Original Research Article

Effect of Scaling and Root Planning on Blood Counts in Patients with Chronic Generalized Periodontitis

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International Archives of Integrated Medicine, Vol. 13, Issue 8, August, 2026.
Available online at http://iaimjournal.com/
ISSN: 2394-0026 (P) **ISSN: 2394-0034 (O)**
Received on: 18-7-2026 **Accepted on:** 18-8-2026
Source of support: Nil **Conflict of interest:** None declared.

DOI: **10.5281/zenodo.22162652**

How to cite this article: Syed Saima, Bushra Iftikhar, Roobal Behal, Suhail Majid Jan. Effect of Scaling and Root Planning on Blood Counts in Patients with Chronic Generalized Periodontitis. Int. Arch. Integr. Med., 2026; 13(8): 11-28.

Abstract

Background: Periodontitis is one of the most common dental ailments, leading to the destruction of the supporting and surrounding tooth structures. In addition to its local impacts, such as gingival inflammation, periodontal pocket formation, and alveolar bone loss, periodontitis is strongly associated with systemic inflammation, which leads to various systemic conditions. All these processes are mediated by cytokines. Cytokines are in conjunction with each other and usually do no act alone. Apart from systemic manifestations, periodontitis is seen to affect blood counts as well.
Aim: The aim of the study is to evaluate the effect of Scaling and Root Planning on Blood Counts in Patients with Chronic Generalized Periodontitis.
Material and method: A total number of 100 patients with chronic periodontitis were included in the study. The Clinical parameters recorded at base line were gingival index (GI), Plaque index (PI), periodontal pocket depth (PPD) and Clinical attachment level (CAL) followed by full mouth scaling and root planning. Blood cell parameters recorded at baseline were hemoglobin concentration, red blood cell count, erythrocyte sedimentation rate, mean corpuscular volume, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration, platelet count, white blood cell count, neutrophil count and lymphocyte count. Theses parameters were recorded again at 3 months.
Results: A statistically significant decrease was seen in gingival index (GI), Plaque index (PI), periodontal pocket depth (PPD) and Clinical attachment level (CAL) followed by full mouth scaling and root planning. In case of blood parameters a statistically significant increase was seen in hemoglobin concentration, red blood cell count, platelet count. Though there was an increase in Mean

Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH) and Mean Corpuscular Hemoglobin Concentration (MCHC), but the increase was statistically insignificant. Also a statistically significant decrease was seen in erythrocyte sedimentation rate, white blood cell count (WBC), and neutrophil count. In case of lymphocyte count there is a statistically insignificant decrease in the count.

Conclusion: The results indicate that a therapeutical intervention in terms of scaling and root planning has a systemic effect on the blood cell counts in chronic periodontitis patients

Key words

Periodontitis, Scaling and root planning, Blood counts, Red blood cell count, White blood cell count, Platelet count, Erythrocyte sedimentation count.

Introduction

Periodontitis is one of the most common dental ailments, leading to the destruction of the supporting and surrounding tooth structures. The term "periodontitis" is built up of two words, i.e., "periodont-" meaning "structure surrounding the teeth" and "itis" meaning "inflammation." The disease of the gingival tissue, if left untreated, leads to the spread of inflammation to deeper tissues, disrupts bone homeostasis, and causes tooth loss [1].

In addition to its local impacts, such as gingival inflammation, periodontal pocket formation, and alveolar bone loss, periodontitis is strongly associated with systemic inflammation, which leads to various systemic conditions. These include obesity, diabetes mellitus, cardiovascular disease, pregnancy, chronic kidney disease (CKD), respiratory diseases, rheumatoid arthritis, neurodegenerative diseases, malignancy, stress, depression, and autoimmunity [2-8]. There may be potential effect of periodontal diseases on a the above mentioned wide range of organ systems including blood [9]. The development and aggravation of these systemic disorders are linked to periodontitis through common inflammatory pathways, which include the function of pro-inflammatory cytokines and periodontal bacteria [10].

Cytokines are in conjunction with each other and usually do no act alone. Cytokines can induce biological changes or tissue damages such as destruction of connective tissue and alveolar bones. These cytokines may be also effective in creating anaemia by preventing proliferation and differentiation of erythrocyte precursors and changing the metabolism of iron [11, 12]. In addition, they can suppress release of erythropoietin hormone from kidneys causing anemia [13].

Routine laboratory test for anaemia is as follows: Complete blood count (CBC) including Hb, HCT and erythrocyte indices, mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), Mean corpuscular haemoglobin concentration (MCHC) and Ferritin [14]. Lainson was one of the first authors to report anaemia as a cause of periodontitis [15]. Apart from anaemia it is exhibited in blood as an increase in total leukocyte count (TLC), PMN and lymphocyte count, and erythrocyte sedimentation rate (ESR) values [16].

Many authors have concluded that periodontal diseases can lead to adverse changes in commonly assessed blood parameters (i.e., haemoglobin [Hb], white blood cell, PMN and lymphocyte count from differential leukocyte count [DLC], and ESR) although some other authors have not found such a correlation [17, 18]. Seigel reported a decrease in the number of erythrocytes secondary to the presence of periodontal disease [19].

Despite a lot of work on this subject there is no conclusive evidence on interrelationship between Scaling and root planning and its effect on blood

parameters, so the present study aims at evaluate the effect of periodontitis and its treatment on commonly assessed blood parameters such as ESR, TLC, polymorphonuclear leucocyte count (PMN) and lymphocyte count from DLC, MCH, MCHC, MCV and Hb.

Methodology

The present study was conducted after obtaining the clearance from the Intuitional Ethical Committee of Government Dental College and Hospital, Srinagar.

Participants

A convenient sample of 50 adult patients was selected for the study. Patients who reported to the OPD of department of periodontics with chief complain of visible calculus or plaque, bleeding gums, loose or shifted teeth, recession or persistent bad breath were evaluated for chronic periodontitis. Screening examination included a medical history, in particular smoking habits, radiographs and full-mouth pocket depth measurements to confirm the diagnosis of chronic periodontitis. The patients participating in this study were only chosen once they completed and signed the consent form. In addition, no fee was taken for laboratory tests or periodontal treatment.

Inclusion criteria: age between 18–40 years, minimum of 20 teeth, pocket depth >5 mm on at least 3 teeth/quadrant, radiographical evidence of horizontal and vertical bone loss , and except for periodontitis, they were perfectly healthy with no systemic disorders. The females included in this study were in the intervening periods of their menstrual cycle.

Exclusion criteria: systemic antibiotic use during the study or preceding 6 months, smoking, pregnancy and lactation women. Patients with chronic periodontitis who did not sign the consent form. Also, patients with any bleeding dyscrasias were excluded from the study.

Clinical parameters

Detailed periodontal status of the patients included in the study was recorded by one expert periodontist. The following periodontal parameters were noted:

- Plaque index according to Silness and Loe (1964).
- Gingival index according to Loe and Silness (1963).
- Probing pocket depth (Community Periodontal Index using CPITN probe).
- Clinical attachment level (Community Periodontal Index using CPITN probe).

Periodontal indices were taken before scaling and root planning. Full mouth scaling and root planning was then carried out. Patients were not put on any iron or vitamin supplements. Neither was there any modification in the diet. After one and three months, periodontal indices were repeated. The CPI index was used in this study as it helped to decide the further treatment plan of the patient after three months. All patients were put on maintenance phase. The blood samples were again collected at baseline and after 3 months.

Blood Sample Collection And Hematological Investigations

5ml of venous blood samples were collected by venepuncture under aseptic conditions in the antecubital fossa. The blood sample was then pushed immediately in sodium citrate vial and EDTA vial separately, mixed well andthe haematological investigations were carried out using automated blood analyser (ErbaManheim Analyzer H560) (**Figure - 1 and 2**).

Figure - 1: Blood analyser.

