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Original Research

Vitamin D deficiency in temporomandibular patients

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ABSTRACT:

Background: To study and evaluate the vitamin D deficiency in temporomandibular patients. **Materials & methods:** A total of 100 patients were enrolled. Out of which 50 were TMDs and 50 were control patients. Age group of subjects was 25 to 40 years. TMDs were diagnosed via physical and radiologic examination, and serum levels of 25 (OH) vitamin D were determined. All data were analysed using SPSS software. P values <0.05 were considered to be statistically significant. **Results:** A total of 50 patients were enrolled. Subjects were divided into two groups as temporomandibular disorder group and control group. The number of subjects were 25 in each group. In TMD patients, the mean serum vitamin D levels were 14.85ng/ mL. The results were not significant. **Conclusion:** In TMDs, vitamin D deficiency should be assessed and corrected.

Keywords: vitamin D, deficiency, temporomandibular disorders.

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INTRODUCTION

Temporomandibular disorders (TMDs) are a subgroup of joint and muscle disorders comprising muscle fatigue in the temporomandibular region, headache, disturbances in jaw movement, and articular sounds during mouth movements. [1] Affecting approximately 6–15% of the population, TMDs are relatively common and have a higher prevalence in women than men. [2] Although TMDs are considered to be a sub-classification of musculoskeletal disorders, the aetiological factors are not clearly understood but are thought to involve emotional tension, loss of teeth, postural deviation, masticator muscle dysfunction and alterations in temporomandibular joint structure.[3] The presence of varying degrees of inflammation has also been reported in certain TMDs. [4]

Vitamin D is an important component in calcium homeostasis, which is known to have a key role in bone health, including articular structures and muscles. [5] 25-hidroxyvitamin D (25-OHD), also known as vitamin D, is a fat-soluble vitamin, synthesized in the skin (from a precursor), and obtained from dietary sources (e.g., oily fish, dietary supplements, or vitamin D-fortified foods). Among the causes of vitamin D deficiency, insufficient UVB exposure or decreased bioavailability are often mentioned, along with some medication, such as glucocorticoids, antiretroviral drugs, or anticonvulsants. [6]

As the majority of human body tissues express vitamin D receptors, it is known that the lack of 25-OHD is implicated in a range of pathological conditions, including musculoskeletal disorders; metabolic, autoimmune, respiratory, and cardiovascular diseases; malignancies; psychiatric conditions; and chronic pain. [7] Hence, this study was conducted to evaluate the vitamin D deficiency in temporomandibular patients.

MATERIALS & METHODS

A total of 100 patients who reported to the Department of Oral Medicine and Radiology Govt. Dental College and Hospital srinagar were enrolled in this study. Out of which 50 were TMDs and 50 were control patients. Age group of subjects was 25 to 40 years. TMDs were diagnosed via physical and radiologic examination, and serum levels of 25 (OH) vitamin D were determined. The impact of age, sex and seasonal variations in serum 25 (OH) vitamin D levels was controlled by the inclusion of age, sex and

date-matched control patients. Serum samples were collected from all participants following an overnight fast, and were processed immediately upon collection. All data were analysed using SPSS software. P values <0.05 were considered to be statistically significant.

RESULTS

A total of 100 patients were enrolled. Subjects were divided into two groups as temporomandibular disorder group and control group. The number of subjects were 50 in each group. Mean age of the patients of the TMD group and control group was 35.5 years and 36.1 years respectively. 58 percent of the patients of the TMD group and 52 percent of the patients of the control group were males. The normal levels for vitamin D were above 20 ng/mL. In TMD patients, the mean serum vitamin D levels were 14.85ng/ mL. The results were not significant. Mean serum calcium levels among the patients of the TMD group and control group was 9.71 mg/dL and 9.81 mg/dL respectively.Mean serum phosphorus levels among the patients of the TMD group and control group was 3.86 mg/dL and 3.74 mg/dL respectively. Non-significant results were obtained while comparing the calcium and phosphorus levels among study group and control group.

