Nat. Volatiles & Essent. Oils, 2021; 8(6): 4384-4395

NVEO
Natural Volatiles &
Essential Oils

Association Of Platelet Count With Periodontal Status - A Retrospective Study

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ABSTRACT

Introduction
Periodontitis is an inflammatory disease affecting the supporting tissues of teeth, resulting in bone and tooth loss. Recent evidence has proven associations between periodontitis and systemic diseases and conditions like diabetes, cardiovascular diseases, preterm low birth weight etc. In this study, we evaluated the possible association between platelet count and periodontitis.

Materials and methods
Data was collected from Patient management software of Saveetha Dental College for a one month time period from January 2020 to February 2020, adhering to inclusion and exclusion criteria. The data includes the patient's periodontal status and platelet count. Results were depicted as graphs.

Results
In the present study, no statistically significant association was noted between platelet count and periodontitis, with a p value of 0.835. However, platelet counts were found to be comparatively increased in periodontitis patients, especially in male population and in the age group 51-60 years, than in gingivitis and clinically healthy patients .

Conclusion
Assessing the systemic inflammatory burden of periodontal diseases helps in understanding the possible role of periodontal disease in the initiation and progression of systemic diseases and conditions. Within the limits of the present study we concluded that no statistically significant association was observed between platelet count and periodontitis patients. More long term longitudinal studies with a larger sample size can be done.

Keywords: Platelet, gingivitis, periodontitis, Innovative technique

INTRODUCTION:

Periodontitis is a chronic inflammatory disease of supporting tissues of teeth, resulting in progressive destruction of the periodontium (1). The plaque biofilm contains thousands of micro-organism that

release microbial products and endotoxins into the subgingival environment which enters the systemic circulation through the ulcerated pocket epithelium. The ensuing host-microbial interaction leads to the release of inflammatory mediators both at local and systemic level. This creates a persistent low grade systemic inflammation that is associated with increased risk of systemic diseases and conditions like diabetes, coronary heart diseases, adverse pregnancy outcomes and respiratory diseases (2).

Periodontal inflammation induced bacteremia causes elevation of WBC, fibrinogen and Von Willebrand factors that increase the blood viscosity. Leukocytes (especially neutrophils) in turn produce specific molecules responsible for the inflammatory response, which can be a risk factor for atherosclerosis and cardiovascular complications (3).

Similarly, platelets also play an important role in hemostasis (4). Not only are they confined to regular hemostasis, they also play major roles in innate immunity as well as regulation of tumor growth and extravasations in the vessel (4–6). When platelets are activated, pro-inflammatory mediators are released, and pro-inflammatory receptors are exposed. It causes platelets to bind to WBC and endothelial cells. Pathogens existing in the periodontal tissues may readily stimulate platelets and WBC, and this activation might be involved in aggravating atherothrombosis (7). Platelet activity increases in cardiovascular diseases (5) which can be linked to periodontitis (8). The present study assessed the association between periodontal status and platelet counts. Our team has extensive knowledge and research experience that has translated into high quality publications (9–21),(22–26)(27)(28).

MATERIALS AND METHODS:

The present study is a retrospective study conducted at Saveetha Dental College. Periodontal status and platelet counts were extracted from Patient management software of Saveetha Dental College for a one month time period from January 2020 to February 2020.

Inclusion criteria-

1. Systemically healthy individuals in the age group of 20-60 years
2. Periodontitis patients with probing depth of ≥6 mm and clinical attachment loss of ≥ 5 mm, tooth loss of ≤4 teeth due to periodontit is with radiographically detected bone loss .
3. Systemically healthy individuals with gingivitis
4. Systemically healthy individuals with clinically healthy gingiva

Exclusion criteria-

1. Individuals with systemic diseases like diabetes, hypertension, hypo/hyperthyroidism, respiratory diseases, hematological disorders etc.
2. Individuals under medications like NSAIDs, antimicrobials, vitamin supplements
3. Individuals who were treated for Periodontit is within the last 6 months
4. Immunocom promised individuals
5. Pregnant and lactating mothers

The platelet count and periodontal status of those patients were collected, compared and tabulated. The collected data were transferred to SPSS for analysis. Chi square test was done. P value less than 0.05 is considered statistically significant. Results were depicted as graphs.

