Jurnal Analis Medika Biosains (JAMBS)
Vol.13, No.01, March 2026, pp. 11-15 http://jambs.poltekkes-mataram.ac.id/index.php/home
E-ISSN: 2656-2456 DOI: 10.32807/jambs.v13i01.578

Overview of Platelet Counts Before and After Platelet-Rich Plasma (PRP) Preparation

Aisyara Yuliandari[1*], Izah Mahrani[2], Siska Zafrida[2] , Hartini H[2], Fauzan[2]
[1] Prodi D4 Teknologi Laboratorium Medis, Akademi Kesehatan John Paul II Pekanbaru
[2] Prodi D3 Analis Kesehatan, Akademi Kesehatan John Paul II Pekanbaru
*E-mail: aisyara@akjp2.ac.id

Article Info

Article history :

Received : Feb, 10th 2026
Revised : Mar, 11th 2026
Accepted : Mar, 26th 2026

Keyword :

Platelet counts,
Platelet Rich Plasma,
Whole blood

ABSTRACT

Platelet-Rich Plasma (PRP) is widely utilized in various clinical settings for tissue repair, particularly in skin rejuvenation, scar management, and wound healing. This study aimed to evaluate the profile of platelet counts both prior to and following the PRP preparation process. Whole blood samples were collected from eligible female participants and platelet levels analyzed using a hematology analyzer. The findings revealed a four-fold rise in the mean platelet count, increasing from a baseline of 190.6×10^3 cells/µL to 781.1×10^3 cells/µL after preparation. The study concluded that baseline platelet levels in whole blood are directly proportional to the final platelet concentration in PRP.

INTRODUCTION

Rapid advancements in science and technology have permeated numerous disciplines, including healthcare. These developments play a crucial role in delivering optimal medical care, particularly regarding therapeutic interventions for patient healing. One such development in the medical field utilizing human blood for healing is the use of Platelet-Rich Plasma (PRP) (Yuliandari, 2021).PRP has been applied across various medical disciplines, including the treatment of thrombocytopenia (Selima et al., 2023), knee osteoarthritis (OA) therapy (Rothrauff et al., 2026), regenerative responses in the pancreas (Simarmata et al., 2021), and tissue repair in dental and oral surgeries (Poetri et al., 2022).

PRP is defined as a blood product containing a high abundance of platelets derived from venous blood centrifugation (Yuliandari et al., 2022). PRP possesses a higher platelet concentration in plasma than the normal platelets circulating in the body. Physiologically, the systemic platelet count is between 150,000 and 400,000/µL, whereas PRP typically presents a count of 1,000,000 platelets/µL in 5 mL volume of plasma (Anzani, 2020; Lestari et al., 2023). According to Legiawati et al. (2023), the platelet concentration in PRP is 2- to 5-fold higher than that of venous blood.

The platelets contained in PRP play a crucial role in healing and repairing damaged tissues (Wu et al., 2025). Platelets function to secrete inflammatory factors and release various growth factors, such as Epidermal Growth Factor (EGF), Insulin-like Growth Factor-1 (IGF-1), Transforming Growth Factor-β (TGF-β), Interleukin-1 (IL-1), Vascular Endothelial Growth Factor (VEGF), Platelet-Derived Growth Factor (PDGF), as well as chemokines and cytokines required for tissue regeneration. These factors serve as the initiator of cell healing and the restoration of damaged tissues (Husak et al., 2025).

How to cite: Yuliandari, A., Mahrani, I., Zafrida, S., Hartini , H., & Fauzan, F. (2026). Overview of Platelet Counts Before and After Platelet-Rich Plasma (PRP) Preparation. *Jurnal Analis Medika Biosains (JAMBS)*, *13*(01). Retrieved from https://jambs.poltekkes-mataram.ac.id/index.php/home/article/view/578

The success of the PRP healing process is influenced by the platelet count contained within it. Platelet count significantly affects the quality of PRP because the higher the platelet count, the greater the release of growth factors (Yuliandari, 2021). The clinical application of PRP is linked to the platelet count to ensure optimal healing outcomes. However, observations in the field reveal that some researchers and clinicians prepare PRP without prior assessment of platelet counts. Consequently, PRP is often administered directly to patients without knowledge of its content, making it impossible to ascertain whether the platelet count is high or low. The objective of this research is to evaluate and compare platelet counts prior to and following the Platelet-Rich Plasma (PRP) preparation process, and to ensure that the preparation method successfully attains the optimal platelet concentration necessary for effective therapeutic applications.