The following blood parameters were analysed by the analyser:

- Number of erythrocytes (number/microliters)
- Hemoglobin concentration (g/dl)
- Platelet count (number/microliters) Mean Corpuscular volume
- Mean Corpuscular Haemoglobin
- Mean Corpuscular Hemoglobin concentration
- White blood cell count (number/microliters)
- Neutrophil count from DLC (percent and absolute)(number/microliters)
- Lymphocyte count from DLC (percent and absolute)(number/microliters)

For ESR (Erythrocyte sedimentation rate) patients were referred to SMHS hospital.

The haematological investigations were carried out at base line and after 3 months post SRP.

Figure - 2: Parameters measured by the analyser.

Treatment

All patients were treated and evaluated by one experienced periodontics. The clinical study protocol consisted of 2 visits of full-mouth supragingival professional tooth cleaning (scaling and polishing) and oral hygiene instructions within a 3 month period. Oral hygiene was assessed using the plaque index (PI) by sillness and loe and to assess gingival inflammation, pocket probing depth (PPD), bleeding on probing were recorded with the UNC 15 probe. After the oral hygiene phase baseline measurements including the described oral hygiene index, PPD and bleeding on probing were recorded. The subsequent non-surgical treatment consisted of subgingival debridement using ultrasonic instruments and Gracey curettes under local anaesthesia. 3 months after the completion of the subgingival scaling the post-treatment measurements were performed.

Statistical analysis

The data obtained were entered in excel sheet. The results were analysed using SPSS 23 software by independent and paired t-test. The results and values were expressed as mean and standard deviation. The significance was fixed at 0.05 ($P< 0.05$). The results were presented in text, tables and graphs.

Results

The present study consisted of 50 patients.

Demographic variables:

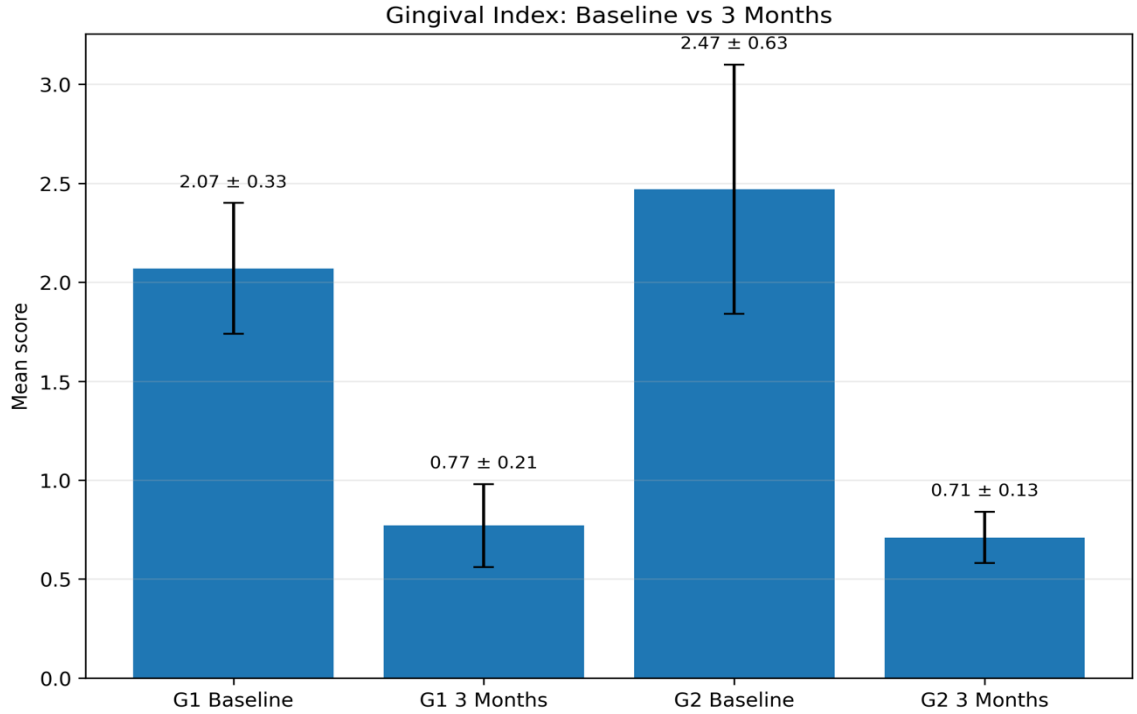
Age and Gender: The study consists of 26 males and 24 females with mean age of 44 years (31-57 years) and 48 years (32-66 years) respectively. They were marked as group 1 for females and group 2 for males.

Periodontal variables

Gingival index

The mean gingival score at baseline for group 1 was 2.07 ± 0.33 and after 3 months it was reduced to 0.77 ± 0.21. Also, the mean gingival score at baseline for group 2 was 2.47 ± 0.63 and after 3 months it was reduced to 0.71 ± 0.13. This decrease in mean gingival score was statistically significant in both the groups. However intergroup comparison was statistically non-significant (**Figure - 3**).

Figure - 3: Gingival Index; Group 1 (G1) and Group 2 (G2).



Plaque index

The mean plaque score at baseline for group 1 was 2.13 ± 0.32 and it was reduced to 0.76 ± 0.24 at 3 months. Also, the mean plaque score at baseline for group 2 was 2.78 ± 0.21 and after 3 months it was reduced to 0.96 ± 0.44. This decrease in mean plaque score was statistically significant in both the groups. However intergroup comparison was statistically non-significant (**Figure - 4**).

Figure - 4: Plaque Index; Group 1 (G1) and Group 2 (G2).