RESULTS AND DISCUSSION:

Based on the inclusion and exclusion criteria, 50 patient's data was selected for the study, from the one month time period Jan 2020. Out of the 50 participants, 19 were females and 31 were males. The mean age of the participants was 55 years.

In this study, 23 participants were diagnosed with gingivitis, 3 participants were diagnosed with clinically healthy gingiva and 25 participants were diagnosed with generalised chronic periodontit is.

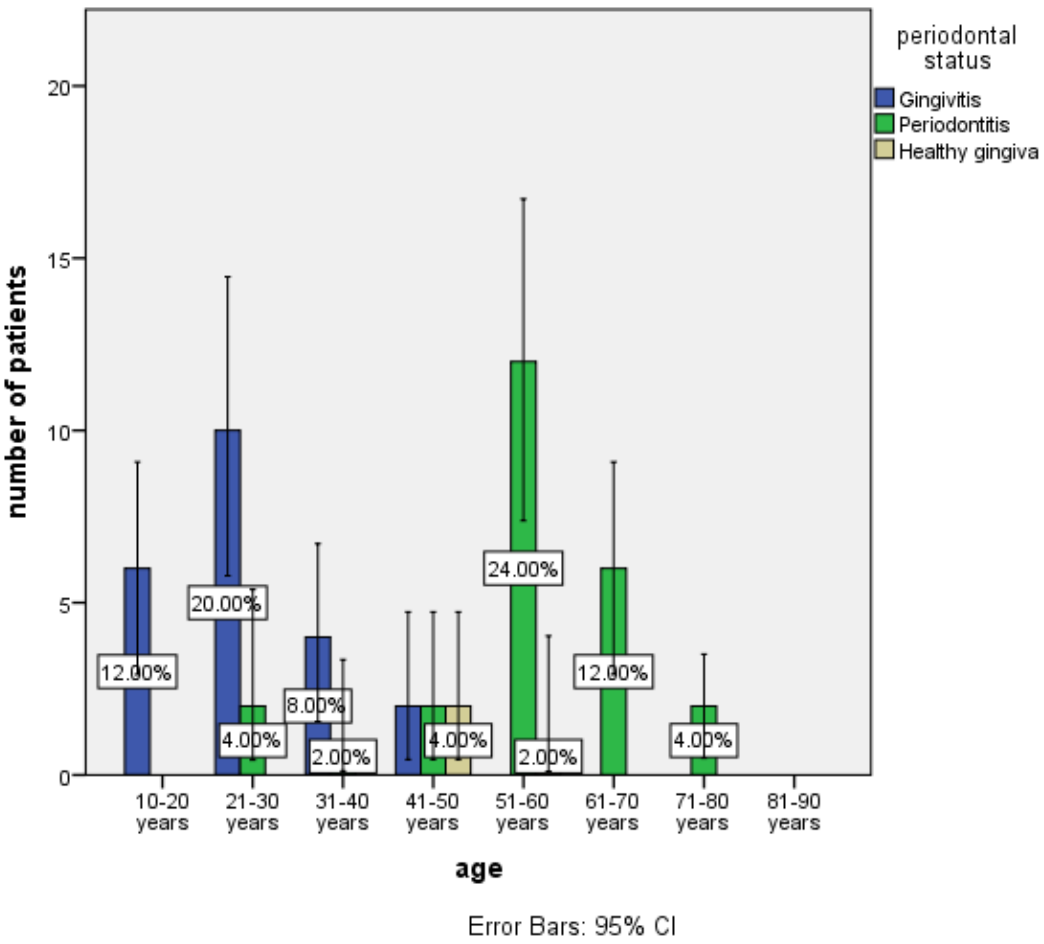

Figure 1: Bar graph correlating age and periodontal status

In the present study, it is observed that periodontitis was found to be more prevalent in the age group 51-60 years. This may be attributed to the cumulative periodontal disease associated morbidity and age changes happening in the periodontium. Also gingivitis was found to be more prevalent in the age group of 21-30 years, which may be attributed to poor oral hygiene and lifestyle habits and age associated hormonal changes. Chi square test was done, p value is 0.00, which is statistically significant ($p<0.05$).

