JOURNAL OF INTERNATIONAL CRISIS AND RISK COMMUNICATION RESEARCH
ISSN: 2576-0017
2024, VOL 7, NO S8

Ensuring Patient Safety: The Nurse's Responsibilities in Blood Transfusion

Hibah Abdullatif AlAwam[1], Kholoud Ali AlShehri[2], Maram Saad Alaryani[3], Rawan Khalid Alotaibi[4], Eatimad Mohammed Isa[5], Alyah Saad Aloryani[6], Wafa Hassan Essa Miqdam[7], Reem Ali Sfiani[8], Kalthom zakaria Alhwsawi[9], Azizah Hamad Alanazi[10], Huda Sultan Alharbi[11], Muneera Mohammed Saeed ALdossery[12], Mona Mohammed Alanazi[13], Sarra Hussain Aldossari[14], Salehah Yetaim Mokhlef Alanazi[15]

1. Senior specialist nurse, Al Iman General Hospital, Ministry of Health, kingdom of Saudi Arabia. hibs1023@gmail.com
2. Specialist nurse, Al Iman General Hospital, Ministry of Health, kingdom of Saudi Arabia. Kholoudaa09@gmail.com
3. Specialist Nurse, AL lman General Hospital, Ministry of Health, kingdom of Saudi Arabia. Maram_5099@hotmail.com
4. Specialist Nurse, King Abdulaziz Spicialtist Hospital – Taif, Ministry of Health, kingdom of Saudi Arabia. -RAWANKA@moh.gov.sa
5. Specialist Nurse, Al-Iman general hospital, Ministry of Health, kingdom of Saudi Arabia. eeassa@moh.gov.sa
6. Senior specialist nurse, Al Iman General Hospital, Ministry of Health, kingdom of Saudi Arabia. aaloryani@moh.gov.sa
7. Nurse Technician, Al Iman General Hospital, Ministry of Health, kingdom of Saudi Arabia. Fofo_-9090@hotmail.com
8. Nurse Technician, Al Iman General Hospital, Ministry of Health, kingdom of Saudi Arabia. Alr99m@hotmail.com
9. Nurse Technician, Al Iman General Hospital, Ministry of Health, kingdom of Saudi Arabia. Kalhawsai@moh.gov.sa
10. Specialist Nurse, Aliman General Hospital, Ministry of Health, kingdom of Saudi Arabia. azizahha@moh.gov.sa
11. Nursing Technician, Al Iman General Hospital, Ministry of Health, kingdom of Saudi Arabia. Hualharby@moh.gov.sa
12. Nursing Technician, Mansoura Center of Primary Health Care, Ministry of Health, kingdom of Saudi Arabia. rn130009419@hotmail.com
13. Nursing Specialist, Al Iman General Hospital, Ministry of Health, kingdom of Saudi Arabia. Malanazi283@moh.gov.sa
14. Staff Nurse, King Salman Hospital, Ministry of Health, kingdom of Saudi Arabia. sareh864@gmail.com
15. Nursing Technician, King Salman Hospital, Ministry of Health, kingdom of Saudi Arabia. noorah544@hotmail.com

ABSTRACT

Blood transfusion is a life-saving procedure, with millions of patients receiving blood components annually worldwide. Nurses play a crucial role in ensuring safe transfusion practices and patient care. However, despite advancements in safety and

technology, transfusion remains a risky procedure, with potential complications ranging from mild allergic reactions to life-threatening events such as acute hemolytic reactions and transfusion-related acute lung injury. Previous studies have highlighted deficiencies in nursing knowledge and practices related to blood transfusion, posing risks to patient safety. This study aimed to evaluate the knowledge and practices of staff nurses regarding blood transfusion at Sher-i-Kashmir Institute of Medical Sciences, Kashmir, to establish a database for further investigations and emphasize the need for in-service training programs. Safe transfusion practices among nurses include rigorous patient identification, efficient use of blood components, safe collection and checking of blood bags, administering the correct component, conducting pre-administration checks, and monitoring the transfused patient. Nurses must be vigilant in recognizing and promptly responding to transfusion reactions, as early intervention can be lifesaving. Meticulous monitoring during and after transfusion is essential, as reactions can occur with any blood component, even when ABO compatible. The findings of this study underscore the importance of continuous education and training for nurses to ensure safe and effective blood transfusion practices.