MATERIALS/METHOD

This study was conducted at the Hematology Laboratory of Akademi Kesehatan John Paul II Pekanbaru. It was an observational study with a cross-sectional design. The samples consisted of whole blood obtained from female students who met the inclusion criteria: aged 21–25 years, non-smokers, not currently menstruating, not taking medication, and with no history of infectious diseases within the last month or disorders affecting platelet levels (Syuhada et al., 2021).

Twenty respondents fulfilling the inclusion criteria were enrolled in this study. Initially, a phlebotomist collected venous blood samples from the respondents into vacuum tubes containing ACD-A anticoagulant. The whole blood platelet count was determined before initiating the PRP preparation. Then, the plasma and buffy coat layers were transferred to a tube without anticoagulant and centrifuged again for 10 minutes at 3000 rpm. The upper two-thirds of the volume were discarded, and the remaining portion was identified as PRP (Yuliandari, 2021). Following this, the platelet count of the resulting PRP was analyzed. A hematology analyzer was utilized for all platelet count measurements.

RESULTS AND DISCUSSION

This study utilized 20 whole blood samples obtained from respondents who met the inclusion criteria. One of the inclusion criteria was females who were not currently menstruating. Santoso et al. (2022) stated that platelet counts during menstruation are affected by platelet production, which plays a role in sealing damaged blood vessels and stopping menstrual bleeding. Rokkam et al. (2024) and Prasetyo et al. (2020) noted that thrombocytosis can occur due to triggering conditions such as acute infection, acute hemorrhage, blood loss, hemolysis, allergic reactions, acute inflammation, renal disorders, splenectomy, cancer, leukemia, and certain medications; therefore, platelets in these conditions are not used for PRP preparation. The mean platelet count data before and after PRP preparation in this study are presented in Figure 1.

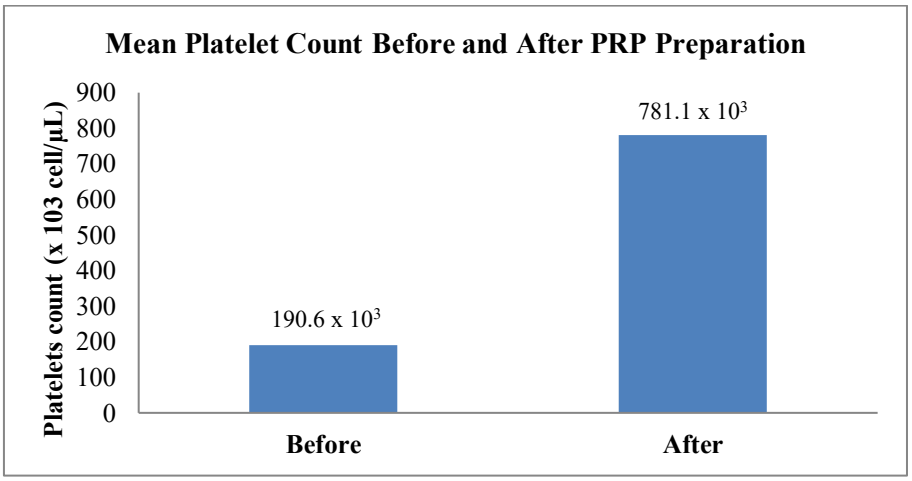

Figure 1. Mean platelet count before and after PRP Preparation

Based on the results prior to PRP preparation, the respondents' mean platelet count was within the normal range, specifically 190.6×10^3 cells/µL. National Heart, Lung and Blood Institute (2025), state that the general normal platelet count in blood ranges from 150×10^3 to 400×103 cells/µL. In this study, the mean platelet count following PRP preparation was 781.1×10^3 cells/µL. According to Sharara et al. (2021), the platelet count after PRP preparation can increase by up to a maximum of 10-fold compared to the count in whole blood. The standard for platelet count in PRP is defined as $\geq600\times10^3$ cells/µL (Rafika et al., 2021).

