©NIJPP
Publications 2025

OPEN ACCESS
ONLINE ISSN: 2992-5479
PRINT ISSN: 2992-605X

NEWPORT INTERNATIONAL JOURNAL OF PUBLIC HEALTH AND PHARMACY (NIJPP)

Volume 6 Issue 1 Page 27-32, 2025

https://doi.org/10.59298/NIJPP/2025/612732

Assessing the use of Blood Transfusions in Anemia Management in Ugandan Hospitals

Obwendo N. J.

Faculty of Medicine Kampala International University Uganda

ABSTRACT

Anemia remains a significant public health challenge in Uganda, particularly affecting children, pregnant women, and individuals with chronic diseases. Blood transfusions play a critical role in managing severe anemia in hospital settings, yet their availability and accessibility face numerous challenges, including shortages in blood supply, inadequate infrastructure, and safety concerns. This review evaluates the effectiveness of blood transfusions in anemia management in Ugandan hospitals, examining clinical indications, supply constraints, and associated risks. Additionally, it explores alternative strategies to reduce reliance on transfusions, such as improving nutritional interventions, enhancing malaria control programs, and strengthening healthcare infrastructure. The findings highlight the need for sustainable approaches to anemia management and policy improvements to optimize blood transfusion practices. Addressing these challenges will be essential in reducing anemia-related morbidity and mortality and improving overall public health outcomes in Uganda.

Keywords: Anemia, blood transfusion, Uganda, anemia management, blood supply, public health.

INTRODUCTION

Anemia is one of the most prevalent and persistent public health challenges in Uganda, affecting a significant proportion of the population, particularly vulnerable groups such as children, pregnant women, and individuals with chronic diseases [1]. Despite ongoing efforts to mitigate its effects, anemia remains a major contributor to morbidity and mortality in Uganda. It is a multifaceted condition, often resulting from a range of nutritional deficiencies, infectious diseases, chronic conditions, and socioeconomic factors [2]. The burden of anemia in Uganda is compounded by limited access to adequate healthcare, insufficient resources, and challenges in addressing the root causes of the condition [3]. This review aims to critically examine the role of blood transfusions in managing severe anemia in hospital settings, exploring both the benefits and limitations, and highlighting alternative strategies for addressing anemia in the Ugandan context. Anemia, defined by a reduction in the number of red blood cells or the hemoglobin concentration in the blood, has long been recognized as a major public health problem globally [4]. In Uganda, the situation is particularly dire, with high rates of anemia reported among different population groups. According to the Uganda Demographic and Health Survey (UDHS), over 50% of children under five years and a significant proportion of pregnant women are affected by anemia [3]. These statistics are concerning because anemia, especially in young children and pregnant women, can lead to severe health consequences, including impaired cognitive development in children and complications during childbirth for women. The prevalence of anemia in Uganda is influenced by several factors, including poor nutrition, parasitic infections (such as malaria and hookworm), and inadequate healthcare infrastructure [5]. Nutritional deficiencies, particularly of iron, folate, and vitamin B12, are among the leading causes of anemia, particularly in rural areas where access to diverse and nutritious foods is limited. Malaria, a prevalent infectious disease in Uganda, is another significant contributor to anemia, as it destroys red blood cells, exacerbating the condition in affected individuals [6]. Furthermore, the high prevalence of chronic diseases, such as HIV/AIDS, tuberculosis, and non-communicable diseases (NCDs), has exacerbated the burden of anemia, as these conditions often lead to long-term inflammation, which can suppress red blood cell production. In hospital settings, the management of severe anemia typically involves blood transfusions,