KEYWORDS: Nurse, Blood Transfusion, Patient Safety.

1. Introduction

Blood transfusion is a highly effective and potentially life-saving procedure. The World Health Organization (WHO) has recognized blood transfusion as one of eight key life-saving interventions. According to WHO data (2011), more than nine million patients in 90 countries receive blood annually, and approximately 85 million units of red blood cells (RBCs) are transfused worldwide each year (García-Roa et al., 2017). In the United States, nearly 21 million blood components are transfused to around 4.5 million patients annually. In India, more than 40 lakh units of RBCs, platelets, and plasma are transfused annually to manage various clinical conditions, including over 1,200 daily road accidents, 60 million surgeries, 240 million major operations, 331 million cancer-related procedures such as chemotherapy, and 10 million pregnancy-related complications (Gupta & Popli, 2018).

Nurses play a critical role in blood transfusion services as they are responsible for the essential aspects of safe transfusion and patient care. Their responsibilities include understanding the indications for transfusing blood products, pre-transfusion sampling, administration of blood products, monitoring patients for adverse reactions, and maintaining proper documentation. Additionally, nurses, through their knowledge, support patient education and ensure that consent for transfusion is informed. Despite advancements in safety and technology for handling and administering blood products, transfusion remains a risky procedure (Tavares et al., 2015).

Bolton-Maggs (2013), in her review of the Serious Hazards of Transfusion (SHOT) report, noted 3,568 incident reports, including nine cases of ABO-incompatible red cell transfusions, four of which were categorized as "never events"—preventable reactions that resulted in serious harm or death. The SHOT report (2019) highlighted

the detection of "near-miss incidents" at various stages before transfusion, with 52.4% of errors identified at the bedside. This underscores the importance of accurately completing bedside checks and emphasizes the need for nursing staff to have knowledge of ABO and D compatibility. The bedside check is a critical measure to prevent transfusion errors, requiring vigilant verification of the patient's identity against the blood component label. Hospitals must implement formal policies for bedside identity checks to ensure safety. Observations reveal significant variations in nurses' practices during transfusion (Sinha et al., 2016).

Nursing professionals are integral to the care of patients undergoing blood transfusions. Given the complexity of the transfusion process, skilled and trained nursing professionals are essential to ensure patient safety. Consequently, proper transfusion practices and the identification of failures largely depend on the nurses' performance. This emphasizes the need for scientific knowledge and technical expertise among nursing staff to prevent complications and ensure patient safety (Tavares et al., 2015).

Findings from previous research provide insight into this issue. Majeed et al. (2019) reported that nurses exhibited average to poor practices regarding blood transfusion procedures, with more than half scoring below 50%(Haseena Majeed et al., 2020). Encan and Akin (2020) found that nurses had a moderate level of knowledge, with a mean score of 23.65 ± 4.13 (Encan & Akin, 2019). Fard et al. (2018) reported mean knowledge and performance scores of 9.58 ± 2.13 and 38.96 ± 2.17, respectively. Similarly, Sapkota et al. (2019) identified suboptimal transfusion practices attributed to significant knowledge gaps and a lack of quality control procedures. Elhy and Kasemy (2021) found that 61.2% of nurses demonstrated poor knowledge, 38.8% fair knowledge, and none achieved a good knowledge score, concluding that a lack of knowledge among nurses jeopardizes patient safety (Elhy, 2017). Al-Nasr et al. (2020) observed unsatisfactory practice scores in 73.9% of nurses, with only 26.1% achieving satisfactory scores. Their mean practice score was 69.4 ± 8.0. Petraka et al. (2018) noted that 88% of nurses had moderate knowledge, while only 5.6% and 6.5% had good and poor knowledge, respectively. Tavares et al. (2017) found an overall average knowledge score of 52.66 ± 10.2, indicating poor knowledge. Hijji et al. (2015) revealed significant gaps in nurses' understanding of patient preparation, the importance of proper identification, and transfusion procedures. Dubey et al. (2016) reported poor knowledge among nurses, with a mean score of 17.34 ± 3.37 (Hijji et al., 2013).