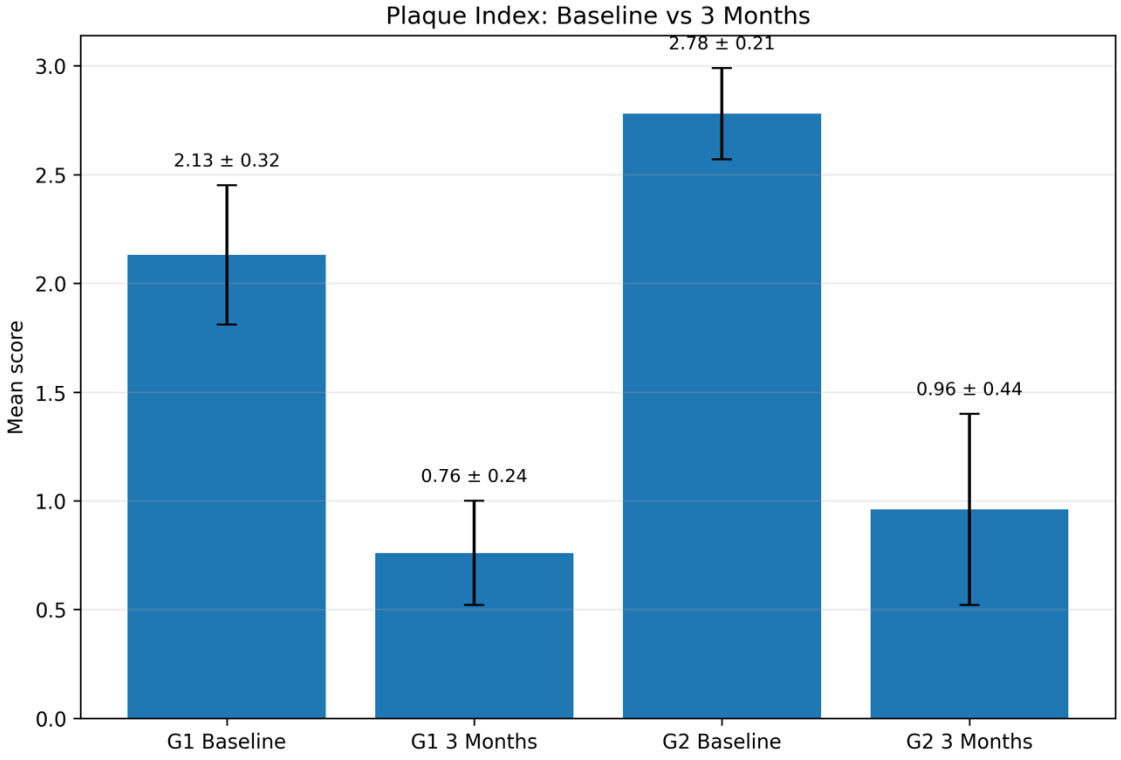
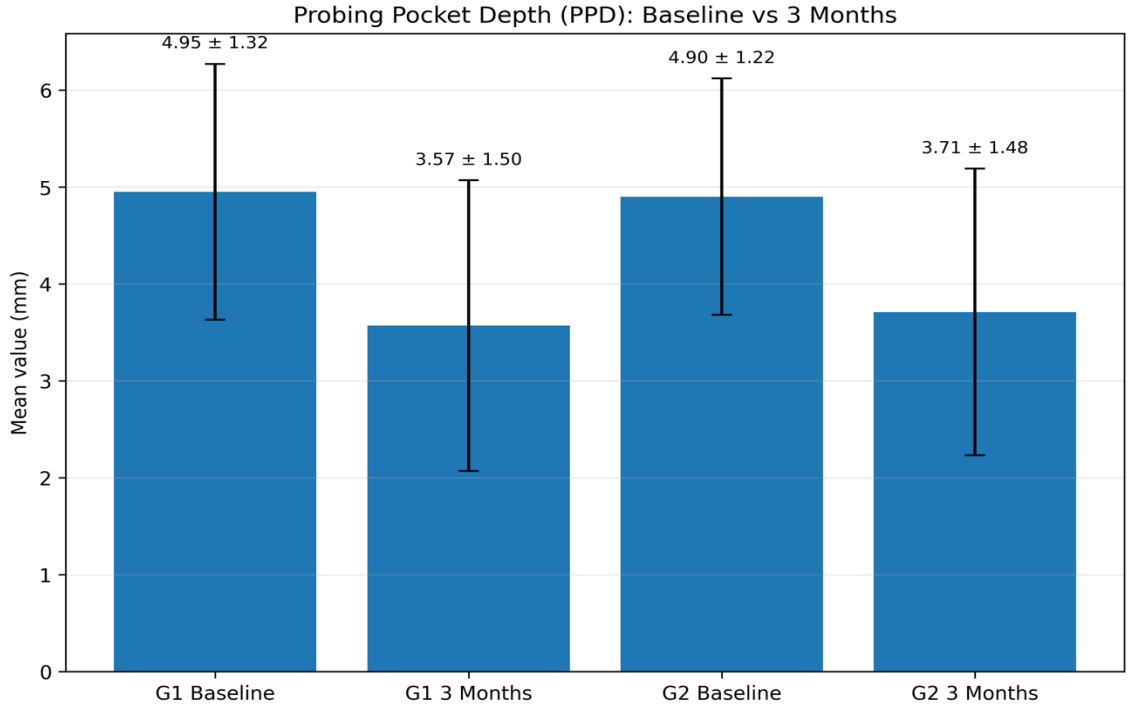


Figure - 5: Probing Pocket Depth (PPD); Group 1 (G1) and Group 2 (G2).



Probing Pocket Depth (PPD) And Clinical attachment level (CAL)

The mean score at baseline for PPD and CAL for group 1 was 4.95 ± 1.32 and 5.14 ± 1.33 respectively. After 3 months it was reduced to 3.57 ± 1.50 and 3.99 ± 0.47 respectively. For group 2 mean score at baseline for PPD and CAL were 4.90 ± 1.22 and 5.44 ± 1.51 respectively. After 3 months it was reduced to 3.71 ± 1.48 and 3.84 ± 0.52 respectively. This decrease both the parameters were statistically significant in both the groups. However intergroup comparison was statistically non-significant (**Figure - 5** and **Figure - 6**). Periodontal variables are shown in **Table - 1.**

Figure - 6: Clinical attachment level (CAL); Group 1 (G1) and Group 2 (G2).

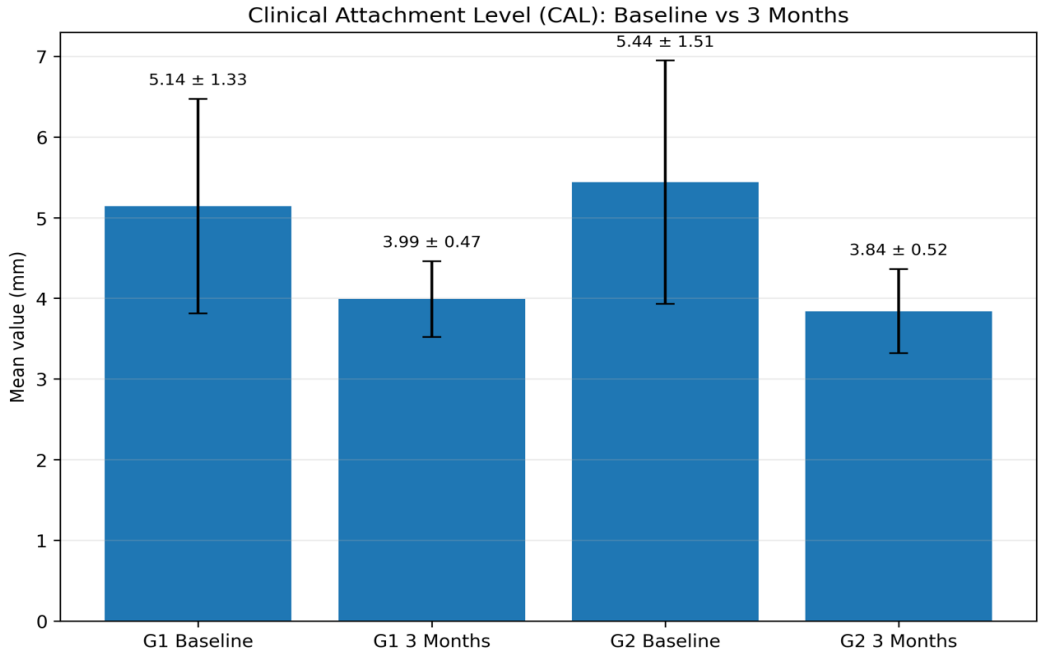
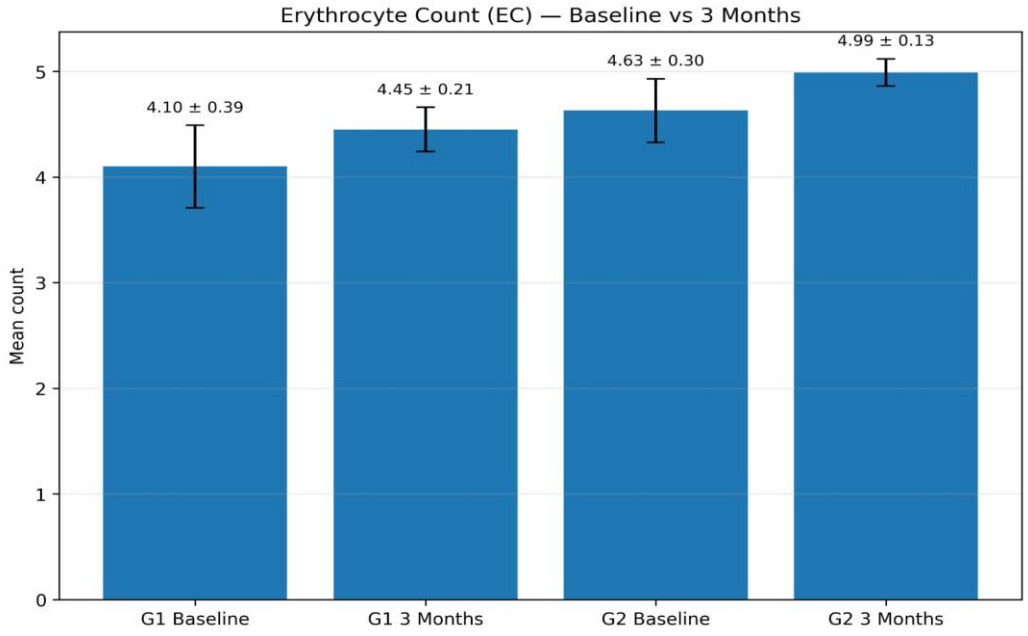


Table - 1: Periodontal parameters.