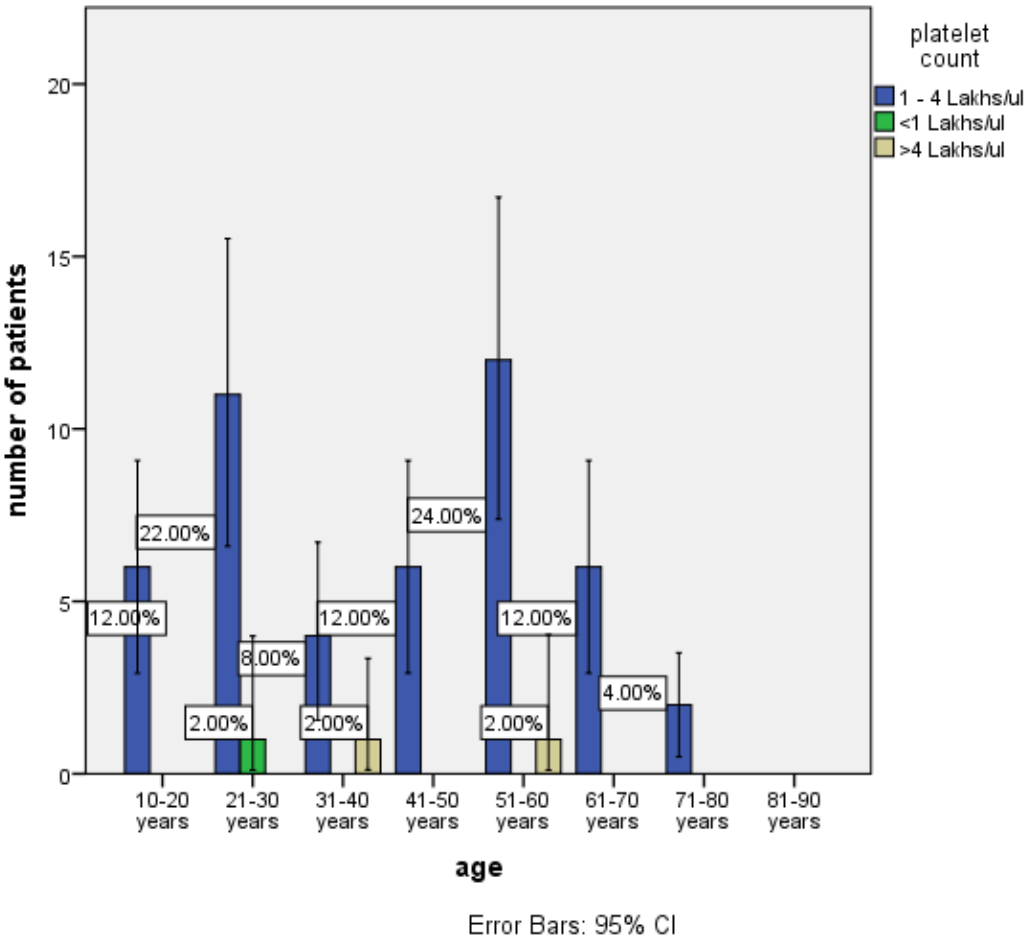

Figure 2: Bar graph correlating age and platelet count

Platelet count was found to be increased in the age group of 51-60 years (2%) which correlated with the prevalence of periodontitis in that age group. Similarly platelet counts on the higher side of the normal range were seen in the age groups that correlated with prevalence of periodontitis and gingivitis in the said age group. Chi square test was done, p value is 0.763, which is statistically insignificant ($p>0.05$).

