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Research Article

ESTIMATION OF VITAMIN D LEVELS IN CHRONICPERIODONTITIS WITH AND WITHOUT TYPE 2 DIABETES MELLITUS IN POST MENOPAUSAL WOMEN: AN OBSERVATIONAL STUDY

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ABSTRACT

Vitamin D plays an important role in bone remodelling, bone hemostatis, as well as in immunity. Due to this, it might affect the extent and development of inflammatory diseases such as periodontitis and diabetes mellitus. Vitamin D deficiency leads with various disorders and the attention is given by the scientific and clinical community because of pleiotropic effects of this hormone in the skeletal system. Studies have shown that vitamin D has anti-inflammatory and anti-microbial properties and plays a important role in musculoskeletal health. There is strong evidence that vitamin D deficiency may increase the likelihood of osteoporosis and osteopenia as well as chronic inflammatory diseases such as hypertension, diabetes mellitus, cardiovascular disease, stroke, inflammatory bowel disease, periodontal disease, mental illness, and cancers.

INTRODUCTION

Periodontitis is a multifactorial disease resulting from interaction between various microorganism and host response. The interaction triggers the complex mechanism of inflammatory process, which leads to tissue destruction and remodeling of alveolar bone. Host inflammatory response is a protective reaction but both hypo-responsiveness and hyper-responsiveness can result in advanced tissue destruction. Furthermore, vitamin D has some antimicrobial effects. When the concentration of serum calcium decreases causes resorption of calcium from bone and leads to decreased bone mineralization**.** Most of the previous studies showed association between high serum levels of 25(OH) D with periodontal health and treatment**.** According to study by Alshouibi *et al* and Antonglou *et al*. reported that sufficient total vitamin D intake was associated with lower incidence of periodontal disease, and vitamin D intake may prevent against periodontal disease progression. In another case-control study by Antonoglou GN *et al*, patients with a low 1,25(OH)2D level were belongs to the periodontal group. In contrast, Zhang *et al*. reported that 25(OH) D levels, the major metabolite of vitamin D were found higher in patients with generalized aggressive periodontitis. Hence, the aim of the study was to estimate the serum levels of Vitamin D levelsand chronic periodontitis in post-menopausal women with and without type II diabetes mellitus and to test whether these concentrations correlate with clinical parameters associated with periodontal disease.

MATERIALS AND METHODS

A total of 30 postmenopausal women reported to the Department of Periodontology, Faculty of Dental Sciences, Ramaiah University of Applied Sciences Bangalore, who were diagnosed with chronic periodontitis and with or without type II diabetes mellitus were included. Informed and written consents were obtained from each participant. The study design was approved by the Ethical Committee and study is carried out for one month i.e, from January 2017 to February 2017.

Inclusion Criteria

- Patients between the age group 48yrs to 65 years females were enrolled into study
- Patients diagnosed with chronic periodontitis with type 2 diabetes mellitus pocket depth ≥ 5mm; bleeding on probing; clinical attachment loss ≥ 3mm.
- Gingival index score of ≥1mm.
- Postmenopausal women

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Exclusion Criteria

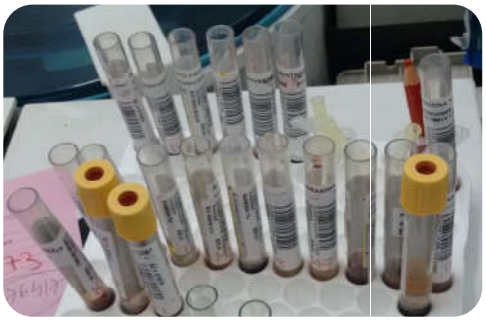
- Patient with a history of any systemic diseases
- Patients associated with cardiovascular disease and renal disease
- Patients who are on calcium supplement.
- Patients with history of periodontal treatment in previous 6 months
- Patients who are pregnant or lactating
- Patients who used antibiotic or other drugs that affect periodontal status in the past 6 months.
- Patients associated with vitamin D deficiency including bone diseases, malignancies, and multiple sclerosis and with immune deficiency and inflammatory diseases.