Parameter	Group	Baseline (Mean ± SD)	3 Months (Mean ± SD)	Mean Reduction	% Reduction	Intergroup Comparison	Intra group Comparison
Gingival Index	Group 1	2.07 ± 0.33	0.77 ± 0.21	1.30	62.8%	<0.05*	NS
	Group 2	2.47 ± 0.63	0.71 ± 0.13	1.76	71.3%	<0.05*	NS
Plaque Index	Group 1	2.13 ± 0.32	0.76 ± 0.24	1.37	64.3%	<0.05*	NS
	Group 2	2.78 ± 0.21	0.96 ± 0.44	1.82	65.5%	<0.05*	NS
Probing Pocket Depth (PPD)	Group 1	4.95 ± 1.32	3.57 ± 1.50	1.38	27.9%	<0.05*	NS
	Group 2	4.90 ± 1.22	3.71 ± 1.48	1.19	24.3%	<0.05*	NS
Clinical Attachment Level (CAL)	Group 1	5.14 ± 1.33	3.99 ± 0.47	1.15	22.4%	<0.05*	NS
	Group 2	5.44 ± 1.51	3.84 ± 0.52	1.60	29.4%	<0.05*	NS

*: statistically significant result ; NS: non-significant

Figure - 7: Erythrocyte count (EC); Group 1 (G1) and Group 2 (G2).



Hematological variables

Effect on erythrocyte count (EC)

The mean erythrocyte count at baseline for group 1 was 4.10 ± 0.39 and after 3 months it was increased to 4.45 ± 0.21. Also, the mean erythrocyte count at baseline for group 2 was 4.63 ± 0.30 and after 3 months it was increased to 4.99 ± 0.13. However, intragroup comparison in the mean erythrocyte count was statistically significant in both the groups. However intergroup comparison was statistically non-significant (**Figure - 7**).

Table - 2: Hematological Parameters.

Parameter	Group	Baseline (Mean ± SD)	3 Months (Mean ± SD)	Mean Change	% Change	Intra-group comparison	Inter-group comparison
Erythrocyte Count (EC)	Group 1	4.10 ± 0.39	4.45 ± 0.21	0.35	8.5%	<0.05*	NS
	Group 2	4.63 ± 0.30	4.99 ± 0.13	0.36	7.8%	<0.05*	NS
Hemoglobin Concentration	Group 1	13.40 ± 0.29	13.66 ± 0.41	0.26	1.9%	<0.05*	NS
	Group 2	14.60 ± 0.34	14.89 ± 0.23	0.29	2.0%	<0.05*	NS
MCV	Group 1	88.84 ± 2.34	89.94 ± 3.13	1.10	1.2%	NS	NS
	Group 2	90.94 ± 4.34	91.24 ± 4.36	0.30	0.3%	NS	NS
MCH	Group 1	29.45 ± 2.26	29.99 ± 2.45	0.54	1.8%	NS	NS
	Group 2	30.55 ± 3.28	30.89 ± 3.54	0.34	1.1%	NS	NS
MCHC	Group 1	32.31 ± 0.44	33.71 ± 0.42	1.40	4.3%	NS	NS
	Group 2	33.71 ± 0.94	33.97 ± 0.87	0.26	0.8%	NS	NS
ESR	Group 1	19.84 ± 7.47	12.46 ± 6.71	-7.38	-37.2%	<0.05*	NS
	Group 2	14.67 ± 6.49	9.71 ± 4.83	-4.96	-33.8%	<0.05*	NS
Platelet Count (PC)	Group 1	143.00 ± 45.00	179.00 ± 41.00	36.00	25.2%	<0.05*	NS
	Group 2	205.00 ± 39.00	243.00 ± 23.00	38.00	18.5%	<0.05*	NS
White Blood Cell Count (WBC)	Group 1	6.23 ± 0.81	5.90 ± 0.41	-0.33	-5.3%	<0.05*	NS
	Group 2	6.41 ± 0.30	5.80 ± 0.23	-0.61	-9.5%	<0.05*	NS
Neutrophil Count (NC)	Group 1	5.43 ± 0.51	5.10 ± 0.34	-0.33	-6.1%	<0.05*	NS
	Group 2	5.76 ± 0.46	5.24 ± 0.43	-0.52	-9.0%	<0.05*	NS
Lymphocyte Count (LC)	Group 1	1.88 ± 0.23	1.75 ± 0.39	-0.13	-6.9%	NS	NS
	Group 2	1.98 ± 0.37	1.82 ± 0.22	-0.16	-8.1%	NS	NS

*: statistically significant result; NS: non-significant

Figure - 8: Hemoglobin concentration; Group 1 (G1) and Group 2 (G2).

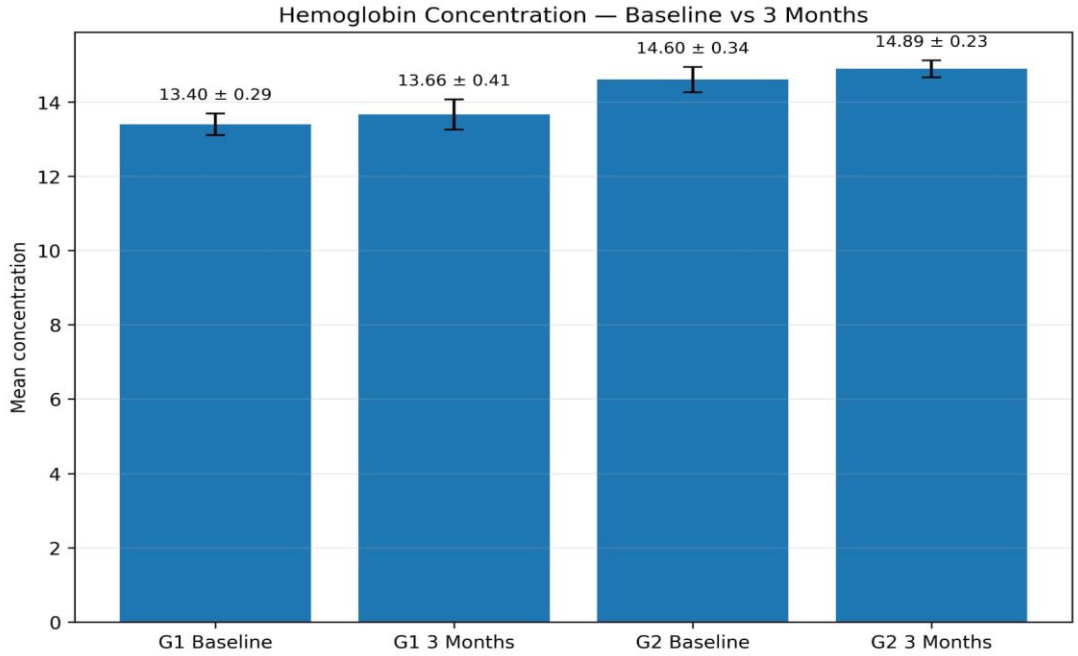


Figure - 9: Mean corpuscular volume (MCV); Group 1 (G1) and Group 2 (G2).