These studies collectively highlight a deficiency in nursing knowledge and practices related to blood transfusion. This gap poses a risk to patient safety, as preventable and manageable conditions may escalate into life-threatening scenarios due to inadequate early assessment and management by nurses. The lack of nursing research on blood transfusion practices, particularly in specific regions like Jammu and Kashmir, exacerbates this issue. To address this, a study was conducted to evaluate the knowledge and practices of staff nurses regarding blood transfusion at Sher-i-Kashmir Institute of Medical Sciences, Kashmir. This research aims to establish a database for further investigations in this field and underscore the need for in-service training programs.

Blood transfusion, when correctly prescribed and performed, has potential to save lives, hence a procedure of important therapeutic support in different treatment protocols in medicine. However, it can lead to acute or late complications and may even lead to death. These reactions may be immune, linked to body's mechanisms of response to blood transfusion, or non-immune, associated with human failure (Mattia & Andrade, 2016).

The nursing team, when responsible for the transfusion, occupies a strategic position in detecting errors that may have occurred in the previous phases of the blood cycle, as well as in pre, intra and post-transfusion monitoring, and may prevent the occurrence of adverse events related to transfusion or minimize damage.

Importantly, the performance of the nursing team in hemotherapy is regulated by Resolution of the Federal Nursing Council (COFEN) No. 0511/2016, which establishes "guidelines for the performance of Nurses and Nursing Technicians during Hemotherapy, in order to ensure competent, resolute and safe nursing care".

Thus, the actions of the nursing team during the transfusion process are fundamental to patient safety and can minimize health risks to the recipients. Therefore, it is essential that the knowledge of team is up to date, based on evidence, in addition to awareness of the current applicable legislation.

The participation of the nurse and the team in the transfusion care requires multiple skills, such as knowledge of indications; data verification to prevent errors; guidance to the recipients of transfusion; detection, communication and action in response to transfusion reactions (RT) and documentation of the procedure (Barbosa et al., 2011). Thus, it is possible to observe that nursing knowledge in the area is broad and necessary for the performance.

The risks associated with blood and blood product transfusion

Transfusion-Transmissible Infections

Viruses

The most critical viral risks associated with blood transfusion include liver diseases such as viral hepatitis, cirrhosis, and hepatocellular carcinoma caused by hepatitis B virus (HBV) and hepatitis C virus (HCV), as well as acquired immunodeficiency syndrome (AIDS) caused by the human immunodeficiency virus (HIV). Hepatitis G virus (HGV), a newly identified blood-transmissible virus, has uncertain clinical significance but may occasionally cause transfusion-associated hepatitis (Cheung et al., 1997).

The human T-cell leukemia virus (HTLV-1) can also be transmitted through blood transfusion. While often asymptomatic, HTLV-1 infection may lead to hematological malignancies such as adult T-cell leukemia, infective dermatitis, and severe inflammatory eye conditions like uveitis (Tosswill et al., 2000). Although the prevalence of HTLV-1 in the UK population is low, ranging from 1:20,000 to 1:80,000 (Brennan et al., 1993; Flanagan et al., 1995), it is significantly higher in certain regions, such as the Caribbean and the Far East. In southern Japan, approximately 30% of adults are infected.

Cytomegalovirus (CMV) is a common virus that can be transmitted through blood transfusion. While typically mild or asymptomatic in most individuals, it poses a significant risk to neonates and immunocompromised patients, leading to complications like pneumonitis, hepatitis, and progressive retinitis. Other viruses that may be transmitted include the Epstein-Barr virus, which causes infectious mononucleosis, and parvovirus 19, which is generally benign but can be harmful to individuals with sickle cell disease or those who are immunocompromised (Cohen, 1995).

Though no confirmed link has been established, there is a theoretical risk of transmission of the agent responsible for new variant Creutzfeldt-Jakob disease (vCJD) through blood transfusion (World Health Organization, 1997).

Bacteria

While viral infections from transfusions often manifest weeks, months, or years later as delayed adverse effects, bacterial contamination of blood typically results in immediate symptoms during the transfusion. Early signs include rigors, fever, hypotension, and nausea (Krishnan & Brecher, 1995). If untreated, septic shock can rapidly develop and prove fatal. Bacterial contamination may occur if the donor has an asymptomatic bloodstream infection (bacteremia) at the time of donation or through the introduction of environmental or skin bacteria during blood collection (Krishnan and Brecher, 1995). Specific bacterial infections, such as brucellosis and syphilis, can also be transmitted via transfusion.

