

**PREOPERATIVE HEMOGLOBIN LEVELS AS A
PREDICTOR OF POSTOPERATIVE LENGTH
OF STAY IN ORTHOPEDIC PATIENTS AT
MUHAMMADIYAH PALEMBANG
HOSPITAL**



UNDERGRADUATE THESIS

As one of the requirements to obtain a
Bachelor of Medicine degree (MBBS)

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**BACHELOR OF MEDICINE STUDY PROGRAM
FACULTY OF MEDICINE UNIVERSITAS
MUHAMMADIYAH PALEMBANG
2026**

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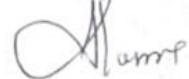
PREOPERATIVE HEMOGLOBIN LEVELS AS A PREDICTOR OF POSTOPERATIVE LENGTH OF STAY IN ORTHOPEDIC PATIENTS AT MUHAMMADIYAH PALEMBANG HOSPITAL

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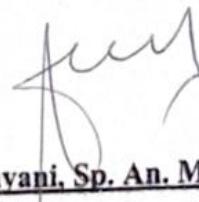
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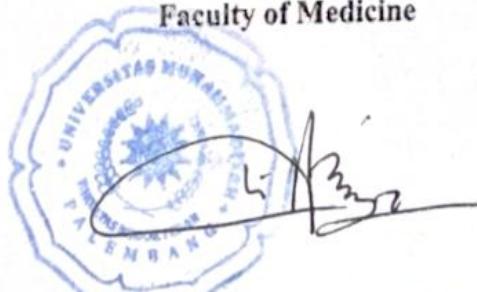
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I hereby declare that :

1. My undergraduate thesis is original and has never been submitted to obtain an academic degree at Muhammadiyah Palembang University or at any other higher education institution.
2. This thesis is purely my own idea, formulation, and research, carried out independently without assistance from any other parties, except for guidance provided by my supervisors.
3. There is no work or opinion written or published by another person included in this thesis, except where properly cited as a reference in the text and listed in the bibliography with the author's name.
4. I affirm that this statement is true and accurate, and if in the future any deviation or inaccuracy is found in this declaration, I am willing to accept academic sanctions or other penalties in accordance with the regulations applicable at this university.

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ABSTRAK

Nama : Aisyah Fadhilah Kurnia
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Judul : Kadar Hemoglobin Praoperatif sebagai Prediktor Lama Rawat Inap Pascaoperasi pada Pasien Ortopedi di Rumah Sakit Muhammadiyah Palembang

Anemia praoperatif merupakan kondisi yang sering ditemukan pada pasien bedah ortopedi dan dapat memengaruhi proses pemulihan pascaoperasi. Kadar hemoglobin yang rendah berhubungan dengan penurunan kapasitas pengangkutan oksigen, gangguan penyembuhan luka, serta peningkatan risiko komplikasi pascaoperasi. Penelitian ini bertujuan untuk mengetahui hubungan antara kadar hemoglobin praoperatif dengan lama rawat inap pascaoperasi pada pasien ortopedi di Rumah Sakit Muhammadiyah Palembang. Penelitian ini merupakan penelitian analitik observasional dengan desain retrospektif kohort menggunakan data rekam medis pasien ortopedi yang menjalani pembedahan pada periode tahun 2021–2024. Jumlah sampel penelitian sebanyak 145 pasien yang dipilih dengan teknik consecutive sampling. Data kadar hemoglobin praoperatif dan lama rawat inap pascaoperasi dianalisis secara univariat dan bivariat. Uji statistik yang digunakan adalah Mann–Whitney U test. Hasil penelitian menunjukkan bahwa 49% pasien mengalami anemia praoperatif. Rerata lama rawat inap pascaoperasi adalah 5,66 hari. Analisis bivariat menunjukkan terdapat hubungan yang bermakna antara kadar hemoglobin praoperatif dengan lama rawat inap pascaoperasi ($p < 0,001$), di mana pasien dengan anemia praoperatif memiliki lama rawat inap yang lebih panjang dibandingkan pasien tanpa anemia.