Armamentarium and Equipment

- Mouth mirror
- UNC 15 periodontal probe
- Explorer
- Straight probe
- Disposable mouth mask
- Disposable hand gloves
- Automated hematology analyzer
- Electrochemiluminescence immunoassay(ELICA)

Clinical parameters BOP, PD, CAL, GI were measured using UNC-15 probe

Under aseptic conditions 5ml of venous blood was drawn from antecubital fossa



Collected blood samples were stored in test tubes

Centrifugation of blood to obtain serum

Serum for estimation of serum levels of 25-hydroxyvitamin D

Electrochemiluminescence immunoassay (ELICA) was used for identifying serum Vitamin D levels

Statistical Analysis

Statistical Software Package SPSS version 22 (IBM SPSS Statistics for Windows, Version 22.0, IBM Corp., released in 2013) was used to perform statistical analyses.

Inferential Statistics: Independent Student t test was used to compare the mean values of study variables between 02 groups.

Chi square test was used to compare the severity of Bleeding on Probing between 02 groups.

The level of significance [P-Value] was set at $P<0.05$

RESULTS

The participants of the study were 30 of age group between 48 to 65 years old postmenopausal females. The mean age of the

CP group and the control group was 55 years. However, there were statistically significant differences were observed between the two groups for all periodontal indices

Comparison of study variables between 02 groups using Independent Student t test

Variables	Group	N	Mean	SD	S.E.M	Mean Diff	t	P-Value
PPD	Group 1	15	6.53	1.2	0.3	0.53	1.096	0.28
	Group 2	15	6.00	1.4	0.4			
CAL	Group 1	15	3.53	0.6	0.2	0.46	1.900	0.07
	Group 2	15	3.07	0.7	0.2			
GI	Group 1	15	2.22	0.5	0.1	0.63	3.716	0.001*
	Group 2	15	1.59	0.5	0.1			
Vitamin D	Group 1	15	5.27	0.7	0.2	0.92	3.839	0.001*
	Group 2	15	4.35	0.6	0.2			

Note: Group 1 - Post Menopausal Women having CGP + DM; Group 2 - Post Menopausal Women having CGP with no DM

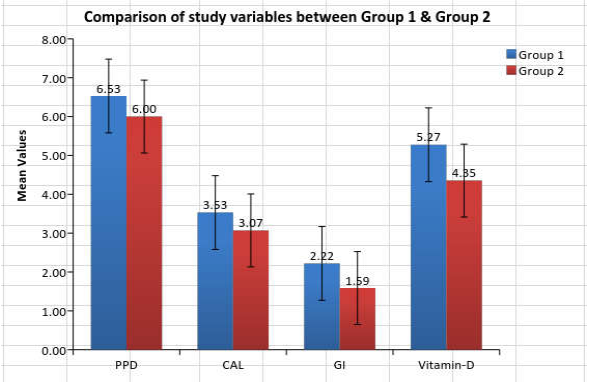
Comparison of Severity of Bleeding on Probing between Group 1 & Group 2 using Chi Square test

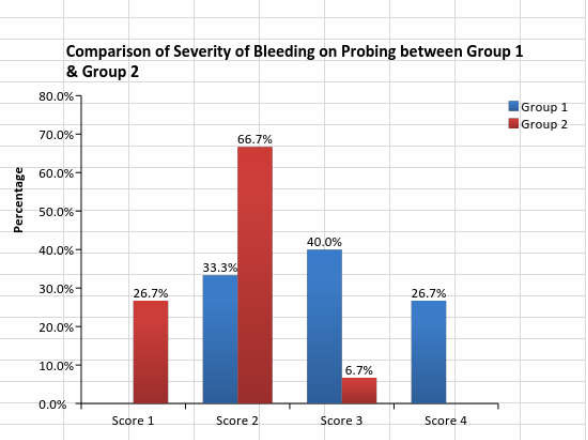
BOP	Group 1 n	Group 1 %	Group 2 n	Group 2 %	c2 Value	P-Value
Score 1	0	0.0%	4	26.7%	13.238	0.004*
Score 2	5	33.3%	10	66.7%		
Score 3	6	40.0%	1	6.7%		
Score 4	4	26.7%	0	0.0%		