Non-Infectious Complications of Blood Transfusion

Immune Hemolytic Transfusion Reactions — Incompatible Red Cells

Red blood cells are coated with inherited antigens. Immune hemolytic transfusion reactions occur when the recipient’s plasma contains antibodies targeting the antigens present on transfused red cells. The resulting antigen-antibody interaction causes hemolysis, either within the blood vessels (intravascular hemolysis) or in the reticuloendothelial system (extravascular hemolysis).

Although over 400 red cell antigens exist, most are clinically insignificant and do not lead to hemolytic reactions. However, severe immune hemolytic reactions, referred to as acute immune hemolytic transfusion reactions (AIHTR), can occur after transfusion of only a few milliliters of incompatible blood. These are often caused by ABO incompatibility.

ABO Incompatibility

The ABO blood group system categorizes individuals into four groups based on the presence or absence of inherited A and B red cell antigens. Group A individuals possess the A antigen, group B the B antigen, group AB both A and B antigens, and group O neither antigen.

Uniquely, antibodies against ABO antigens develop naturally without prior antigen exposure. Group A individuals have anti-B antibodies, group B individuals have anti-A antibodies, group O individuals have both, and group AB individuals lack

both. A hemolytic reaction occurs when the recipient's plasma contains antibodies (anti-A or anti-B) against the transfused red cells' antigens (Jeter & Spivey, 1995).

For example, transfusing group A blood into a group B recipient can lead to antigen-antibody binding, causing red cell agglutination and activation of the complement cascade. This cascade releases potent complement components (C3a, C4a, and C5a) that contribute to systemic symptoms such as fever, chills, breathlessness, hypotension, flushing, chest oppression, and pain in the lower back and legs.

The complement system damages the antibody-coated red cells by forming membrane pores, leading to intravascular hemolysis and the release of hemoglobin into the plasma, much of which is excreted in the urine.

Severe outcomes include hypovolemic shock, acute renal failure, and disseminated intravascular coagulation (DIC). DIC depletes coagulation proteins, increasing the risk of bruising and bleeding, and may result in life-threatening hemorrhages (Hoffbrand & Pettit, 1980).

Other Immune Hemolytic Reactions

Unlike anti-A and anti-B antibodies, most clinically significant red cell antibodies are immune antibodies. These are only found in the plasma of patients who have been previously exposed to red cells bearing the specific foreign antigens. Such exposure can occur in two ways: through blood transfusion or during pregnancy, when fetal red cells with paternal antigens leak into the maternal circulation. Consequently, individuals without a history of transfusion or pregnancy are highly unlikely to experience a hemolytic transfusion reaction unless they receive ABO-incompatible blood. Estimates suggest that the risk of immune hemolytic reaction in 97% of cases is eliminated when ABO-compatible blood is transfused.

Hemolytic reactions due to these "secondary or atypical" antibodies tend to be less severe than those caused by ABO incompatibility, as they often do not activate the complement system. The most common example involves the D antigen of the Rhesus (Rh) blood group system.

Approximately 85% of the population expresses the RhD antigen on their red cells and are classified as RhD-positive, while 15% lack the antigen and are RhD-negative. RhD-negative individuals can develop anti-D antibodies after exposure to RhD-positive red cells. If such an individual receives a transfusion of RhD-positive blood, the anti-D antibodies bind to the RhD antigen on the donor red cells, triggering a hemolytic reaction. The antibody-coated red cells are destroyed extravascularly by macrophages in the spleen and reticuloendothelial system.

The immediate symptom is often a rising temperature. However, anemia and jaundice may develop later as hemoglobin from the destroyed donor red cells is metabolized to bilirubin. Other red cell antibodies, such as those targeting the Rh blood group antigens (anti-c, anti-C, anti-E, and anti-e), Kell system (anti-K), Duffy system (anti-Dfy), and Kidd system (anti-Jka), can also precipitate hemolytic reactions.

These reactions are sometimes delayed, manifesting up to a week after transfusion due to secondary antibody production (Marshall et al., 1999). Clinical signs of

delayed reactions include anemia and jaundice within 10 days of transfusion. Rarely, these reactions can be severe if the antibody activates the complement system.