Kata kunci: hemoglobin praoperatif, anemia, lama rawat inap, bedah ortopedi

ABSTRACT

Name : Aisyah Fadhilah Kurnia
Study Program : Medicine
Title : Preoperative Hemoglobin Levels as a Predictor Of Postoperative Length of Stay in Orthopedic Patients at Muhammadiyah Palembang Hospital

Preoperative anemia is a common condition among orthopedic surgical patients and may affect postoperative recovery. Low hemoglobin levels are associated with reduced oxygen-carrying capacity, impaired wound healing, and an increased risk of postoperative complications. This study aimed to analyze the relationship between preoperative hemoglobin levels and postoperative length of stay in orthopedic patients at Muhammadiyah Palembang Hospital. This study was an observational analytical study with a retrospective cohort design, using medical record data of orthopedic patients who underwent surgery from 2021 to 2024. A total of 145 patients were included using a consecutive sampling technique. Preoperative hemoglobin levels and postoperative length of stay were analyzed using univariate and bivariate analyses. The Mann–Whitney U test was used for statistical analysis. The results showed that 49% of patients had preoperative anemia. The mean postoperative length of stay was 5.66 days. Bivariate analysis demonstrated a statistically significant relationship between preoperative hemoglobin levels and postoperative length of stay ($p < 0.001$), with anemic patients experiencing longer hospitalization compared to non-anemic patients.

Keywords: preoperative hemoglobin, anemia, length of stay, orthopedic surgery

FOREWORD

Assalamu'alaikum Warahmatullahi Wabarakatuh

I am grateful to Allah SWT for His blessings and mercy, which have allowed me to complete this undergraduate thesis. This thesis is necessary for my Bachelor of Medicine degree at the Faculty of Medicine, Universitas Muhammadiyah Palembang. I recognize that without the assistance and guidance of various individuals, it would have been difficult to finish this thesis. Therefore, I would like to thank:

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Lastly, I hope that Allah SWT will repay all the kindness of all parties who have helped. Hopefully this undergraduate thesis will bring benefits to the advancement of science.

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Palembang, 20 December 2025



Aisyah Fadhilah Kurnia

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CHAPTER I

INTRODUCTION

1.1 Background of the Study

Orthopedic surgery is one of the most common surgical procedures worldwide, especially in low- and middle-income countries. In 2017, approximately 22.3 million orthopedic procedures were performed globally (Salamanna *et al.*, 2022). Major orthopedic surgeries, such as total hip and knee replacements, often involve significant blood loss up to 1 liter per procedure even with advanced surgical techniques(Steuber *et al.*, 2016). This blood loss can lead to preoperative anemia, which has been reported in 15–48% of patients undergoing major orthopedic surgery (Endeshaw *et al.*, 2024).

Preoperative anemia is a major clinical concern because it increases the risk of perioperative transfusions, postoperative complications, delayed wound healing, and prolonged length of stay (LOS). Even mild anemia is associated with higher readmission rates and increased mortality (Kansagra & Stefan, 2016; Endeshaw *et al.*, 2024). A study in Ethiopia found that patients with preoperative anemia had 1.77 times greater odds of prolonged LOS compared to those without anemia (Endeshaw *et al.*, 2024). Similarly, Duarte et al. (2021) demonstrated that preoperative anemia in hip and knee arthroplasty patients increased transfusion risk, LOS, and ICU admission rates, particularly in women.

Length of hospital stay is an important indicator of surgical outcomes, resource use, and healthcare system efficiency (British Orthopaedic Association, 2023). Prolonged stays are linked to higher hospital costs, reduced bed availability, and increased risks of nosocomial infections and thromboembolic events (Salamanna *et al.*, 2022). These risks are even more critical in Type C hospitals like Muhammadiyah Palembang Hospital, where facilities and resources are more limited compared to Type A or B hospitals. Thus, optimizing perioperative care and minimizing unnecessary hospitalization are crucial for improving service efficiency and patient safety.

In Indonesia, few studies have specifically examined the relationship between preoperative hemoglobin levels and postoperative care duration in orthopedic patients, particularly in Type C hospitals. Therefore, this study aims to analyze the relationship between preoperative hemoglobin levels and the length of postoperative orthopedic care at Muhammadiyah Palembang Hospital. The findings of this study are expected to provide evidence that can be used as a basis for routine preoperative screening and early correction of anemia, as well as support better clinical decision-making to improve patient outcomes and hospital efficiency.

1.2 Problem Formulation

What is the relationship between preoperative hemoglobin levels and the duration of postoperative orthopedic care at Muhammadiyah Palembang Hospital?