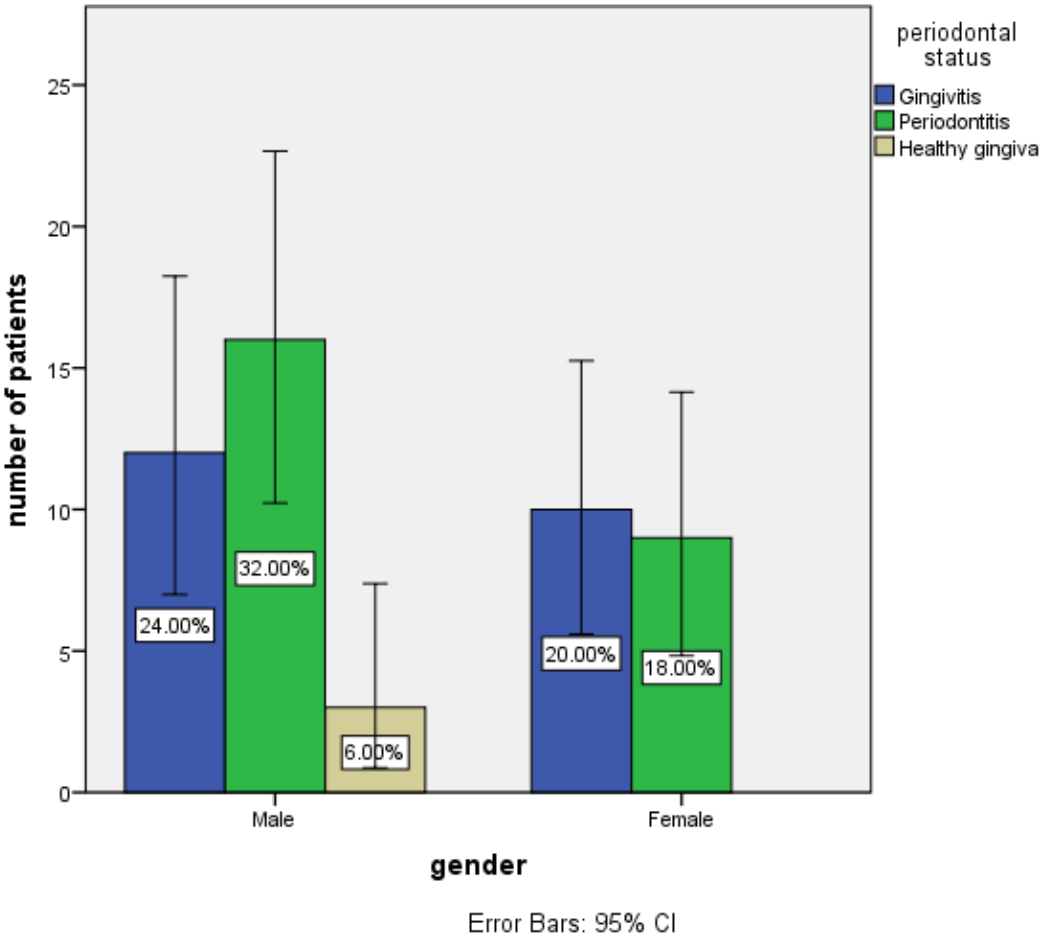

Figure 3: Bar graph correlating gender and periodontal status

Periodontitis was found to be more in males (32%) than females (24%) which may be attributed to poor oral hygiene and habits like smoking, tobacco chewing seen in males. Similarly gingivitis was found to be more in males than females. The lower prevalence of
gingivitis and periodontitis in females may be attributed to good oral hygiene habits in females. Chi square test was done, p value is 0.239, which is statistically insignificant (p>0.05).