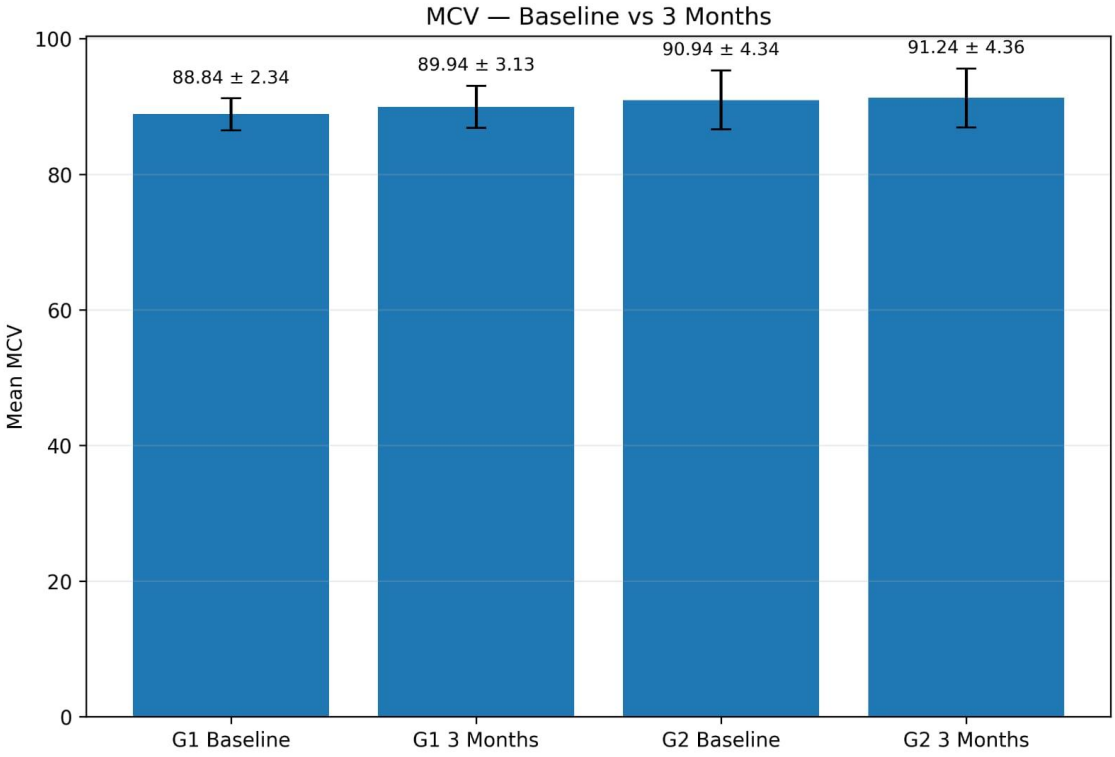


Figure - 10: Mean corpuscular hemoglobin (MCH); Group 1 (G1) and Group 2 (G2).

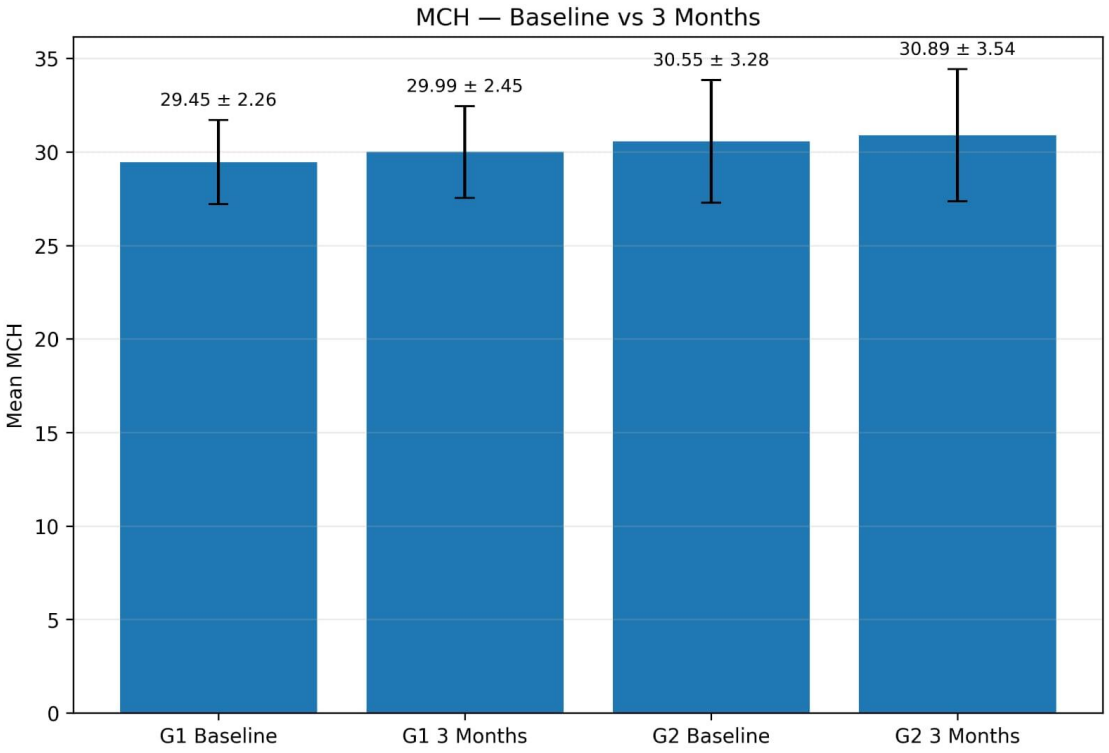


Figure - 11: Mean corpuscular hemoglobin concentration (MCHC); Group 1 (G1) and Group 2 (G2).

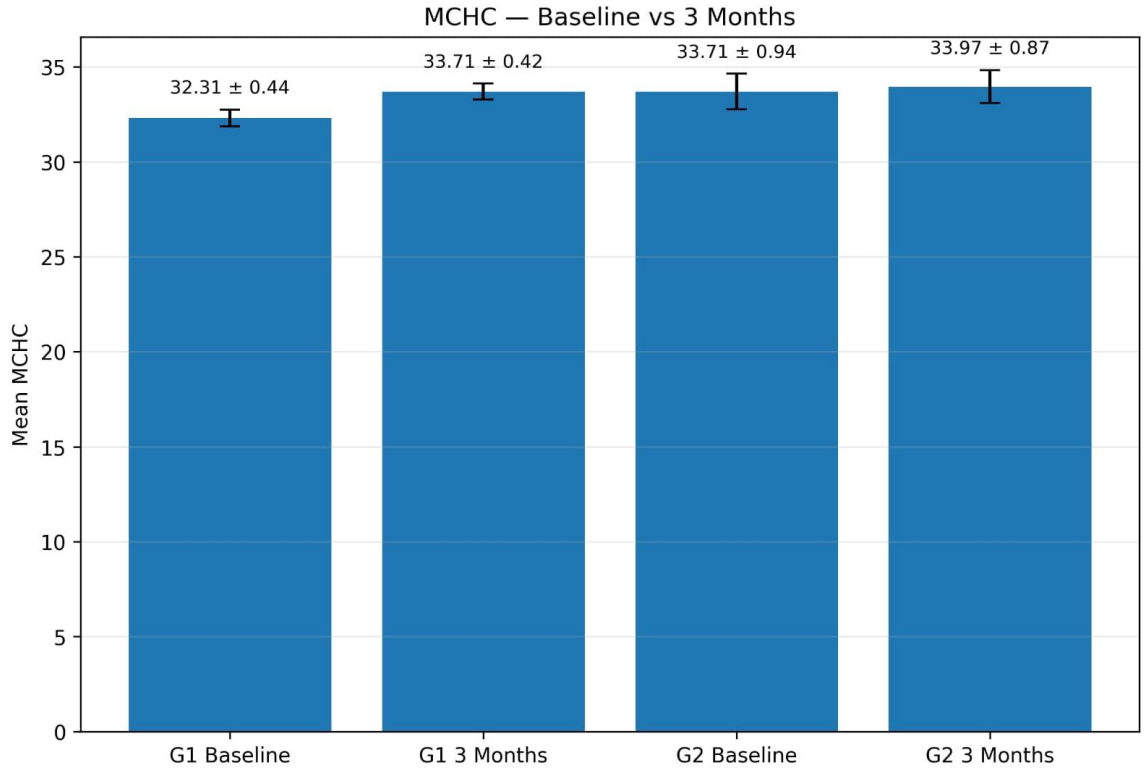


Figure - 12: Erythrocyte sedimentation rate (ESR); Group 1 (G1) and Group 2 (G2).

