Short Communication

Rational Use of Blood in Obstetrics and Gynaecology in Pakistan: Perspective from a Developing Country

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Blood transfusion is an essential component of obstetric and gynaecologic care, serving as a life-saving intervention for conditions such as haemorrhage, severe anemia, and surgical blood loss. However, judicious and rational use of blood and blood components is necessary due to accompanying risks, including transmission of transfusion transmitted infections (TTIs), immunological reactions, and other potential adverse reactions. Rationalizing blood use aligns with WHO (World Health Organization) recommendations and aims to improve patient outcomes while conserving a limited resource.[1]

One of the leading causes of maternal mortality worldwide, especially in low resource settings, is haemorrhage. Recent research by Ruiz-Labarta et al., (2023) showed that access to blood transfusions can significantly improve survival rates in cases of postpartum haemorrhage, emphasizing the need for transfusion protocols in delivery units to manage obstetric emergencies.[2] Caesarean sections, especially those done in an emergency setting, are associated with a higher risk of losing blood and requiring blood transfusions. A systematic review by Iqbal et al., (2022)[3] on blood transfusions and caesarean sections revealed a correlation between transfusion rates and complexity of caesarean sections. Patients at high risk with conditions like placenta accreta are associated with higher rates of transfusions. This highlights the importance of assessing transfusion needs prior to surgical intervention and plan accordingly.

Clinical guidelines and protocols for blood transfusion in obstetrics have advanced, promoting the use of massive transfusion protocols and goal-directed therapy to manage peripartum blood loss effectively. A study by Tanaka et al., (2017)[4] studied the impact of massive transfusion protocols and finds that reduced response times and increased maternal survival rates when protocols are systemically applied. The findings suggested that blood components availability and systematic protocols reduce the need for more extensive surgical interventions, like hysterectomies. Despite the above, the availability of transfusion services in low- and middle-income countries remains a significant challenge. Sharma et al., (2024)[5] highlighted the disparities in maternal outcomes between countries with differing access to transfusion services. The study argued that establishing a sustainable blood supply chain and transfusion services is crucial in reducing maternal mortality, as haemorrhage related deaths are disproportionately higher in these regions.

However, blood transfusions, although can be lifesaving, are also associated with risks such as transfusion reactions, immunological responses and infectious disease transmission. Wang et al., (2022)[6] examined the incidence of transfusion related adverse events in obstetric patients, recommending enhanced screening and safer practices. They emphasized that while transfusions are essential in emergency scenarios, safety protocols are critical in order to minimize risks and optimize patient outcomes.

In Pakistan, as in many developing countries, blood resources are often limited, and infrastructure challenges limit access to safe transfusion. Rationalizing the use of blood is essential to ensure patient safety, maximize resource allocation, and reduce transfusion-associated risks. Pakistan's blood transfusion system is demand-driven and fragmented, with services provided by public and private hospital-

based blood banks or independent facilities. These blood banks handle various stages of the transfusion process, including blood collection, testing, processing, and distribution. There is generally no clear division between manufacturing units (Blood Centres) and ordering units (Blood Banks), which affects service organization. Hospital blood banks often offer comprehensive services that promote the use of whole blood, while donor management is frequently shifted to patients' families, who must find 'replacement' donors (including paid donors, despite an official ban) or obtain blood from private entities or non-profit organizations, which poses safety risks. Some public sector organizations (such as the Armed Forces) and larger non-governmental organizations (NGOs) take on the role of regional blood centres, while numerous small, unregulated laboratories provide undocumented, demand-driven services following ambiguous prescription guidelines. Operational adoption of rational clinical blood use is still needed. The current structure of blood transfusion services is dominated by 'blood banks' located within public and private hospitals or operating as independent private facilities. These banks manage the full transfusion chain, from blood collection to issuance. Additionally, various organizations, such as 'Blood Donor Organizations' and NGOs, are involved in blood collection, testing, processing, and distribution.

As of 2020, an estimated 2.7 million donations are collected annually from approximately 650 blood centres with differing levels of activity.[7] While the use of component therapy is on the rise, a significant amount of blood is still administered as whole blood. Due to uneven access to blood and insufficient regulatory oversight, patients and their families may face exploitation, and unsafe practices can occur. This includes incidents of blood pilferages, especially from larger public blood establishments.

