serum levels of vitamins A, B12, C, D3, and E did not significantly differ between OLP patients and healthy groups. These vitamins may not play a significant role in the pathogenesis of OLP in southwestern Iran. These findings align with our results regarding the lack of a significant difference in vitamin B levels between lichen planus patients and healthy individuals.

In another study, Nosratzehi et al. (12) examined serum levels of vitamin B12 and folic acid in relation to oral lichen planus (OLP). In this descriptive study, 64 individuals (25 with OLP and 32 healthy individuals) were selected. Serum levels of vitamin B12 and folic acid in both healthy and OLP groups were measured using the Elexis 2016 instrument and the electrochemiluminescence method. The findings of this group also showed that the serum level of vitamin B12 in healthy individuals was 284.7 ± 99.5, and in those with oral lichen planus, it was 288±.165.7 picograms per milliliter. The student's t-test demonstrated that the mean serum vitamin B12 level in OLP patients did not differ significantly from that of healthy individuals, confirming the results of our study.

In our have a look at, there has been no statistically good-sized distinction in vitamin B12 tiers between the 2 groups, which is consistent with some preceding research (thirteen, 29). Mirzai et al. Evaluated folic acid in Iranian OLP patients and suggested no tremendous difference between healthy and affected person businesses (30). Rahmatpour and colleagues additionally mentioned that the vitamin B12 degree in every other institution of Iranian OLP patients is in the ordinary variety (31). Thongprasom and associates assessed homocysteine stages in OLP patients in a group of Thai patients and pronounced no sizeable difference among patients and healthful people (32). In contrast, any other observe conducted through Chen and co-workers evaluated serum vitamin B levels in a rather large Chinese populace and suggested considerably decrease measurements in OLP sufferers (13). These studies advocate that vitamin B12 deficiency might not be strongly related to the pathogenesis of OLP. Additionally, there can be correlations among race and vitamin B12 repute. Further research with larger pattern sizes and heterogeneous populations are needed to confirm these findings.

CONCLUSION:

The mean serum levels of vitamin D and vitamin B12 in OLP patients did not significantly differ from those in healthy individuals. Several factors may influence serum levels of vitamin D and vitamin B12, including the season of sample collection, duration of sunlight exposure, BMI, age, number of pregnancies, parathyroid hormone levels, and serum calcium levels. However, our study demonstrated that vitamin D and B12 levels are not significantly affected by gender, age, and BMI. Therefore, other factors should be investigated in future studies.

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