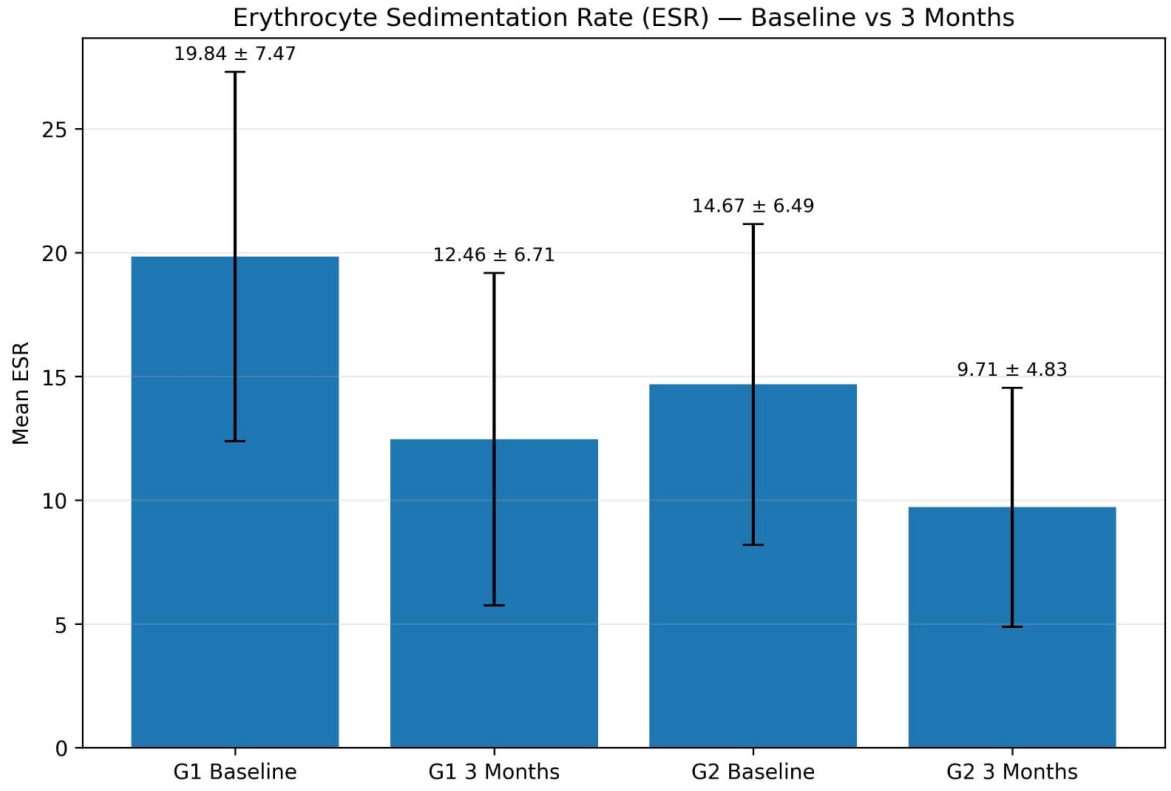
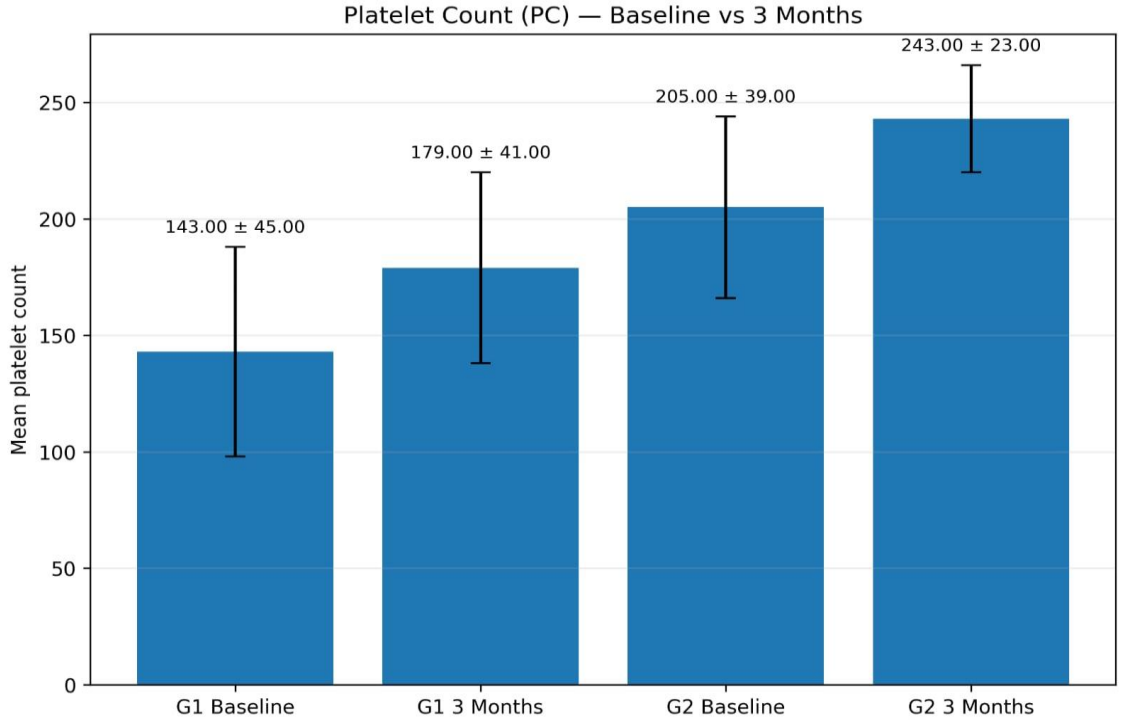


Figure - 13: Platelet count (PC); Group 1 (G1) and Group 2 (G2).



Effect on hemoglobin concentration

The mean hemoglobin concentration at baseline for group 1 was 13.40 ± 0.29 and after 3 months it was increased to 13.66 ± 0.41. Also, the mean hemoglobin concentration at baseline for group 2 was 14.60 ± 0.34 and after 3 months it was increased to 14.89 ± 0.23. This increase in hemoglobin concentration was statistically significant in the within the groups. However intergroup comparison was statistically non-significant (**Figure - 8**).

Figure - 14: White blood cell count (WBC); Group 1 (G1) and Group 2 (G2).

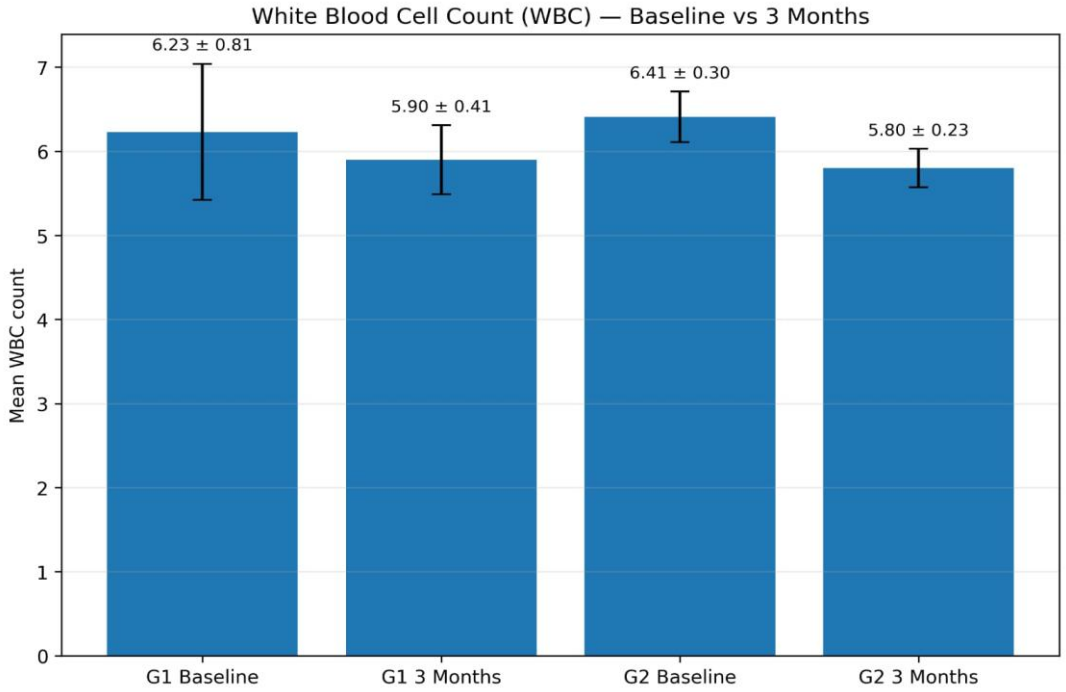


Figure - 15: Lymphocyte count (LC); Group 1 (G1) and Group 2 (G2).