OPEN ACCESS
ONLINE ISSN: 2992-5479
PRINT ISSN: 2992-605X

particularly when patients are critically ill or do not respond to other forms of treatment, such as iron supplementation or addressing underlying causes [7]. Blood transfusions play a crucial role in stabilizing patients with acute anemia, improving oxygen delivery to tissues, and preventing life-threatening complications. However, the use of blood transfusions in Uganda faces several challenges, including a shortage of blood donations, inadequate storage and transportation infrastructure, and concerns regarding the safety and quality of blood products [8]. As such, while blood transfusion is an essential component of anemia management, it is not always an available or optimal solution in all cases. Given the widespread prevalence of anemia in Uganda and the challenges associated with blood transfusion use, it is critical to explore alternative strategies that could complement or reduce the need for transfusions, while also addressing the root causes of anemia [9]. These strategies may include improving nutritional intake, enhancing malaria control programs, promoting maternal health, and investing in healthcare infrastructure to ensure timely and effective anemia management. This review aims to evaluate the current use of blood transfusions in managing severe anemia in Ugandan hospitals. It will assess the prevalence and burden of anemia among various population groups, including children under five, pregnant women, and individuals with chronic diseases. The review will also examine the role of blood transfusions in managing anemia, their effectiveness, and limitations. Challenges related to blood donation, supply, infrastructure, safety concerns, and accessibility in rural and underserved areas will be identified [10]. Alternative strategies for managing anemia, such as improving nutritional status, addressing underlying causes, and enhancing healthcare delivery systems, could reduce reliance on blood transfusions. The review will propose recommendations for policy and healthcare system improvements to reduce anemia prevalence, optimize blood transfusion use, and explore sustainable alternatives for anemia management in Uganda. The review aims to explore the prevalence and burden of anemia in Uganda, particularly among children, pregnant women, and individuals with chronic diseases. It will also examine the use of blood transfusions in managing severe anemia in hospital settings, the challenges associated with their implementation, and the main challenges related to blood donation, storage, and transportation. Alternative strategies to manage anemia in Uganda will be explored, and policy recommendations will be made to improve anemia management, including enhancing access to blood transfusions, promoting anemia prevention, and reducing reliance on transfusions. This review is of significant importance for public health in Uganda due to the critical nature of anemia as a health issue. Anemia not only impacts the health and well-being of individuals but also contributes to broader socioeconomic challenges, such as impaired productivity, high healthcare costs, and a reduced quality of life. By assessing the role of blood transfusions in managing severe anemia and identifying alternative strategies, this review will contribute to the development of more effective, sustainable, and equitable approaches to anemia management in Uganda. The findings from this review could inform healthcare policies and interventions aimed at improving anemia prevention, diagnosis, and treatment across the country. Understanding the challenges associated with blood transfusions and exploring alternative approaches will provide valuable insights for healthcare providers, policymakers, and community health workers, allowing them to better address the needs of anemic populations and reduce the burden of anemia in Uganda. Moreover, this review will contribute to the global body of knowledge on anemia management in low-resource settings, providing lessons that could be applicable to other countries facing similar challenges. By highlighting successful interventions and strategies, it may inspire further research and innovation in anemia treatment and prevention, particularly in the context of low-income countries with limited healthcare resources. Ultimately, the significance of this review lies in its potential to shape the future of anemia management in Uganda, improving health outcomes for vulnerable populations, and contributing to the broader goals of achieving universal health coverage and reducing health inequities in the country.

Clinical Indications for Blood Transfusions in Anemia Management

Blood transfusion is a critical intervention in managing anemia, particularly when hemoglobin levels fall below safe thresholds, leading to compromised oxygen delivery [11]. The decision to administer a transfusion is guided by clinical judgment, established guidelines, and the underlying cause of anemia. Key causes include nutritional deficiencies, infectious diseases, hemolytic disorders, obstetric and gynecological complications, chronic illnesses, and cancer-related anemia. The World Health Organization (WHO) recommends restrictive transfusion strategies to minimize unnecessary transfusions while ensuring adequate oxygen delivery [12]. The Ugandan Ministry of Health (MoH) has developed national blood transfusion guidelines aligned with WHO recommendations, prioritizing transfusion for severe cases of anemia, especially in vulnerable populations like pregnant women, children, and critically ill patients. Hemoglobin thresholds for transfusion vary based on clinical context, such as stable non-critical patients (Hb <7 g/dL), critically ill patients (e.g., Sepsis, Shock), pregnant women and postpartum anemia (Hb <7 g/dL), severe sickle cell crisis or acute hemolysis (SSC), and chronic disease-associated anemia (individualized transfusion decisions). While blood transfusion can be lifesaving, it carries potential risks such as transfusion reactions, iron overload, infection risk, and immunological complications. In resource-limited settings

OPEN ACCESS
ONLINE ISSN: 2992-5479
PRINT ISSN: 2992-605X

like Uganda, optimizing blood utilization while ensuring safe transfusion practices is vital to improving patient outcomes. In conclusion, blood transfusion remains a crucial intervention in managing severe anemia, particularly in cases where oxygen transport is significantly impaired[13].