Analysis of the mean platelet count before and after PRP preparation revealed a 4-fold increase in the mean count following preparation. This finding is consistent with Legiawati et al. (2023), who stated that platelet counts in PRP are 2- to 5-fold higher compared to those in whole blood. Similarly, Fajaryani et al. (2020) reported a significant difference between whole blood platelet counts (299×10^3 cells/µL) and PRP platelet counts (593×10^3 cells/µL).

Based on the study findings, there is a positive correlation where higher baseline platelet counts in whole blood result in higher platelet concentrations in PRP. This observation aligns with Wardhani (2021), who analyzed whole blood platelet counts of 196×10^3 cells/µL, 224×10^3 cells/µL, and 294×10^3 cells/µL before proceeding with PRP preparation. Two preparation techniques were employed: the Nugraha method and the Matsui Tabata method. The Nugraha method produced PRP platelet counts of 454×10^3, $1{,}002\times10^3$, and $1{,}582\times10^3$ cells/µL, respectively, whereas the Matsui Tabata method resulted in counts of 442×10^3, 574×10^3, and $1{,}198\times10^3$ cells/µL, respectively.

CONCLUSIONS

In conclusion, this study demonstrates a four-fold rise in platelet count following PRP preparation, increasing from a baseline of 190.6×103 cells/µL to 781.1×103 cells/µL.

ACKNOWLEDGEMENTS

The authors would like to thank Akademi Kesehatan John Paul II Pekanbaru and all individuals who participated in this research.

REFERENCE

Anzani, B. P. (2020). Literature Review: Perbandingan Efektivitas Platelet Rich Plasma (PRP) dengan Asam Hialuronat (HA) sebagai Terapi Osteoarthritis. *Jurnal Kesehatan*, *11*(1), 158. https://doi.org/10.26630/jk.v11i1.1608

Fajaryani, D., Rahayu, M., & Limijadi, E. K. S. (2020). Perbedaan Jumlah Trombosit, Leukosit Dan Eritrosit Dengan Kecepatan Sentrifugasi Yang Berbeda Pada Pembuatan Platelet Rich Plasma. *Medica Hospitalia : Journal of Clinical Medicine*, *7*(1), 12–16. https://doi.org/10.36408/mhjcm.v7i1.421

Husak, V., Povelychenko, O., Maltseva, V., Romanenko, K., Vorontsov, K., Pazdnikov, R. (2025). Growth factor and cell content in Platelet-Rich Plasma (PRP), Leukocyte- and Platelet-Rich Plasma (L-PRP), Platelet-Rich Fibrin (PRF) in patients with long bone defects from combat injuries. *BMC Musculoskelet Disord,* **26**: 1106.

Legiawati, L., Yusharyahya, S. N., Bernadette, I., Novianto, E., Priyanto, M. H., Gliselda, K. C., Iriyanty, S., & Mutiara, R. (2023). Comparing Single-spin Versus Double-spin Platelet-rich Plasma (PRP) Centrifugation Methods on Thrombocyte Count and Clinical Improvement of Androgenetic Alopecia: A Preliminary, Randomized, Double-blind Clinical Trial. *The Journal of clinical and aesthetic dermatology*, *16*(12), 39–44.

Lestari, A. I. 2019. Different Amount of Thrombocytes on Blood Storage For 24 Hours in Room and Refrigeration. *Journal of Vocational Health Studies*, 3(2), 58-62.

National Heart, Lung and Blood Institute. (2025). Platelet Disorder: Thrombocytopenia. https://www.nhlbi.nih.gov/health/thrombocytopenia

Poetri, A. R., Murdiastuti, K., & Sudibyo. (2022). Effect of The Activation Time of Platelet Rich Plasma and Collagen on the Levels. *ODONTO Dental Journal*, *9*(1), 162–169.