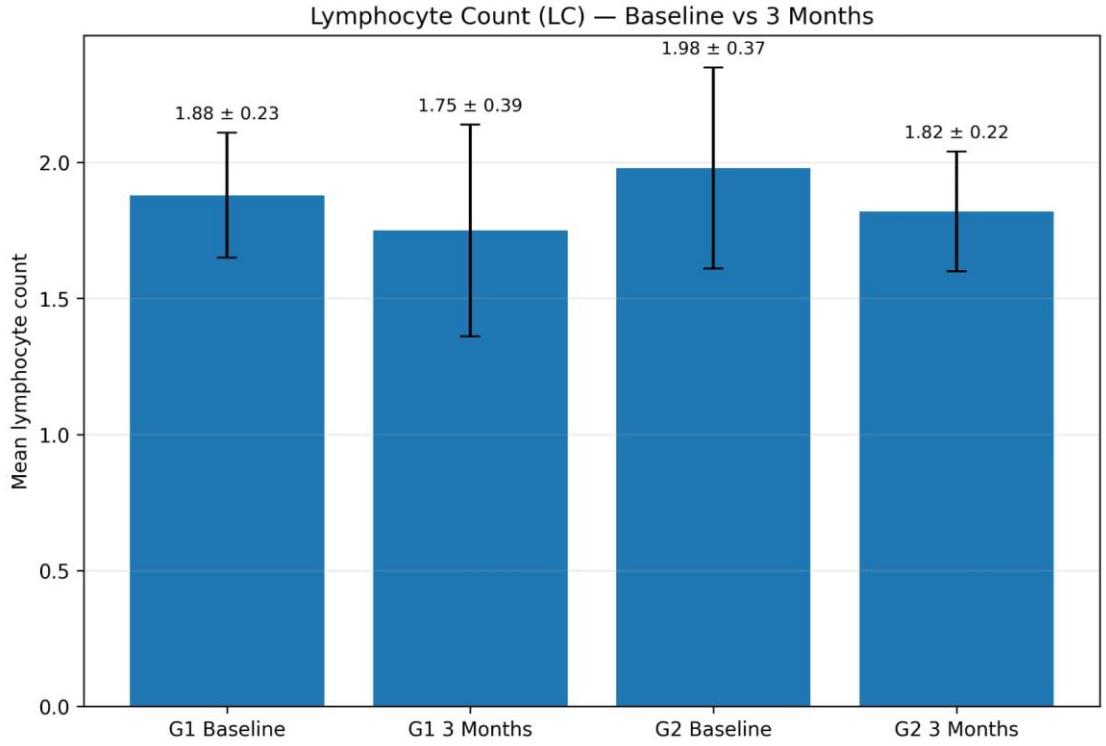
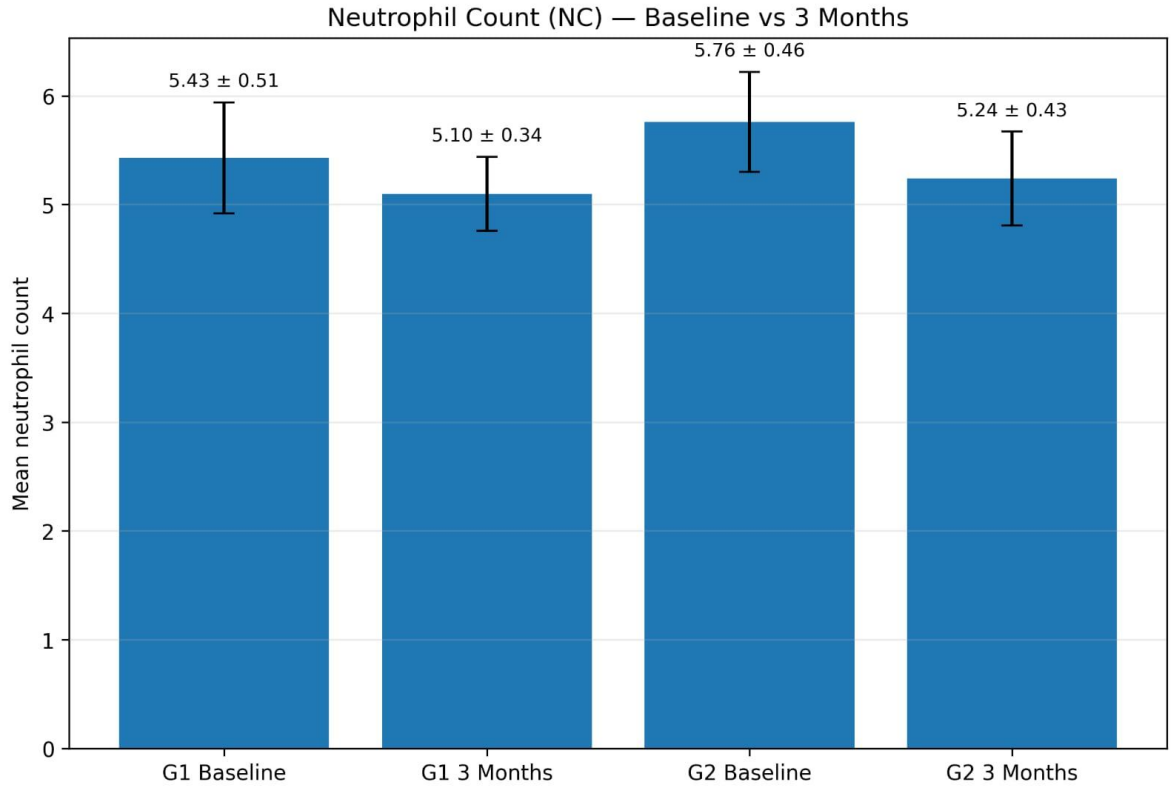


Figure - 16: Neutrophil count (NC); Group 1 (G1) and Group 2 (G2).



Effect on Red Cell Indices: Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH) and Mean Corpuscular Hemoglobin Concentration (MCHC)

The Mean Corpuscular Volume(MCV), Mean Corpuscular Hemoglobin(MCH) and Mean Corpuscular Hemoglobin Concentration (MCHC)at baseline for group 1 were 88.84 ± 2.34, 29.45 ± 2.26 and 32.31 ± 0.44 respectively and after 3 months it was increased to 89.94 ± 3.13, 29.99 ± 2.45 and 33.71 ± 0.42 respectively. Also, Mean Corpuscular Volume(MCV), Mean Corpuscular Hemoglobin (MCH) and Mean Corpuscular Hemoglobin Concentration (MCHC) at baseline for group 2 were 90.94 ± 4.34, 30.55 ± 3.28 and 33.71 ± 0.94 respectively and after 3 months it was increased to 91.24 ± 4.36, 30.89 ± 3.54 and 33.97 ± 0.87 respectively. This increase in all the red cell indices in both intergroup and intragroup comparison was statistically non-significant (**Figure – 9 to 11**).