Blood Supply and Availability in Ugandan Hospitals

Blood supply in Uganda is crucial for emergency medical care, maternal health, surgical procedures, and treatment for conditions like severe anemia and hemophilia. The Uganda Blood Transfusion Service (UBTS) is responsible for coordinating blood donation, collection, testing, and distribution under the Ministry of Health. Blood donation comes from two main sources: voluntary blood donors and family/replacement donors. Blood supply fluctuates due to factors such as school calendar effects, regional disparities, and peak demand periods [14]. Blood donations undergo rigorous screening for transfusion-transmissible infections (TTIs), including HIV/AIDS, Hepatitis B and C, Syphilis, and malaria. However, infrastructure limitations and testing infrastructure issues hinder safe blood transfusions. Risks include the window period between infection detection and detectability, as well as adverse transfusion reactions. Accessibility and affordability of blood transfusions are affected by cost implications, with public hospitals charging nominal fees for testing, storage, and administration, while private hospitals charge higher fees, making access more difficult for low-income patients. Geographic disparities in blood availability also affect blood availability, with urban hospitals benefiting from proximity to UBTS regional centers, while rural hospitals face delays in blood delivery and lack proper storage facilities. Shortages have severe consequences on emergency anemia management, especially for vulnerable populations like pregnant women, children with malaria-induced anemia, accident victims, and patients undergoing major surgeries [15-17]. Strengthening UBTS operations, investing in rural healthcare facilities, and promoting voluntary blood donation campaigns are essential steps to improve blood transfusion services nationwide.

Challenges in Blood Transfusion Practices in Uganda

Blood transfusion is a vital healthcare service in Uganda, but it faces several challenges. The main issues include inadequate blood supply and high demand, which are largely due to low voluntary blood donation rates, high burden of transfusion-dependent conditions, seasonal blood shortages, infrastructure and resource limitations, inadequate storage and distribution facilities, limited laboratory capacity for blood typing and crossmatching, staff shortages and inadequate training in transfusion medicine, and patient safety concerns. The Uganda Blood Transfusion Service (UBTS) faces challenges in collecting, testing, and distributing blood due to insufficient storage and distribution facilities, particularly in rural and regional hospitals [8]. Additionally, many health facilities lack well-equipped laboratories or trained personnel to conduct these tests efficiently, increasing the risk of incompatible transfusions. Staff shortages and inadequate training in transfusion medicine also contribute to delays in accessing safe blood or improper handling of blood products. Patient safety during and after a blood transfusion is another significant challenge. Patients are at risk of adverse reactions, including allergic responses, febrile reactions, and hemolytic reactions caused by incompatible blood. Insufficient patient monitoring and post-transfusion care also pose a risk. Ethical concerns related to emergency transfusions and informed consent remain a challenge, especially in rural areas where religious or cultural beliefs may influence medical decisions. To address these challenges, Uganda needs a multi-faceted approach that includes increasing public awareness, improving infrastructure for storage and distribution, enhancing laboratory capacity, training healthcare workers in transfusion medicine, and strengthening patient safety protocols [18-19]. Collaborative efforts between the government, healthcare institutions, and international partners are essential to ensure a reliable and safe blood supply for all Ugandans in need.

