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# **Original Research**

## Assessment of correlation between serum levels of vitamin A, B12, D3, E, and recurrent aphthous stomatitis

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### ABSTRACT:

**Background:** Recurrent aphthous stomatitis (RAS), also known as recurrent oral ulcers or canker sores, is a common condition characterized by the recurrent formation of small, painful ulcers in the mouth. The present study was conducted to assess correlation between serum levels of vitamin A, B12, D3, E, and RAS. **Materials & Methods:** 56 RAS patients of both genders were enrolled. There were 2 groups. Group I comprised of RAS cases and group II had healthy controls. 5 ml of venous blood was aspirated and subjected to assessment of vitamins A, vitamin B12, vitamin D3 and vitamin E. **Results:** Out of 56 patients, males were 36 and females were 20. The mean vitamin A level in group I was 14.2 and in group II was 25.3, vitamin B12 level was 274.2 in group I and 418.4 in group II, vitamin D3 level was 13.7 in group I and 25.3 in group II and vitamin E level was 7.2 in group I and 10.2 in group II. The difference was significant (P< 0.05). There was positive correlation between vitamin B12 (r- 0.35, p- 0.05) in group I. **Conclusion:** Deficit of vitamins A, B12, D3, and E has a substantial impact on RAS, and RAS patients' serum levels of vitamins B12 and E have a significant proportional association.

Key words: Recurrent aphthous stomatitis, vitamin D3, vitamin E

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### **INTRODUCTION**

Recurrent aphthous stomatitis (RAS), also known as recurrent oral ulcers or canker sores, is a common condition characterized by the recurrent formation of small, painful ulcers in the mouth. These ulcers typically appear on the non-keratinized mucosal surfaces, such as the inside of the cheeks, lips, tongue, and soft palate. RAS is not contagious and is not associated with any systemic diseases.<sup>1</sup>

The exact cause of RAS is still not fully understood, but it is thought to involve a complex interaction between genetic, immunological, and environmental factors.<sup>2</sup> Some potential triggers or factors that may contribute to the development of RAS include trauma, stress, certain foods such as spicy or acidic foods, chocolate, coffee, nuts, and citrus fruits are reported as potential triggers in some individuals, hormonal changes, vitamin and mineral deficiencies, immune system dysfunction etc.<sup>3</sup>

Recurrent aphthous stomatitis is usually diagnosed based on the characteristic appearance of the ulcers and the absence of other systemic symptoms. There are three main types of RAS such as recurrent aphthous major, minor, herpetiform ulcerations.<sup>4</sup> Vitamins play a significant part in immunological processes.Vitamin A protects the health of the oral epithelium. Vitamins maintains the function of polymorph, macrophages, and NK cells (they are the immune-competent cells involved in innate/nonspecific immunity; they form the body's principal barrier against external assaults).<sup>5</sup> Additionally, vitamin A enhances the activities of B cells and CD4 + cells, supporting antibody-mediated adaptive immunity. In order to maintain the CD4/CD8 ratio and NK cells in cellular immunity, vitamin B12 functions as an immune-modulator.<sup>6</sup>The present study was conducted to assess correlation between serum

levels of vitamin A, B12, D3, E, and recurrent aphthous stomatitis.

### **MATERIALS & METHODS**

The present study consisted of 56 RAS patients of both genders. All gave their written consent to participate in the study.

# **RESULTS**

 Table I Distribution of patients

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Gender Male	Female
Number 36	20

significant.

Data such as name, age, gender etc. was recorded.

There were 2 groups. Group I comprised of RAS cases and group II had healthy controls. 5 ml of

venous blood was aspirated and subjected to

assessment of vitamins A, vitamin B12, vitamin D3 and vitamin E. Data thus obtained were subjected to

statistical analysis. P value < 0.05 was considered

Table I shows that out of 56 patients, males were 36 and females were 20.

### Table II Comparison of the serum level of vitamin A, B12, D3, E

Parameters	Group I	Group II	P value
Vitamin A	14.2	25.3	0.04
Vitamin B12	274.2	418.4	0.01
Vitamin D3	13.7	25.3	0.02
Vitamin E	7.2	10.2	0.05

Table II, graph I shows that the mean vitamin A level in group I was 14.2 and in group II was 25.3, vitamin B12 level was 274.2 in group I and 418.4 in group II, vitamin D3 level was 13.7 in group I and 25.3 in group II and vitamin E level was 7.2 in group I and 10.2 in group II. The difference was significant (P < 0.05).