1.3 Objectives of the Study

1.3.1 General Objectives

To analyze the relationship between preoperative hemoglobin levels and the duration of postoperative orthopedic care at Muhammadiyah Palembang Hospital.

1.3.2 Specific Objectives

1. To determine the distribution of preoperative hemoglobin levels in orthopedic patients at Muhammadiyah Palembang Hospital.
2. To determine the average duration of postoperative orthopedic care in orthopedic patients at Muhammadiyah Palembang Hospital.
3. To analyze the relationship between preoperative hemoglobin levels and the duration of postoperative orthopedic care.

1.4 Benefits of the Study

1.4.1 Theoretical Benefits

Improving the understanding of how preoperative hemoglobin levels affect the prognosis of postoperative patients, particularly in orthopedic medicine.

1.4.2 Practical Benefits

1.4.2.1 For Researchers

This study can serve as a reference and foundation for further research on the role of hemoglobin levels in the perioperative management of orthopedic patients, as well as enriching scientific research in the fields of medicine and healthcare.

1.4.2.2 For Hospitals

The results of this study can be used to evaluate and improve the preoperative care protocol for orthopedic patients, especially in terms of detecting and treating anemia before surgery, to reduce the risk of complications and shorten the length of stay.

1.4.2.3 For Medical Staff

The findings of this study can serve as a basis for clinical considerations in daily practice, especially in the screening of hemoglobin levels, operative decision-making, and comprehensive and standardized patient orthopedic management planning.

1.4.2.4 For Patients and the Public

This study can improve patient's understanding of the importance of hemoglobin levels before surgery, encouraging them to get early health screenings and improve their nutritional status before undergoing surgical procedures.

1.5 Research Originality

Table 1.1. Research Originality

| No. | Authors | Title | Research Design | Result | Differentiator |
|-----|--|---|------------------------------------|--|--|
| 1 | Endeshaw, A., Diress, F., & Endeshaw, M. | The relationship between preoperative anemia and length of stay in the hospital for patients undergoing orthopedic surgery at a teaching hospital in Ethiopia. | <i>Retrospective cohort</i> | Of the 212 patients who underwent long-term hospitalization, 124 (58.49%) experienced anemia, compared to 88 (41.51%) who did not. The odds of a prolonged stay after orthopedic surgery were 1.77 (AOR = 1.77, 95% CI 1.25, 2.50) times higher among patients with preoperative anemia compared to those without. | Place of research, category of independent and dependent variables |
| 2 | Suyanti & Faizah, K.. | The relationship between preoperative anemia and increased risk of blood transfusion and length of hospital stay in adults undergoing hip and knee arthroplasty | <i>Retrospective observational</i> | Preoperative anemia was significantly associated with a higher rate of blood transfusions (34.5% vs. 5.6%; P = 0.001), a longer hospital stay (6.48 days vs. 3.36 days; P = 0.001), and a higher rate of admission to the intensive care unit (47.2% vs. 29.6%; P = 0.009). | Place of research, number of variables, and categories of independent and dependent variables. |
| 3 | Abdullah, H., Sim, Y., & Hao, Y. | The relationship between preoperative anemia and length of stay for patients undergoing primary total knee arthroplasty in Singapore. | <i>Retrospective cohort</i> | preoperative anemia significantly increases LOS (mild anemia, adjusted odds ratio (aOR) 1.71, p<0.001; moderate/severe anemia, aOR 2.29, p<0.001). A similar effect was observed when anemia was defined as having a hemoglobin (Hb) level below 13 g/dL, regardless of gender. | Place of research, number of variables, category of dependent variables. |

Table 1.1. Research Originality (Continued)

| No. | Authors | Title | Research Design | Result | Differentiator |
|-----|---|--|---------------------------|---|--|
| 4 | Nicolas, A., Morrison, R., & Casson, C. | Screening and intervention for anemia with low iron stores in elective hip and knee arthroplasty | <i>Prospective cohort</i> | In the intervention group, transfusions decreased significantly (108 [6%] vs. 63 [4.1%], p 5 0.005), as did readmissions (81 [4.5%] vs. 48 [2.3%], p 5 0.020), and critical care admissions (23 [1.3%] vs. 9 [0.5%], p 5 0.030). LOS decreased significantly from 3.9 days to 3.6 days (p = 0.017). | Place of research, number of variables, category of independent variables. |

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