Alternatives to Blood Transfusion in Anemia Management

Anemia management without blood transfusion is crucial in situations where donor blood is scarce, religious beliefs prohibit transfusion, or transfusion-related complications are present [20-22]. Alternatives include iron supplementation, erythropoiesis-stimulating agents (ESAs), folate and vitamin B12 therapy, and dietary modifications. Iron-rich foods like red meat, liver, eggs, legumes, and dark leafy greens are rich in iron. Food fortification with iron and folic acid is effective in regions with high anemia prevalence. Consuming vitamin C-rich foods alongside iron-rich meals enhances absorption. Malaria and parasitic infection control measures include insecticide-treated bed nets, antimalarial treatment, and deworming programs. Autologous blood donation (PABD) allows patients to donate their own blood in advance, reducing reliance on donor blood and mitigating transfusion risks. Synthetic alternatives to blood transfusion include HBOCs, engineered molecules that mimic hemoglobin's oxygen-carrying capacity, and perfluorocarbon-based oxygen carriers [20-23]. A multifaceted approach is needed to ensure effective and sustainable anemia management, incorporating pharmacologic treatments, dietary and disease-prevention strategies, and emerging technologies like blood substitutes. Tailoring interventions based on the underlying cause of anemia and patient-specific factors ensures effective and sustainable treatment.

OPEN ACCESS
ONLINE ISSN: 2992-5479
PRINT ISSN: 2992-605X

Policy and Regulatory Framework for Blood Transfusion in Uganda

Uganda has established a structured policy and regulatory framework for blood transfusion services, ensuring safety, availability, and efficiency [24-25]. These policies align with international best practices and address key aspects such as blood collection, screening, storage, distribution, and transfusion safety. The Uganda Blood Transfusion Service (UBTS) oversees voluntary blood donation drives, ensuring donors meet eligibility criteria. Blood is then screened for transfusion-transmissible infections (TTIs) and distributed to hospitals and health centers. UBTS operates a centralized blood supply system with regional blood banks, distributing safe and adequately screened blood based on demand and emergency needs. Quality assurance and safety standards are enforced through monitoring and evaluation. To increase voluntary blood donation, Uganda has implemented public awareness campaigns, youth and school-based programs, partnerships with NGOs and the private sector, and strengthening regional blood banks. The WHO recommends 100% voluntary blood donation, universal blood screening, efficient blood utilization, safe blood storage and transportation, and strong regulatory frameworks. Uganda can learn from successful blood transfusion models in South Africa, Rwanda, and Ghana, and strengthen its policies in line with these international best practices to improve its blood transfusion system [12].

Future Directions and Recommendations

The sustainable and efficient blood transfusion system in Uganda requires a multi-faceted approach that includes strengthening donor recruitment, enhancing blood safety, promoting alternative anemia management strategies, and improving policy and infrastructure. Key areas for future improvements include expanding voluntary blood donor recruitment campaigns, improving blood storage and distribution networks, investing in advanced blood screening technologies, and training healthcare workers on best transfusion practices. To reduce dependence on blood transfusions, a proactive approach to managing anemia through alternative interventions is needed. Scaling up iron supplementation programs, strengthening malaria and infectious disease control measures, and implementing effective policies and infrastructure investments are crucial for sustaining improvements in blood transfusion services and anemia management. Increasing government funding for the Uganda Blood Transfusion Service (UBTS) and hospital blood banks can strengthen blood banking capacity and ensure an adequate, safe blood supply [19]. Developing national guidelines for anemia management can optimize transfusion practices and reduce unnecessary transfusions, leading to better resource utilization and improved patient care. By implementing these strategies, Uganda and other resource-limited settings can improve access to safe blood transfusions while reducing the burden of anemia through effective preventive and management interventions.