Obstetric haemorrhage remains a significant cause of maternal morbidity and mortality in Pakistan. Haemorrhage is commonly seen in cases of postpartum haemorrhage (PPH), placenta previa, and placental abruption.[8-10] In gynaecology, transfusions are typically administered for chronic, abnormal uterine bleeding, and surgical blood loss.[11] However, the indications for transfusion often vary among clinicians due to the absence of standardized guidelines, leading to inconsistencies and, at times, overuse of blood components.[12,13] The most used blood components in Pakistan are whole blood and packed red blood cells (PRBCs).[14] Whole blood use is more prevalent in developing countries compared to high-income nations, where blood component therapy is more commonly practiced targeting specific deficiencies. Studies indicate that component therapy could lead to more effective blood management, especially in resource-limited settings.[15]

Challenges related to blood transfusion practices in obstetrics and gynaecology in Pakistan include, (1) Limited blood availability and donor systems. Pakistan faces significant challenges in maintaining an adequate and safe blood supply. The country's blood donation rate remains low, with a high reliance on family replacement donations instead of volunteer donors.[16] This reliance can delay transfusions in emergencies and increases the risk of TTIs due to limited screening capacity; (2) The risk of TTIs is a concern in Pakistan due to the prevalence of infections like hepatitis B, hepatitis C, HIV, and syphilis among the blood donor population.[17] Despite guidelines for screening blood donors, resource constraints and inconsistent practices lead to occasional lapses, increasing the risk for blood transfusion recipients; and (3) Inadequate infrastructure and training. Blood services in Pakistan often lack proper infrastructure especially in rural areas, including storage facilities, testing laboratories, and skilled personnel. Additionally, many healthcare providers lack formal training in blood management protocols, leading to inconsistent transfusion practices. This discrepancy emphasizes the need for educational programmes focused on judicious blood use and transfusion safety.[18,19]

The strategies for rational blood use in obstetrics and gynaecology include improving blood donation and supply management. This involves increasing voluntary blood donation that is critical for ensuring a stable blood supply. Awareness campaigns highlighting the importance of voluntary donation can help reduce dependence on replacement donations. Collaboration with NGOs and community-based organizations can also facilitate blood donation drives and improve the availability of safe blood.[20,21] Use of blood components instead of whole blood can enhance resource efficiency by providing targeted therapy. For example, PRBCs for anaemia and fresh frozen plasma (FFP) for clotting deficiencies allows healthcare providers to treat specific conditions while conserving blood.[22] Component therapy is especially beneficial in Pakistan, where blood shortages are frequent, as it allows one unit of donated blood to benefit multiple patients.

Standardized guidelines, such as Pakistan's National Guidelines of Clinical Transfusion Practice[23] and those provided by the Royal College of Obstetricians and Gynaecologists (RCOG), should be adapted and implemented to fit Pakistan's healthcare environment.[24] The national guidelines are designed for quick reference to promote rational use of blood components and avoid unnecessary blood transfusions. The guidelines are not designed to replace the conventional textbooks or to provide a definitive text on the clinical use of blood. Rather, its purpose is to provide an easily accessible learning tool that will assist prescribers of blood to make appropriate clinical decisions on transfusion and contribute to wider efforts to minimize the unnecessary use of blood and blood components. It is expected that the use of this document in the Pakistan healthcare system will significantly improve the blood transfusion practices in our hospitals.

Establishing haemoglobin thresholds for transfusion, criteria for emergency transfusions, and protocols for managing PPH can guide clinicians and prevent unnecessary transfusions. In addition, regular audits and feedback mechanisms should be put in place to monitor adherence to these guidelines.[25]

Training programmes for obstetricians, gynaecologists, nurses, and transfusion specialists on the principles of blood management can significantly reduce unnecessary transfusions.[26] Training should emphasize the importance of evaluating alternatives to transfusion, such as iron supplementation for treating anaemia, especially during pregnancy.[27] As the initial step, the SBTP team designed a standard training module for clinicians and nurses on clinical use of blood based on a WHO template followed by the workshop. The major outputs of the workshop included the development of a standardized blood request form and TOR for hospital transfusion committees (working group activities). Moreover, the pilot workshop brought forward the requirement of a more thorough, stepwise intervention in this area. Programmes such as 'Judicious Use of Blood' workshops, as already conducted through the Pakistan's Safe Blood Transfusion Programme (SBTP), could be replicated to improve blood use practices.[28]

As such, transfusion guidelines and evidence-based practices should be followed. According to the global recommendations, restrictive transfusion thresholds (e.g., haemoglobin below 7 g/dL) are as effective as liberal transfusion practices for stabilizing patients while reducing the risks associated with transfusion.[29,30]

The rational use of blood in obstetrics and gynaecology is crucial in a resource-limited setting like Pakistan. Addressing the challenges related to blood availability, infection risks, and inconsistent transfusion practices can improve maternal and patient outcomes. Implementing component therapy, adopting standardized guidelines, increasing voluntary donations, and enhancing training for healthcare providers are key strategies to promote judicious blood use. With these measures, Pakistan can make strides toward safer and more efficient transfusion practices, ultimately benefiting maternal health across the country.

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