Reactions Due to Incompatible White Cells

Febrile Non-Hemolytic Transfusion Reaction (FNHTR)

FNHTR is a common reaction among patients who have undergone multiple transfusions. These patients may develop antibodies to human leukocyte antigen (HLA) on transfused white cells. Antigen-antibody binding during subsequent transfusions activates white cells, releasing cytokines such as interleukin-1 (IL-1) and tumor necrosis factor (TNF). These cytokines cause symptoms, typically mild and self-limiting, including fever, chills, and headache starting 30–60 minutes after transfusion begins. Antipyretic drugs, such as paracetamol, can effectively relieve these symptoms (Jeter and Spivey, 1995).

Transfusion-Related Acute Lung Injury (TRALI)

TRALI is a potentially fatal complication caused by donor plasma containing antibodies against white cell antigens. These antibodies lead to the aggregation of the recipient's white cells, primarily in the microvasculature of the lungs. This aggregation releases chemicals that damage the vessel linings, resulting in pulmonary edema and acute respiratory distress. Symptoms, including dyspnea, coughing, rigors, and fever, typically appear within an hour of transfusion (Dry et al., 1999).

Other Adverse Effects

Allergic Reactions

Mild allergic reactions to proteins, drugs, or chemical derivatives in donor plasma occur in 1–2% of transfusions. These reactions, often presenting as pruritic urticaria (itchy red rashes), develop within an hour of starting transfusion and can be managed with antihistamines such as chlorpheniramine, administered intravenously or intramuscularly.

Severe systemic allergic reactions, or anaphylactoid reactions, are rare but life-threatening. They typically occur in patients with immunoglobulin A (IgA) deficiency. Such reactions may be triggered by only a few milliliters of plasma-containing blood products and can progress rapidly to cardiopulmonary arrest without intervention. Symptoms include skin flushing, urticaria, nausea, abdominal pain, hypotension, cyanosis, and respiratory distress (Jeter and Spivey, 1995).

Circulatory Overload

Circulatory overload occurs predominantly in elderly individuals and infants, particularly when transfusion rates are too rapid in patients with pre-existing cardiac or pulmonary conditions. Hypervolemia leads to hypertension and pulmonary edema, with symptoms such as dyspnea, cyanosis, and a dry cough. A slow transfusion rate can prevent these complications.

Post-Transfusion Purpura

This rare condition is characterized by severe thrombocytopenia, which manifests as purpura and excessive bleeding within 10 hours of transfusion. The underlying cause is the immune destruction of platelets due to antibodies against platelet antigens in the recipient's plasma (Gonzalez et al., 1996).

Iron Overload

Iron overload is a chronic complication affecting patients who require long-term, repeated transfusions over several years. Each unit of blood contains approximately 250 mg of iron, and the human body, which normally stores around 4,000 mg of iron, lacks a mechanism to excrete excess iron. Prolonged transfusions can result in hemosiderosis, where iron accumulates in tissues, causing organ damage. For instance, iron deposition in the liver can lead to cirrhosis, while accumulation in the pancreas can result in diabetes. Preventive treatment involves the use of iron-chelating agents, such as desferrioxamine (Davies & Brozovic, 1990).

Safe transfusion practice among nurses

Patient Identification

Ensuring correct patient identification is one of the most critical aspects of guaranteeing that the appropriate blood is transfused to the correct patient. Patient identification must be rigorously confirmed at several key stages of the transfusion process: when the pre-transfusion sample is obtained, when the blood component is collected from the transfusion laboratory or a satellite blood fridge, and when the blood component is administered to the patient.

The Efficient Use of Blood

Blood donations are given voluntarily, and it is essential for healthcare professionals to ensure that this altruistic contribution is utilized effectively and judiciously for the benefit of patients. Numerous factors can influence the supply and demand of blood components. Avoiding the need to discard unused components is vital to safeguard patient safety, particularly in situations where the risk of blood shortages is significant.

To optimize the use of each blood component, nurses should adhere to local hospital protocols for the appropriate handling, storage, transportation, and administration of blood products. As blood components are valuable resources, unused units should be returned promptly to the transfusion laboratory to enhance their potential for use in other patients. Hospital policies on returning unused blood components may vary and should be followed by the nursing staff.

Before collecting or requesting delivery of a blood component, nurses must ensure that the patient has a functioning cannula, a signed and written prescription, all necessary equipment, and is ready for transfusion. This preparation increases the likelihood that the blood component will be used within the required timeframe, reducing the risk of wastage. In emergencies, such as massive hemorrhage, managing unused blood components while meeting unpredictable needs can be challenging. However, patient safety must remain the priority. Communication

failures, lack of knowledge, or negligence can also lead to the unnecessary discard of blood components. Nurses have a pivotal role in preventing these outcomes.