CONCLUSION

Blood transfusions remain a critical intervention in managing severe anemia in Ugandan hospitals, particularly among children, pregnant women, and individuals with chronic illnesses. Despite their lifesaving potential, significant challenges persist in ensuring accessibility, safety, and efficiency in blood transfusion services. Limited blood supply, infrastructural constraints, and risks associated with transfusion-transmissible infections hinder optimal patient outcomes. Additionally, disparities in blood availability between urban and rural hospitals further exacerbate the burden of anemia-related morbidity and mortality. To improve anemia management, Uganda must adopt a multifaceted approach that enhances blood donation campaigns, strengthens healthcare infrastructure, and ensures the safe and efficient distribution of blood products. Investing in alternative strategies such as improved nutrition, malaria prevention, and early diagnosis and treatment of anemia can help reduce reliance on transfusions. Furthermore, policy reforms and increased funding for the Uganda Blood Transfusion Service (UBTS) are crucial in addressing supply chain inefficiencies and ensuring equitable access to safe blood. Ultimately, a sustainable approach to anemia management in Uganda requires a combination of strengthened transfusion services, preventive healthcare measures, and policy interventions. By addressing these challenges, Uganda can improve health outcomes, reduce anemia-related complications, and enhance the overall quality of care for vulnerable populations.

REFERENCES

1. Bongomin F, Olum R, Kyazze AP, Ninsiima S, Nattabi G, Nakyagaba L, et al. Anemia in Ugandan pregnant women: a cross-sectional, systematic review and meta-analysis study. Trop Med Health. 2021;49(19). doi:10.1186/s41182-021-00309-z.
2. Morales F, Montserrat-de la Paz S, Leon MJ, Rivero-Pino F. Effects of malnutrition on the immune system and infection and the role of nutritional strategies regarding improvements in children's health status: a literature review. Nutrients. 2023;16(1). doi:10.3390/nu16010001.
3. Nankinga O, Aguta D. Determinants of anemia among women in Uganda: further analysis of the Uganda demographic and health surveys. BMC Public Health. 2019;19(1757). doi:10.1186/s12889-019-8114-1.

