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## Assessment of serum albumin levels in clinically healthy subjects and chronic periodontitis patients

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### Abstract

**Background:** Periodontal disease is characterized by an immuno-inflammatory process. Serum albumin level is a practical marker of the general health status as it demonstrates the severity of an underlying disease and mortality in the elderly. Hence; the present study was undertaken for assessing serum albumin levels in clinically healthy subjects and chronic periodontitis patients

**Materials & methods:** A total of 100 subjects were included and were divided into two study groups as follows: Periodontitis group: 50 patients with clinical and radiographic diagnosis of chronic periodontitis; and Control group: 50 healthy controls. Demographic and clinical details of all the patients were obtained. Radiographic evaluation of all the patients was carried out for analysing the extent of periodontal involvement. All the patients were recalled in the morning and fasting blood samples were obtained. All the samples were collected in sterile test tubes and were sent for biochemical analysis. Auto-analyser was used for evaluation of serum albumin levels. All the results were recorded and analysed by SPSS software.

**Results:** Mean serum albumin levels among the patients of the periodontitis group were found to be 4.13 g/dL. Mean serum albumin levels among the subjects of the control group were found to be 4.99 g/dL. While comparing statistically, it was seen that mean serum albumin levels among the patients with chronic periodontitis group was significantly lower in comparison to the control group.

**Conclusion:** There exist an inverse relationship between serum albumin levels and severity of periodontal pathologies. However; further studies are recommended.

**Keywords:** Albumin, Periodontitis

### Introduction

Periodontal disease is characterized by an immuno-inflammatory process triggered by the accumulation of bacterial biofilm on the external surface of the tooth, affecting the gingival tissues, periodontal ligament, cementum, and alveolar bone in susceptible individuals. The common clinical signs of periodontal disease include gingival bleeding, alveolar bone resorption, periodontal pocket formation, halitosis, dental mobility, and in advanced cases, spontaneous tooth loss<sup>[1-3]</sup>. Epidemiological studies have suggested that chronic periodontitis (CP) may be associated as an etiologic factor and modulator of outcomes such as cardiovascular diseases, rheumatoid arthritis, chronic kidney disease and Anemia<sup>[4, 5]</sup>.

Serum albumin level is a practical marker of the general health status as it demonstrates the severity of an underlying disease and mortality in the elderly. Several studies have demonstrated that serum albumin concentrations are associated with general health status among the elderly. Moreover, malnutrition may also be monitored by means of serum albumin concentration. Serum albumin is the main protein synthesized by the liver. Inflammation and malnutrition both reduce albumin concentration by decreasing its rate of synthesis<sup>[6-8]</sup>. Hence; the present study was undertaken for assessing serum albumin levels in clinically healthy subjects and chronic periodontitis patients.

### Materials and Methods

The present research aimed at analysing and comparing the serum albumin levels in between patients with chronic periodontitis and healthy controls. A total of 100 subjects were included and were divided into two study groups as follows:

Periodontitis group: 50 patients with clinical and radiographic diagnosis of chronic periodontitis;

Control group: 50 healthy controls

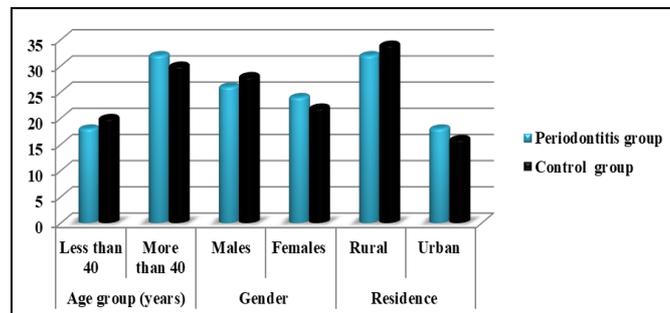
Demographic and clinical details of all the patients were obtained. Radiographic evaluation of all the patients was carried out for analysing the extent of periodontal involvement. Exclusion criteria included:

- Diabetic patients,
- Hypertensive patients,
- Patients with presence of any type of malignant neoplasm

All the patients were recalled in the morning and fasting blood samples were obtained. All the samples were collected in sterile test tubes and were sent for biochemical analysis. Auto-analyser was used for evaluation of serum albumin levels. All the results were recorded and analysed by SPSS software. Student t test was used for evaluation of level of significance.

### Results

In the present study, majority of the patients of both the study group belonged to the age group of more than 40 years. 64 percent of the patients of the periodontitis group and 60 percent of the patients of the control group belonged age group of more than 40 years. 52 percent of the patients of the periodontitis group and 56 percent of the patients of the control group were males. In the present study, mean serum albumin levels among the patients of the periodontitis group were found to be 4.13 g/dL. Mean serum albumin levels among the subjects of the control group were found to be 4.99 g/dL. While comparing statistically, it was seen that mean serum albumin levels among the patients with chronic periodontitis group was significantly lower in comparison to the control group.