Safe Collection

The individual collecting a blood component for a patient must carry written evidence of the patient's identity and verify that it matches the patient's identification band precisely. Some hospitals employ a collection slip system for this purpose. The identification details must include the patient's full first name, surname, date of birth, and unique identification number (British Committee for Standards in Haematology (BCSH), 1999). This procedure significantly reduces the risk of collecting the wrong blood component and serves as an important safety measure to prevent the administration of an incompatible component.

Checking the Blood Bag

Transfusion-transmitted bacterial infections remain a preventable cause of mortality and significant morbidity. Healthcare staff involved in transfusions should be vigilant for visual signs of bacterial contamination in red cell and platelet units (SHOT, 2008).

The registered nurse must inspect the blood pack for signs of discoloration, clumping, or leakage and check the expiration date (RCN, 2006). Abnormalities, such as leakage, discoloration, or expired units, should prompt immediate notification of the transfusion laboratory (McClelland, 2007). In 2007, there were 12 incidents of patients receiving expired blood (SHOT, 2008).

In the same year, 25 cases of transfusion-transmitted infections were reported to SHOT, with three cases confirmed. All confirmed cases were bacterial infections—two from red cells and one from a platelet unit (SHOT, 2008). While bacterial contamination is more common in platelets, pre-release bacterial testing of platelets has been mandated in some countries and introduced in certain blood services (McClelland, 2007).

Transfusing the Correct Component

Administering an incorrect blood component can expose patients to serious risks, including injury or death. The ABO and Rh blood grouping systems are the most critical for ensuring transfusion compatibility. It is essential that the donor and patient blood types are accurately matched to avoid complications (for red cell compatibility. Transfusion of ABO-incompatible blood can result in life-threatening acute intravascular hemolysis. Precise patient identification is therefore crucial in ensuring the safe administration of blood components.

Nurses can inadvertently expose patients to inappropriate or unnecessary transfusions through errors such as administering expired blood components or acting on an inaccurate hemoglobin result. For patients with specific requirements—such as the need for irradiated or cytomegalovirus (CMV)-negative blood—failure to meet these needs may result in the transfusion of an unsuitable component. Such oversights underline the importance of vigilance in the transfusion process.

Pre-Administration Check

The pre-administration check is a crucial step that must be conducted meticulously before transfusing any blood component. The primary aim of this check is to confirm that the patient's identity on the blood pack label corresponds precisely with the recipient's details. This verification is achieved by asking the patient to state their full name and date of birth and ensuring this information matches their identification band. Subsequently, the details on the identification band (or an agreed alternative method of identification) must be cross-checked with those on the blood pack label.

For patients unable to state their name and date of birth, such as those who are confused or unconscious, their identity must be confirmed by a second staff member and verified against the identification band. According to the National Patient Safety Agency (NPSA, 2006), the compatibility report or the patient's notes must not be used as part of the final identity-checking process. Two key principles must guide nurses: no identification band means no transfusion, and blood pack details must always be checked against the identification band. Additionally, the pre-administration check ensures that the blood group and the donation number on the compatibility label's tie-on tag match those on the blood component.

Addressing discrepancies is another vital part of the pre-administration process. For instance, if the date of birth on the blood pack does not match that on the patient's identification band, even by a single digit, the nurse must halt the transfusion and notify the transfusion laboratory. Similarly, the check should be performed without interruptions to ensure safety. If a distraction occurs, the check must restart from the beginning.

Safe transfusion practices also require adherence to aseptic techniques to mitigate the risks associated with handling bodily fluids, accessing intravenous routes, and using sharps. Appropriate disposal of sharps and adherence to universal precautions are essential to protect the patient, nurse, and others.

Monitoring the Transfused Patient

There is some variation in opinions regarding the frequency of observations during a blood transfusion. However, it is generally agreed that baseline observations should be taken before administration to identify any changes during the procedure. Observations should also be recorded at 15 minutes after the commencement of each blood component, as a minimum standard. Rowe and Doughty (2000) emphasize the importance of early monitoring, noting that without timely checks, serious transfusion reactions may go unnoticed until it is too late to intervene (Rowe & Doughty, 2000).