OPEN ACCESS
ONLINE ISSN: 2992-5479
PRINT ISSN: 2992-605X

4. Safiri S, Kolahi A-A, Noori M, Nejadghaderi SA, Karamzad N, Bragazzi NL, et al. Burden of anemia and its underlying causes in 204 countries and territories, 1990–2019: results from the Global Burden of Disease Study 2019. J Hematol Oncol. 2021;14(185). doi:10.1186/s13045-021-01202-2.
5. Legason ID, Atiku A, Ssenyonga R, Olupot-Olupot P, Barugahare JB. Prevalence of anaemia and associated risk factors among children in north-western Uganda: a cross-sectional study. BMC Hematol. 2017;17(10). doi:10.1186/s12878-017-0081-0.
6. Caicedo O, Villamor E, Forero Y, Ziade J, Pérez P, Quiñones F, et al. Relation between vitamin B12 and folate status, and hemoglobin concentration and parasitemia during acute malaria infections in Colombia. Acta Trop. 2010;114:17–21. doi:10.1016/j.actatropica.2009.11.005.
7. Lasocki S, Pène F, Ait-Oufella H, Aubron C, Ausset S, Buffet P, et al. Management and prevention of anemia (acute bleeding excluded) in adult critical care patients. Anaesth Crit Care Pain Med. 2020;39:655–64. doi:10.1016/j.accpm.2020.04.004.
8. Checkley L, Motwani G, Wange IC, Nwanna-Nzewunwa O, Kirya F, Ajiko MM, et al. Assessment of blood donation and transfusion in eastern Uganda: a mixed-methods study. Ann Glob Health. 85:59. doi:10.5334/aogh.2426.
9. Power-Hays A, R NC, K AC, H HC, J SS, MA AL, et al. P-039: alternative dosing and prevention of transfusions (Adapt): a prospective trial evaluating transfusion utilization and the feasibility of pharmacokinetic hydroxyurea dosing in children with sickle cell anemia in Uganda. Hemasphere. 2022;6(36). doi:10.1097/01.HS9.0000873052.78363.19.
10. Bloch EM, Vermeulen M, Murphy E. Blood transfusion safety in Africa: a literature review of infectious disease and organizational challenges. Transfus Med Rev. 2012;26:164–80. doi:10.1016/j.tmrv.2011.07.006.
11. Obeagu IE, Obeagu GU, Igwe MC, Alum EU, Ugwu OPC. Men's essential roles in the management of sickle cell anemia. Newport Int J Sci Exp Sci. 2023;4(2):20–9.
12. Blood safety and availability. [Internet]. Available from: https://www.who.int/news-room/fact-sheets/detail/blood-safety-and-availability.
13. Dhabangi A, Musisi E, Kyeyune D. Improving blood transfusion safety in resource-poor countries: a case study of using leucocyte reduced blood in Uganda. Afr Health Sci. 2020;20:977–83. doi:10.4314/ahs.v20i2.54.
14. Hollingsworth B, Wildman J. What population factors influence the decision to donate blood? Transfus Med. 2004;14:9–12. doi:10.1111/j.0958-7578.2004.00473.x.--
15. Obeagu EI, Nimo OM, Bunu UO, Ugwu OPC, Alum EU. Anaemia in children under five years: African perspectives. Int J Curr Res Biol Med. 2023;1(1):1–7.
16. Hokororo JC, Habtu M, Bahegwa RP, Ngowi RR, Msigwa YS, Degeh MM, et al. Patient safety efforts in Tanzania: a rapid review of two-decades efforts (2002-2022) to inform interventions towards attainment of 2030 targets. Adv Infect Dis. 2022;12(466). doi:10.4236/aid.2022.123036.
17. Coccolini F, Shander A, Ceresoli M, Moore E, Tian B, Parini D, et al. Strategies to prevent blood loss and reduce transfusion in emergency general surgery, WSES-AAST consensus paper. World J Emerg Surg. 2024;19(26). doi:10.1186/s13017-024-00554-7.
18. Pape A, Habler O. Alternatives to allogeneic blood transfusions. Best Pract Res Clin Anaesthesiol. 2007;21:221–39. doi:10.1016/j.bpa.2007.02.004.
19. Kaconco J, Nabuuma B, Mugarura JT, Kirabira JB. Investigating relationship of master production scheduling on blood transfusion sustainability in Uganda. Soc Sci Humanit Open. 2023;8(100514). doi:10.1016/j.ssaho.2023.100514.
20. Ezekwe CI, Uzomba CR, Ugwu OPC. The effect of methanol extract of *Talinum triangulare* (water leaf) on the hematology and some liver parameters of experimental rats. Glob J Biotechnol Biochem. 2013;8(2):51–60.
21. Ugwu OPC, Nwodo OFC, Joshua PE, Odo CE, Bawa A, Ossai EC, Adonu CC. Anti-malaria and hematological analyses of ethanol extract of *Moringa oleifera* leaf on malaria-infected mice. Int J Pharm Biol Sci. 2013;3(1):360–371.
22. Ugwu OPC. Anti-malaria effect of ethanol extract of *Moringa oleifera* (*Agbaji*) leaves on malaria-induced mice [dissertation]. Nsukka: University of Nigeria; 2011. p. 39.
23. Ugwu OPC, Nwodo OFC, Joshua PE, Odo CE, Ossai EC. Effect of ethanol leaf extract of *Moringa oleifera* on lipid profile of malaria-infected mice. Res J Pharm Biol Chem Sci. 2013;4(1):1324–1332.

OPEN ACCESS
ONLINE ISSN: 2992-5479
PRINT ISSN: 2992-605X

24. Ugwu OPC, Nwodo OFC, Joshua PE, Odo CE, Ossai EC, Abubakar B. Ameliorative effects of ethanol leaf extract of *Moringa oleifera* on the liver and kidney markers of malaria-infected mice. Int J Life Sci Biotechnol Pharm Res. 2013;2(2):43–52.
25. Enechi OC, Okpe CC, Ibe GN, Omeje KO, Ugwu Okechukwu PC. Effect of *Buchholzia coriacea* methanol extract on haematological indices and liver function parameters in *Plasmodium berghei*-infected mice. Glob Vet. 2016;16(1):57–66.

CITE AS: Obwendo N. J. (2025). Assessing the use of Blood Transfusions in Anemia Management in Ugandan Hospitals. NEWPORT INTERNATIONAL JOURNAL OF PUBLIC HEALTH AND PHARMACY, 6(1):27-32. https://doi.org/10.59298/NIJPP/2025/612732