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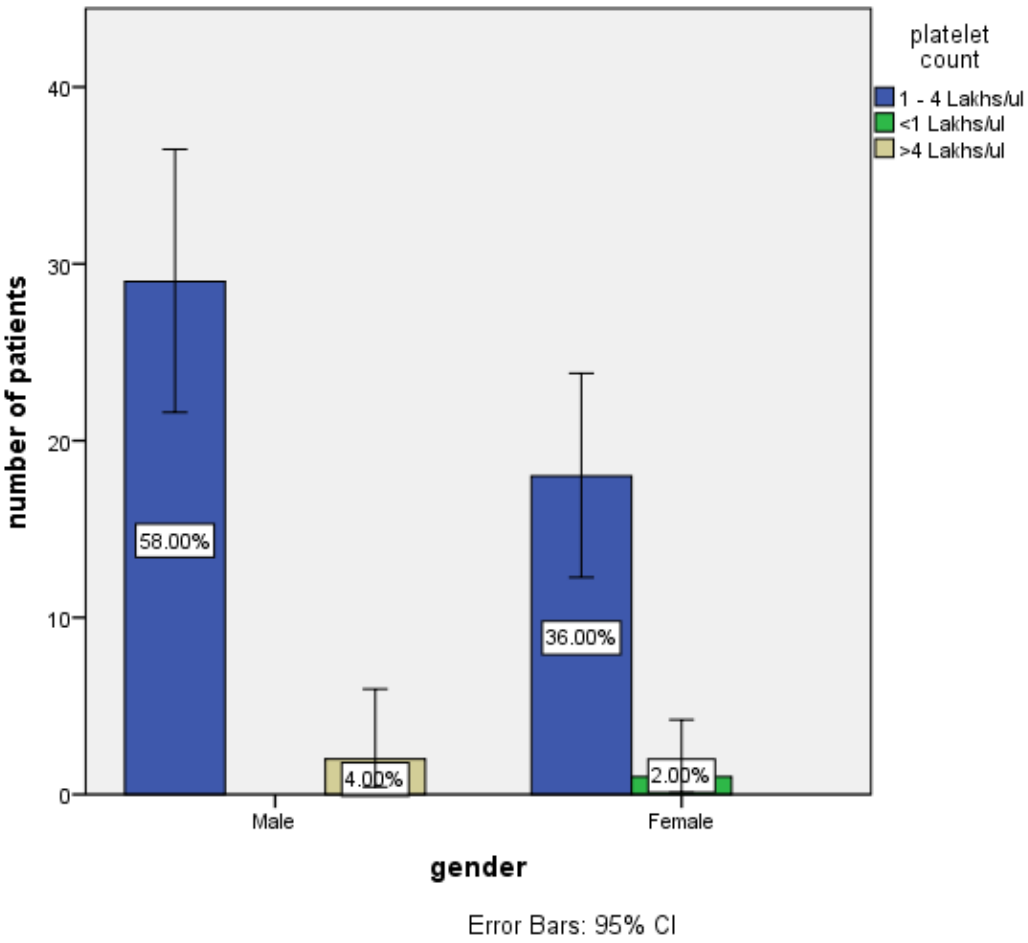

Figure 4: Bar graph correlating gender and platelet count

Platelet counts were higher in males than in females which correlated with increased prevalence of gingivitis and periodontitis seen in males. This proves a possible association between the periodontitis induced systemic inflammation and increase in levels of platelets. Chi square test was done, p value is 0.301, which is statistically insignificant (p>0.05).