* - Statistically Significant

Descriptive Statistics of RBS levels of Group 1

Group	N	Mean	SD	Range Min	Range Max
Group 1	15	269.3	55.6	210	386





DISCUSSION

The most prominent role of VitD in the human body is the regulation of calcium and phosphate homeostasis, through its action on at least three organs, the kidney, the small intestine and the bone**.** The initial defense mechanism against the periodontal pathogens includes the expression of a number of host defense peptides, such as β-defensins and cathelicidins from oral epithelial cells 47. The only human cathelicidin, LL-37, is a multifunctional peptide, with antimicrobial activity against both Gram-positive and Gram-negative bacteria. It also exhibits chemotactic properties and plays a role in dendritic cell maturation. Intakes for vitamin D and calcium found evidence to support a role of vitamin D in skeletal health for maintenance of oral health.

The main finding of this study was a positive association between serum 1,25(OH)2D level and periodontal health status in postmenopausal women with type II diabetes mellitus. The observed associations of 1,25(OH)2D with periodontal inflammation and tissue destruction may be due to bone-associated functions or the immune modulatory effects of vitamin D.

In the present study showed statistically significant positive correlation was observed when bleeding on probing was compared in group I, this was in accordance with a study conducted by Ame *et al* 2002.

The data obtained from various studies suggest that vitamin D level may influence periodontal disease health condition, but association appears to be related to reducing acute measures of periodontal inflammation rather than destructive periodontal disease in which the study conducted by Page R C *et al* 2007. Jabber S *et al* 2011, conducted a case-control study in which postmenopausal women with osteoporosis and in pregnant women showed low level serum 25(OH)D among women with periodontal disease. Present study showed lower serum vitamin-D levels in type-2 diabetes mellitus chronic periodontitis subjects.

Dietriech T *et al* 2005, reported the association between serum [25(OH)D] and measures of BOP and clinical attachment level. The present study showed lower level of serum [25(OH)D] and BOP and clinical attachement level in postmenopausal women with chronic periodontitis and type II diabetes mellitus was statistically significant.

Zhan *et al* 2014, concluded that Vitamin D is a protective factor for tooth loss and this effect might be an impact factor of Vitamin D on periodontal diseases. In a group of patients with type I diabetes mellitus, a positive association of the serum [25(OH)D] level and periodontal health was observed. But the present study included type 2 diabetes mellitus showed lower serum vitamin-D levels in chronic periodontitis.

Antonglou *et al* in 2013, showed a positive corelation between serum level of 1,25(OH)D and periodontal condition in diabetic subjects. However, they found that the elimination of periodontal infection that would increase the serum level of 1,25(OH)D while it had no effect on 25(OH)D serum levels. The present study showed positive correlation with lower level of the serum 1,25(OH)D between chronic periodontitis in postmenopausal women with type II diabetes mellitus

Antonoglou *et al* 2015, showed the low level of serum [25(OH)D] was associated with chronic periodontitis. In the present study, the relationship between the levels ofserum vitamin D and chronic periodontitis showed positively associated with chronic periodontitis.

CONCLUSION

Vitamin D level appears to be associated with periodontal health rather than measures of clinical attacment level or alveolar bone loss among healthy postmenopausal women. The present study concludes, low level of serum $1,25(OH)_2$ D could be a risk factor for chronic periodontitis. The results of this study suggests that the levels of serum vitamin D in patients with chronic periodontitis should be measured and if needed supplements of vitamin D could be used as an adjunctive treatment.

Future Scope

Further, the possible association between chronic periodontitis and serum vitamin D levels should be carried out to get a wider picture of the role of vitamin D in postmenopausal women associated type II diabetes mellitus. Further studies on this research can be helpful to prove the efficacy of vitamin D in treating periodontal disease.

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