Graph I Comparison of the serum level of vitamin A, B12, D3, E



### Table III Correlation between vitamin B12 and vitamin A/vitamin D3/vitamin E inboth groups

Parameters	Group I (vit B12)		Group II(vit B12)	
	R value	P value	R value	P value
Vitamin A	-0.14	0.56	-0.17	0.52
Vitamin D3	-0.21	0.81	0.29	0.63
Vitamin E	0.35	0.05	0.12	0.91

Table III shows that there was positive correlation between vitamin E and vitamin B12 (r- 0.35, p- 0.05) in group I.

### DISCUSSION

Minor aphthous ulcersare the most common type, accounting for about 80% of cases.<sup>7</sup> They are small, shallow ulcers (less than 1 centimetre in diameter) that heal without scarring within 1 to 2 weeks. Major aphthous ulcersare larger and deeper ulcers that can be more painful and take longer to heal.8 They may leave scars after healing.Herpetiform ulcers are not caused by the herpes virus. They are small, multiple ulcers that tend to cluster together and heal within 1 to 2 weeks.Treatment for RAS focuses on managing symptoms, promoting healing, and preventing recurrences.<sup>9</sup> Some common approaches include topical medications such as over-the-counter or prescription mouthwashes, ointments, or gels containing anesthetics, anti-inflammatory agents (e.g., corticosteroids), or antimicrobial agents may help relieve pain and reduce inflammation. Pain relievers, such as acetaminophen or ibuprofen, can be used to manage pain.10 Maintaining good oral hygiene practices, such as regular brushing with a soft toothbrush and using a mild, non-irritating toothpaste, promote help prevent infection and can healing. Avoiding or minimizing consumption of known trigger foods may help reduce the frequency of outbreaks.Employing stress-reduction techniques, such as relaxation exercises or counselling, may be beneficial for some individuals. If deficiencies in vitamins or minerals are suspected, certain supplementation may be recommended.<sup>11</sup>

We found that out of 56 patients, males were 36 and females were 20. Mustafi et  $al^{12}$  assessed correlation between serum levels of Vitamin A, B12, D3, E, and RAS. Forty patients suffering from RAS were compared to forty normal individuals. RAS patients had a significantly lower serum level of vitamin A, B12, D3 and E than normal individuals; and there were a positive relation between the serum level of vitamin B12 and vitamin E in RAS patients.

We observed that the mean vitamin A level in group I was 14.2 and in group II was 25.3, vitamin B12 level was 274.2 in group I and 418.4 in group II, vitamin D3 level was 13.7 in group I and 25.3 in group II and vitamin E level was 7.2 in group I and 10.2 in group II. Saral et al<sup>13</sup>evaluated the degree of lipid peroxidation and the presence of antioxidant vitamins in RAU patients. Twenty healthy controls and thirty RAU patients were included. High performance liquid chromatography was used to evaluate the levels of vitamins A, E, and C, as well as malondialdehyde (MDA), in the serum and saliva of patients with RAU and control participants. Vitamin levels in both fluids were considerably lower in RAU patients than in healthy control subjects (p- 0.05 for vitamins A and E, and p- 0.005 for vitamin C, respectively). In contrast, patients with RAU had significantly greater levels of MDA in serum and saliva than the control group (p-0.005).

We found that there was positive correlation between vitamin E and vitamin B12 (r- 0.35, p- 0.05) in group

I. Khademi et al<sup>14</sup> in their study 25 patients suffering from RAS were compared to 24 healthy individuals. Applying enzyme-linked immunosorbent assay method, the amount of malondialdehyde (MDA) as well as Vitamins A, E, and C were measured in the saliva and serum of two groups. No significant difference was detected between salivary and serum levels of antioxidant vitamins (A, E, and C) and MDA in both experimental groups (P > 0.05).

The limitation the study is small sample size.

### CONCLUSION

Authors found that deficit of vitamins A, B12, D3, and E has a substantial impact on RAS, and RAS patients' serum levels of vitamins B12 and E have a significant proportional association.

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