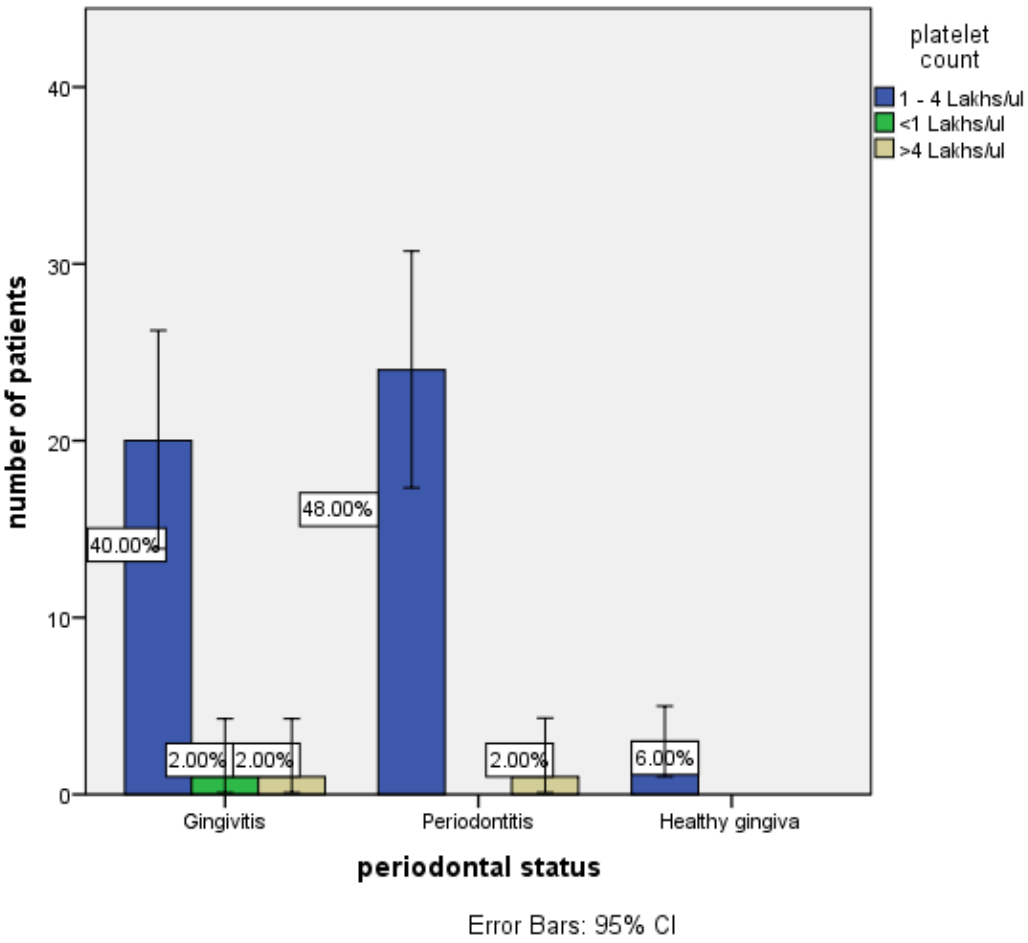

Figure 5: Bar graph correlating platelet count and periodontal status

This graph shows a positive correlation in periodontal status (gingivitis and periodontitis) and platelet counts.

Platelet count was found to be increased in both gingivitis patients and periodontitis patients (2%) but p value was found to be 0.835, which is statistically insignificant ($p>0.05$). This increased platelet count can be due to dental plaque bacteria like Porphyromonas gingivalis which induces platelet activation and aggregation (30). No significant difference was noted ($p>0.05$) with males and females regarding the correlation of periodontal status and platelet count. Similarly, several studies in the literature observed higher platelet counts in periodontitis patients (7,31), (32). Differently, Kumar et al. reported statistically lower platelet counts in the periodontitis group (31).

The increase in platelet counts among patients with periodontitis may be caused by oral bacteria (34). Platelets play an important role in maintaining vascular integrity and regulating hemostasis; they are involved in chronic inflammation associated with thrombosis, atherogenesis (29). Increase in platelet count might be another underlying mechanism for the link between periodontal inflammation and cardiovascular diseases (35).

In a study conducted by Abdulaziz Al-Rasheed, it was observed that platelet counts were increased in chronic periodontitis cases compared to the healthy group, which is similar to our present study (32).

Studies have also correlated other parameters with severity of periodontitis, apart from platelets. Sahingur S et al correlated periodontitis with fibrinogen levels and reported that fibrinogen levels were found to be higher in periodontitis patients than healthy groups (36).

Christan C et al conducted a study by correlating the platelet and WBC count in smokers and non-smokers after periodontal therapy. They reported that platelet count was reduced in both smokers and non-smokers but in non-smokers both platelet and WBC count were reduced whereas in smokers only platelet count were reduced (33). This shows that periodontal treatment reduces the systemic inflammation and the inflammatory mediator levels.

CONCLUSION:

Within the limits of the present study, it is concluded that no statistically significant association (p value - 0.835) was noted with the platelet count and the periodontitis status. However, increased platelets levels were seen in periodontitis patients, especially in male population and in the age group 51-60 years. The present study was conducted in a small population with a smaller sample size. Future studies can be conducted in a larger population and include more parameters.

ACKNOWLEDGEMENT:

The authors sincerely acknowledge the Saveetha dental college and faculty Medical record department and Information technology department of SIMATS for their tireless help in sorting out data pertinent to this study.

SOURCE OF FUNDING:

- Saveetha Institute of Medical and Technical sciences
- Saveetha Dental College
- Saveetha University
- Southern Engineering Co Ltd

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest in the present study.

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