Prasetyo, A., Sadhana, U., Miranti, ika perwira, Karlowee, V., & Istiadi, H. (2020). *Patobiologi Umum*. Fakultas Kedoktera, Universitas Diponegoro, Semarang.

Rafika, Amelia, D., Naim, N., & Hasan, Z. A. (2021). Comparison of Platelet Concentrate Prepared by Platelet Rich Plasma and Platelet Apheresis on Platelet Counts and Leukocyte Residues. *Jurnal Analisis Kesehatan*, *10*(1), 22–28.

Rokkam, V. R., Killeen, R. B., Kotagiri, R. (2024). Secondary Thrombocytosis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560810/

Rothrauff, B.B., Featherall, J. T., Uppstrom, T.J., Gohring, G., Nelson, A. L., Evans, T. A., Millett, P. J., Provencher, M. T., Philippon, M. J., Huard, J. (2026). Platelet-Rich Plasma in the Treatment of Musculoskeletal Disease in 2025 and Beyond. *The American Journal of Sports Medicine*. 2026;0(0).

Santoso, A.P.R., Nur, M., Nabil, A.J., Novitasari, N., Rachmawati, I., Rahmawati, A., Khotimah, S., (2022). Kadar Trombosit Pada Remaja Menstruasi Hari Ke-3 Mahasiswa Analis Kesehatan, 3–8. *Prosiding Rapat Kerja Nasional Asosiasi Institusi Perguruan Tinggi Teknologi Laboratorium Medik Indonesia.*

Selima, Z. A., Khallaf, H., El-Saadany, H., & Rehan, F. (2023). Ultrasound-Guided Injection of Platelet-Rich Plasma in Partial Anterior Cruciate Ligament Injury. *Tanta Medical Journal*, *51*(1), 62–66. https://doi.org/10.4103/tmj.tmj_46_19

Sharara, F. I., Lelea, L. L., Rahman, S., Klebanoff, J. S., & Moawad, G. N. (2021). A narrative review of platelet-rich plasma (PRP) in reproductive medicine. *Journal of assisted reproduction and genetics*, *38*(5), 1003–1012. https://doi.org/10.1007/s10815-021-02146-9

Simarmata, H. P., Namora, S, R. L., Pebriani Pasaribu, J., Panangian Sitorus, J., & Chiuman, L. (2021). Efektivitas PRP Terhadap Perubahan Profil Lipid Darah Tikus Putih Jantan

(Rattus Norvegicus) Diabetes Melitus Yang Di Induksi Streptozotocin. *Biospecies*, *14*(1), 10–17.

Syuhada, S., Izzuddin, A., & Yudhistira, H. (2021). Perbandingan Trombosit dengan Antikoagulan K2EDTA. *Jurnal Ilmiah Kesehatan Sandi Husada*, *10*(1), 170–176. https://doi.org/10.35816/jiskh.v10i1.575

Wardhani, P. (2021). Perbandingan Efektivitas Metode Preparasi Platelet-Rich Plasma (PRP) Dalam Menghasilkan Konsentrasi Platelet Yang Besar. *[*Skripsi*]*. Universitas Muhammadiyah Yogyakarta

Wu, W.-S., Chen, L.-R., & Chen, K.-H. (2025). Platelet-Rich Plasma (PRP): Molecular Mechanisms, Actions and Clinical Applications in Human Body. *International Journal of Molecular Sciences*, *26*(21): 10804. https://doi.org/10.3390/ijms262110804

Yuliandari, A. (2021). Pengaruh Durasi Penyimpanan Whole Blood Terhadap Jumlah Trombosit Platelet Rich Plasma (PRP). *Jurnal Sains Dan Teknologi Laboratorium Medik*, *5*(1), 21–26.

Yuliandari, A., Sitorus, V. Y., Priskila, S. E., & Margaretta, T. S. (2022). Peningkatan Kemampuan Mahasiswa dalam Bidang Hematologi untuk Pengolahan Darah dalam Menghasilkan Produk Autologous Platelet Rich Plasma. *Jurnal Pengabdian Masyarakat Bestari*, *1*(7), 547–552.