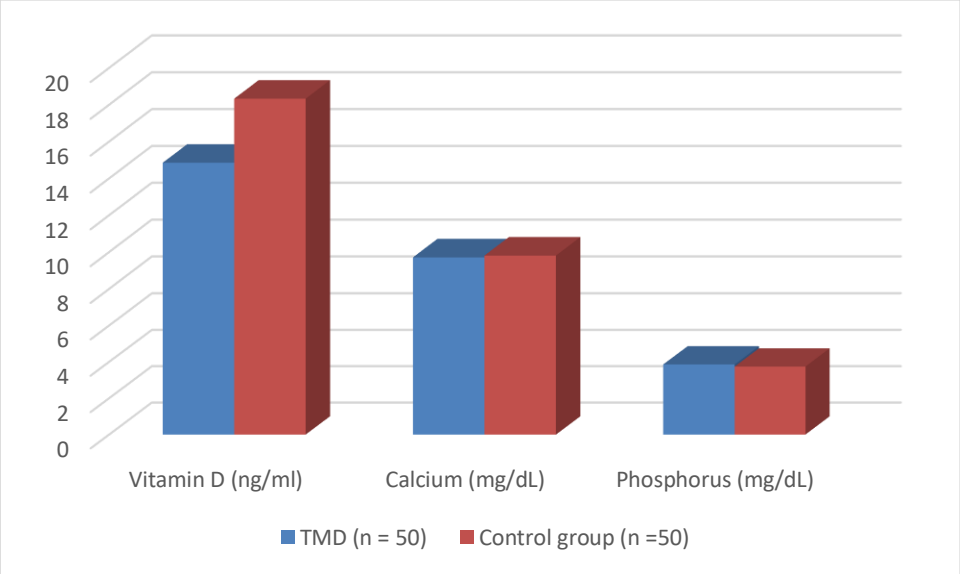
Table 1: Age and Gender-wise distribution of patients

Variable		TMD group		Control group	
		Number	Percentage	Number	Percentage
Mean age (years)		35.5		36.1	
Gender	Males	29	58	26	52
	Females	21	42	24	48

Table 2: Characteristics in patients

Characteristics	TMD (n = 50)	Control group (n =50)	P – value
Vitamin D (ng/ml)	14.85	18.33	0.23
Calcium (mg/dL)	9.71	9.81	0.75
Phosphorus (mg/dL)	3.86	3.74	0.12

Graph 1: Comparison of vitamin D levels, calcium levels and phosphorus levels



DISCUSSION

Temporomandibular disorders are a heterogeneous group of diseases involving the temporomandibular joint and related structures, mainly characterised by symptoms such as alterations in joint movement, articular sounds or pain. [1] TMDs are clinically important since they may disturb life quality in patients due to pain or alterations in joint movements causing difficulty in eating or speaking, and they are also important because their treatment is complex. [8] Although the aetiological factors that trigger TMDs remain unclear, biomechanical stress, oestrogen hormones and emotional stress have been defined as having a possible aetiological role. [9,10]

Vitamin D is a key element in calcium metabolism, and previous studies have shown that reduced serum levels of 25 (OH) vitamin D are associated with musculoskeletal disorders, such as chronic low back-leg pain and fibromyalgia, however, data regarding vitamin D status and TMDs are limited. [11,12] In an experimental model, Shen et al. reported that vitamin D deficiency was correlated with an erosive temporomandibular joint osteoarthritis through induction of DNA damage and production of

inflammatory cytokines. [13] Decreased vitamin D levels have also been associated with radiographic changes in the temporomandibular joint. [14]

In our study, a total of 100 patients were enrolled. Subjects were divided into two groups as temporomandibular disorder group and control group. The number of subjects were 50 in each group. The normal levels for vitamin D were above 20 ng/mL. A prospective observational study by Demir CY et al, included patients with TMDs and age-matched healthy controls. TMDs were diagnosed via physical and radiologic examination, and serum levels of 25 (OH) vitamin D, parathyroid hormone, calcitonin, calcium, magnesium, and phosphorus were determined. The study included 100 patients, comprising 50 patients with TMDs and 50 control patients. No statistically significant between-group differences were found regarding age or sex. No statistically significant between-group differences were found in terms of serum 25 (OH) vitamin D, calcitonin, calcium, magnesium or phosphorus levels. Parathyroid hormone levels were statistically significantly higher in patients with TMDs versus healthy control patients. In patients with temporomandibular disorders, increased parathyroid hormone levels in response to vitamin D deficiency was significantly more prominent. These data suggest that, in patients with temporomandibular disorders, vitamin D deficiency should be assessed and corrected. [15]

In our study, In TMD patients, the mean serum vitamin D levels were 14.85ng/ mL. The results were not significant. Mean serum calcium levels among the patients of the TMD group and control group was 9.71 mg/dL and 9.81 mg/dL respectively.Mean serum phosphorus levels among the patients of the TMD group and control group was 3.86 mg/dL and 3.74 mg/dL respectively. Non-significant results were obtained while comparing the calcium and phosphorus levels among study group and control group. Another study, published by Yilmaz et al. in 2019 [16] suggests a prevalence of TMDs (especially the muscular disorders) among chronic kidney disease (CKD) patients (~41.5%); however, due to the limitations of their study, the authors could not establish a cause and effect relationship between TMD and hemodialysis patients. These results are significant for future studies on vitamin D, which is considered to be deficient in CKD patients and may play a role in the evolution of temporomandibular disorders on hemodialysis patients by inducing inflammatory cytokine production. [17,18]

CONCLUSION

In TMDs, vitamin D deficiency should be assessed and corrected.

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