The British Committee for Standards in Haematology (BCSH, 1999) recommends recording temperature, pulse, and blood pressure before administering each blood component, with temperature and pulse rechecked at 15 minutes and all vital signs measured upon completion of the transfusion. Castledine (2006) proposes a more frequent monitoring schedule: vital signs at 15 minutes, every 15 minutes for the first hour, and every 30 minutes for the second hour (Castledine, 2006).

Although there is limited evidence to determine the optimal frequency of monitoring

(Thompson et al., 2008a), there is consensus on the importance of observing vital signs to ensure patient safety. Gray and Pirie (2005) stress that monitoring throughout and after the transfusion is essential for identifying adverse events or reactions (Gray et al., 2005). Similarly, Thompson et al. (2008b) highlight the necessity of skilled practitioners, patient involvement, visual assessments, and vital sign monitoring to enable early detection and response to transfusion reactions (Thompson et al., 2008b).

The primary goal of observations is to identify acute transfusion reactions early and respond appropriately (Thompson et al., 2008a). Nurses must recognize the initial signs of adverse reactions and act swiftly, as failure to address such symptoms promptly can have severe consequences. Understanding the causes and timing of transfusion reactions is also crucial for nurses to provide effective monitoring (Thompson et al., 2008b). Gray et al. (2007) emphasize that the prompt recognition and management of suspected reactions can be lifesaving and help prevent the escalation of symptoms.

Patients should be monitored in settings where they can be continuously observed (Gray and Pirie, 2005; Thompson et al., 2008a). Rowe and Doughty (2000) and Thompson et al. (2008a) stress the critical role of visual assessments, which include observing the patient and listening to their concerns. Empowering patients to participate in their care is equally important, as they may notice symptoms before changes in vital signs are detected.

The timing of transfusions is another significant consideration. Risk assessments are necessary when transfusions occur at night, as suggested by Stevenson (2007), who points out the potential for increased risks due to reduced staffing levels. SHOT (2008) also advises against transfusions outside of core hours unless in emergencies. Castledine (2006) supports this recommendation, emphasizing that night-time transfusions should only occur when necessary.

Parris and Grant-Casey (2007) identify the first 30 minutes of transfusion as the period when adverse reactions are most likely, with severe haemolytic and anaphylactic reactions typically occurring within the first 15 minutes (Thompson et al., 2008a). Transfusion reactions can be classified based on timing (acute or delayed) or etiology (immune or non-immune) (Gray et al., 2007). SHOT (2008) defines acute reactions as those occurring during transfusion or within 24 hours of initiating the component. It is worth noting that even a thorough pre-transfusion safety check cannot eliminate the risk of incompatibility caused by earlier errors in the transfusion process.

Nurses must also be aware that the early stages of major reactions may present similarly to mild reactions, making vigilance essential (Gray et al., 2007). Additional caution is required for patients unable to communicate symptoms, such as unconscious individuals, very young children, or anesthetized patients. For unconscious patients, signs of an ABO-incompatible reaction may include bleeding, tachycardia, hypotension, or hypertension.

Meticulous monitoring during and after transfusion is a critical aspect of nursing

care, as reactions can occur with any blood component, even when it is ABO compatible. The most crucial response to suspected transfusion reactions is to stop the transfusion immediately and seek medical advice without delay.

2. Conclusion

Blood transfusion is a cornerstone of modern medical treatment, capable of saving lives when performed correctly. However, it is a complex procedure fraught with risks, requiring meticulous attention at every stage. Nurses are pivotal in ensuring the safety and efficacy of blood transfusion processes, from pre-administration checks to post-transfusion monitoring. Their role involves accurate patient identification, adherence to aseptic techniques, vigilant monitoring for adverse reactions, and thorough documentation.

Research consistently highlights knowledge gaps among nurses regarding blood transfusion practices, underscoring the need for continuous education and adherence to evidence-based guidelines. Empowering nurses with the necessary skills and knowledge can prevent complications, enhance patient safety, and optimize the use of this precious resource. Ultimately, the competence and vigilance of nursing professionals are vital to achieving safe and effective transfusion outcomes.