Effect on erythrocyte sedimentation rate (ESR)

The mean erythrocyte sedimentation rate (ESR) at baseline for group 1 was 19.84 ± 7.47 and after 3 months it was reduced to 12.46 ± 6.71. Also, the mean erythrocyte sedimentation rate (ESR)at baseline for group 2 was 14.67 ± 6.49 and after 3 months it was reduced to 9.71 ± 4.83. This decrease in mean erythrocyte sedimentation rate (ESR) was statistically significant within the groups. However intergroup comparison was statistically non-significant (**Figure - 12**).

Effect on platelet count (PC)

The mean platelet count at baseline for group 1 was 143 ± 45 and after 3 months it was increased to 179 ± 41 . Similarly, the mean platelet countat baseline for group 2 was 205 ± 39 and after 3 months it was increased to 243 ± 23. This increase in mean platelet count was statistically significant within the groups. However intergroup comparison was statistically non-significant (**Figure - 13**).

Effect on white blood cell count (WBC)

The mean white blood cell count (WBC) at baseline for group 1 was 6.23 ± 0.81 and after 3 months it was decreased to 5.9 ± 0.41. Similarly, the white blood cell count (WBC) at baseline for group 2 was 6.41 ± 0.30 and after 3 months it was decreased to 5.8 ± 0.23. This decrease in white blood cell count (WBC) was statistically significant within the groups. However intergroup comparison was statistically non-significant (**Figure - 14**).

Effect on neutrophil count (NC) and lymphocyte count (LC)

The mean neutrophil count (NC) and lymphocyte count (LC) at baseline for group 1 was 5.43 ± 0.51 and 1.88 ± 0.23 respectively, after 3 months it was decreased to 5.10 ± 0.34 and 1.75 ± 0.39 respectively. Similarly, the mean neutrophil count (NC) and lymphocyte count (LC) at baseline for group 2 was 5.76 ± 0.46 and 1.98 ± 0.37 respectively, and after 3 months it was decreased to 5.24 ± 0.43 and 1.82 ± 0.22 respectively. This decrease in mean neutrophil count (NC) was statistically significant within the groupsand intergroup comparison was non-significant. However lymphocyte count (LC) in both intergroup and intragroup comparison was statistically non-significant (**Figure – 15, 16**)

Hemotological variables are shown in **Table - 2.**

Discussion

Periodontitis is an inflammatory disorder of periodontium characterized by the loss of connective tissue that supports the teeth as well as the deterioration of alveolar bone [20]. Previous studies have documented a link between periodontitis and an increased risk of systemic conditions [21].

Non-surgical Periodontal Therapy (NPT) is the gold standard and the first step for treatment of chronic periodontitis [22, 23]. Oral hygiene instructions, scaling and root surface debridement, are the basic steps of NPT to achieve resolution of gingival inflammation, it

ensures the mechanical elimination of periodontal pathogens and their by-products [24]. Clinical parameters i.e. gingival index (GI), plaque index (PI), periodontal pocket depth (PPD) and Clinical attachment level (CAL) were included in the study for the assessment of the inflammatory state of the gingival tissues, the progression of the periodontal disease and the therapeutic effect of the treatment i.e. scaling and root planning. The effect of scaling and root planning was assessed on gingival index(GI) and plaque index (PI), in this study in both the groups i.e. in females and in males a statistically significant decrease in these parameters were noted. In order to assess the effect of SRP, a paired *t*-test was applied to both the groups, a decrease was noted in periodontal parameters at the end of the treatment, a significant statistical decrease ($P<.001$) was found, and SRP improved the periodontal condition. Similar results have been seen in the previous studies done by Aziz. et al. and Talbert, et al. who observed a significant reduction in plaque score after SRP [25, 26]. The reduction in PI corresponds to the reduction in microbial deposits on the tooth surfaces and gingival crevices. Also, oral hygiene instructions given and increased self-awareness of being regularly checked for oral hygiene could have motivated the patients to clean their teeth surfaces regularly [27]. Although many indices have been proposed to assess gingival health, due to the reliability, validity, and ease of recording, the GI introduced by Loe and Silness (1963) remains the preferred choice amongst practitioners. There is a statistically significant reduction in GI from baseline to 3 months which can be attributed to the reduction in plaque, calculus, and subsequent resolution of gingival inflammation [27]. The results are in accordance with Acharya, et al. and Agarwal, et al [28, 29].

PD and CAL are correlated to the clinical inflammation indices in periodontitis [27]. A significant improvement in the clinical parameters was evident by a decrease in the PPD in both groups and gain of attachment in the chronic generalized periodontitis patients at the 3 month follow up after non-surgical periodontal therapy from the baseline. This could be attributed to effective mechanical debridement, which was aimed at reduction in the bacterial load, as a result of which the local inflammation decreased significantly [30]. Similar results were seen in previous study as well [30].

Previous studies have shown an effect of chronic periodontitis on blood cells. Hutter, et al. have concluded in their study that periodontitis is associated with the elevated levels of the C-reactive protein and white blood cells [31]. Also, in a study done by the Nibali, et al. shows that there is depression in the erythrocytes number in the patients with chronic periodontitis, and in another study done by the Hutter, et al. , he has seen that patients with chronic periodontitis show the sign of anemia [31, 32]. In previous studies it has been seen that systemic inflammation causes increase in platelet number and activation of platelets [33]. A study has been done which concludes that platelet indices MPV, PCT, and PDW can be used as simple, practical, and cost-effective biomarker for periodontitis, thus indication an effect on platelet county due to periodontitis [34]. Also, regarding the effect of periodontitis on ESR it has been seen in previous studies that patients suffering from periodontal disease had lower hematocrit levels, red blood cell counts, and hemoglobin levels with higher ESR values [35]. This study also aims at finding an association between SRP and blood parameters.

In this study a statistically significant improvement ($p <0.05$) is seen from baseline to 3 months in red blood cell count and hemoglobin. However, no significant change is observed in MCV, MCH and MCHC. These changes are in agreement with a previously reported interventional study [36, 37]. The finding that hemoglobin and RBC values increased after periodontal treatment is also supported by recent observational studies [31, 35]. Also, the increase in values of MCV, MCH and MCHC post treatment in our study was not very high. The minimal change in MCV indicates that the

anemia due to periodontitis is normocytic and hence not due to iron or vitamin deficiency. Again, the small increment in MCH and MCHC values compared to increase in hemoglobin levels implies that anemia associated with periodontitis is of normochromic type [36].

In the present study there is a statistically significant improvement ($p < 0.05$) seen from baseline to 3 months in ESR values. Similar results have been noted previously in studies done by Yadav, et al. [38] this could be attributed to decrease in inflammatory markers post scaling and root planning [39]. Also, a statistically significant increase is seen in both the group from baseline to 3 months in platelet counts. This increase in thromobocyte count could be due to fact that they play an integral role in innate immunity against micro-organism [40, 41]. Such results were seen in previous study done by B. Rai [37].

When considering the effect of SRP on WBC count, neutrophil and lymphocyte count. in this study a statistically significant decrease($p < 0.05$) is seen from baseline to 3 months in WBC and neutrophil counts. However, no statistically significant increase is seen in lymphocyte count from baseline to 3 months. The results are in accordance with Guan X, et al. [42] who have shown a significant decrease in total white blood cell (WBC) counts and neutrophil counts following SRP as the local and systemic inflammatory burden from gum disease drops. The decrease in lymphocyte count was not statistically significant as local periodontal treatment primarily targets acute tissue inflammation and subgingival bacterial loads, which cause profound shifts in neutrophils rather than systemic adaptive immune cells like lymphocytes. These finding were similar to Devinder, et al. [43].

Conclusion

Thus, within limitations, it can be concluded that chronic inflammatory diseases such as periodontitis may affect almost all the parameters, and successful treatment of periodontitis leads to an improvement in all blood parameters. However, future studies are necessary to draw a definite conclusion.

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