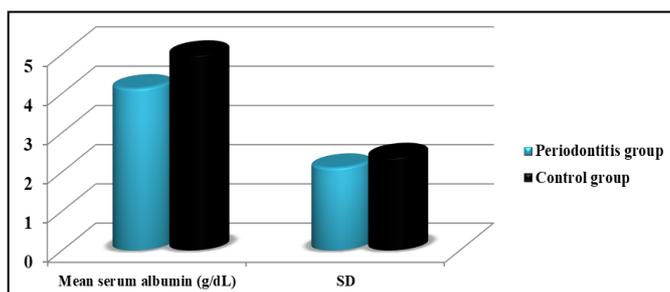


Graph 1: Demographic and clinical data

Table 1: Comparison of serum albumin levels

Groups	Mean serum albumin (g/dL)	SD
Periodontitis group	4.13	2.11
Control group	4.99	2.38
t-value	132.77	
p-value	0.002*	

\*: Significant



Graph 2: Comparison of serum albumin levels

### Discussion

Periodontitis is the result of the infection and interaction of selected bacterial species with components of the host immune response in disease-susceptible individuals. Clinically, periodontitis is characterized by the loss of connective tissue attachment that supports the dentition (cementum, periodontal ligament, and alveolar bone), and in humans the formation of periodontal pockets that are colonized with Gram-negative, facultative, or anaerobic bacterial species. Serum albumin is the most abundant plasma protein in humans and is produced in the liver. Albumin is essential for maintaining the osmotic pressure needed for proper distribution of body fluids between intravascular compartments and body tissues. The range of albumin concentration in blood is 3–5 g/dl [9]. Hence: the present study was undertaken for assessing serum albumin levels in clinically healthy subjects and chronic periodontitis patients.

In the present study, majority of the patients of both the study group belonged to the age group of more than 40 years. 64 percent of the patients of the periodontitis group and 60 percent of the patients of the control group belonged age group of more than 40 years. 52 percent of the patients of the periodontitis group and 56 percent of the patients of the control group were males. Navkiran Kaur *et al.* evaluated the relationship between periodontal health status and serum albumin levels. A total of 60 subjects of both genders with age range of 40-70 years were included in the study. Patients were divided into two groups viz. Group I; clinically healthy subjects and Group II; patients with chronic periodontitis, that is, loss of attachment  $\geq 5$  mm. Serum albumin concentration was estimated by bromocresol green albumin method. The mean value of serum albumin levels for Group I was 4.815 g/dL with standard deviation (SD) of 0.127 and for Group II, the mean value of serum albumin levels was 4.219 g/dL (SD 0.174). The difference between serum albumin levels in Group I and Group II were found to be statistically significant ( $P \leq 0.001$ ). The findings of this clinical trial suggested an inverse relationship between the serum albumin concentration and chronic periodontal disease [10]. Kolte RA *et al.* evaluated the relationship between periodontal disease and general health status in adults using the serum albumin concentration. A total of 100 patients of both genders with age range of 40 to 70 years were included in the study. Patients were divided into the following two groups: clinically healthy subjects and patients with periodontitis, that is, loss of attachment  $\geq 5$  mm. The mean serum albumin levels for Group I was 4.47 g/dl with standard deviation (SD) of 0.276 and for Group II, the mean value of serum albumin was 4.61 g/dl with SD of 0.273. Using Student's unpaired 't' test, the difference between the serum albumin levels in Group I and Group II were found to be statistically significant ( $P=0.020$ ). The mean body mass index values for Group I was 22.63 with a SD of 3.85, whereas the same for Group II was 22.23 with a SD of 4.21, which were on comparison, found to be nonsignificant ( $P=0.462$ ). The findings of the clinical trial suggested an inverse relationship between the serum albumin concentration and chronic periodontal disease [11].

In the present study, mean serum albumin levels among the patients of the periodontitis group were found to be 4.13 g/dL. Mean serum albumin levels among the subjects of the control group were found to be 5.08 g/dL. While comparing statistically, it was seen that mean serum albumin levels among the patients with chronic periodontitis group was significantly lower in comparison to the control group. Ashtankar MA *et al.* assessed the effect of surgical

periodontal therapy (flap surgery) on serum albumin in chronic periodontitis patients. Fifty participants of generalized chronic periodontitis were selected from the outpatient department. Clinical parameters were recorded at baseline, after 1 month, and 3 months. Venous blood was collected at baseline and 3 months after surgery from the participants to measure serum albumin by the bromocresol green albumin method. Serum albumin level increased from baseline to follow-up period after surgical periodontal treatment, i.e., 3 months. This effect was found to be statistically significant ( $<0.001$ ) in both groups as per the paired t-test. Surgical periodontal treatment (open flap debridement) has a positive effect on serum albumin level<sup>[12]</sup>. Abhijit V *et al.* examined among patients who were receiving chronic outpatient hemodialysis. Adult patients at two locations, North Carolina and New York City, were evaluated by dentist examiners. Six sites per tooth (up to 32 teeth per patient) were examined. A periodontitis case was defined as  $\geq 60\%$  of sites with attachment level  $\geq 4$  mm. Common causes of end-stage kidney disease were hypertension (12.3%), diabetes (22.1%), glomerulonephritis (7.1%), and other (58.4%). The average number of teeth was 20.3 (SD 8.4). Thirty-five (23%) patients were periodontitis cases. Severe periodontitis was associated with low serum albumin (odds ratio 8.20; 95% confidence interval 1.61 to 41.82;  $P = 0.01$ ) compared with individuals without severe periodontitis disease after adjustment for age, gender, race, diabetes, hypertension, body mass index, smoking, study site, total cholesterol, serum calcium, serum phosphorus, and normalized protein catabolic rate. There was no observed association of severe periodontitis with CRP<sup>[13]</sup>.

## Conclusion

From the above results, the authors concluded that there exist an inverse relationship between serum albumin levels and severity of periodontal pathologies. However; further studies are recommended.

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