References

Barbosa, S. M., Torres, C. A., Gubert, F. D. A., Pinheiro, P. N. D. C., & Vieira, N. F. C. (2011). Enfermagem e a prática hemoterápica no Brasil: Revisão integrativa. Acta Paulista de Enfermagem, 24(1), 132–136. https://doi.org/10.1590/S0103-21002011000100020

Brennan, M., Runganga, J., Barbara, J. A., Contreras, M., Tedder, R. S., Garson, J. A., Tuke, P. W., Mortimer, P. P., McAlpine, L., & Tosswill, J. H. (1993). Prevalence of antibodies to human T cell leukaemia/lymphoma virus in blood donors in north London. BMJ (Clinical Research Ed.), 307(6914), 1235–1239. https://doi.org/10.1136/bmj.307.6914.1235

Castledine, G. (2006). Blood transfusion: Poor technique, record keeping and communication. British Journal of Nursing (Mark Allen Publishing), 15(7), 369.

Cheung, R. C., Keeffe, E. B., & Greenberg, H. B. (1997). Hepatitis G virus: Is it a hepatitis virus? The Western Journal of Medicine, 167(1), 23–33.

Cohen, B. (1995). Parvovirus B19: An expanding spectrum of disease. BMJ (Clinical Research Ed.), 311(7019), 1549–1552. https://doi.org/10.1136/bmj.311.7019.1549

Davies, S. C., & Brozovic, M. (1990). ABC of transfusion. Transfusion of red cells. BMJ (Clinical Research Ed.), 300(6719), 248–252. https://doi.org/10.1136/bmj.300.6719.248

Dry, S. M., Bechard, K. M., Milford, E. L., Churchill, W. H., & Benjamin, R. J. (1999). The pathology of transfusion-related acute lung injury. American Journal of Clinical Pathology, 112(2), 216–221. https://doi.org/10.1093/ajcp/112.2.216

Elhy, A. H. A. (2017). Nurses' Knowledge Assessment Regarding Blood Transfusion to Ensure Patient Safety. IOSR Journal of Nursing and Health Science, 06(02), 104–111. https://doi.org/10.9790/1959-060202104111

Encan, B., & Akin, S. (2019). Knowledge of Blood Transfusion Among Nurses. Journal of Continuing Education in Nursing, 50(4), 176–182. https://doi.org/10.3928/00220124-20190319-08

Flanagan, P., McAlpine, L., Ramskill, S. J., Smith, A. G., Eglin, R., Parry, J. V., & Mortimer, P. P. (1995). Evaluation of a combined HIV-1/2 and HTLV-I/II assay for screening blood donors. Vox Sanguinis, 68(4), 220–224. https://doi.org/10.1111/j.1423-0410.1995.tb02576.x

García-Roa, M., Del Carmen Vicente-Ayuso, M., Bobes, A. M., Pedraza, A. C., González-Fernández, A., Martín, M. P., Sáez, I., Seghatchian, J., & Gutiérrez, L. (2017). Red blood cell storage time and transfusion: Current practice, concerns and future perspectives. Blood Transfusion = Trasfusione Del Sangue, 15(3), 222–231. https://doi.org/10.2450/2017.0345-16

Gonzalez, J., Schwartz, J., Gerstein, G., Klainer, A. S., & Bisaccia, E. (1996). Case report: Post-

transfusion purpura. New Jersey Medicine: The Journal of the Medical Society of New Jersey, 93(2), 101–102.

Gray, A., Hearnshaw, K., Izatt, C., Kirwan, M., Murray, S., & Shreeve, K. (2007). Safe transfusion of blood and blood components. Nursing Standard (Royal College of Nursing (Great Britain): 1987), 21(51), 40–47. https://doi.org/10.7748/ns2007.08.21.51.40.c4610

Gray, A., Howell, C., & Pirie, E. (2005). Improving blood transfusion: A patient-centred approach. Nursing Standard (Royal College of Nursing (Great Britain): 1987), 19(26), 38–42. https://doi.org/10.7748/ns.19.26.38.s62

Gupta, S., & Popli, H. (2018). Regulation of Blood and Blood products in India, USA and EU. International Journal of Drug Regulatory Affairs, 6(2), Article 2. https://doi.org/10.22270/ijdra.v6i2.246

Haseena Majeed, Kousar Parveen, Hussain, M., Afzal, M., & Dr. Sayed Amir Gilani. (2020). Assessment of Nurses' Practices Regarding Blood Transfusion. https://doi.org/10.5281/ZENODO.3996692

Hijji, B., Parahoo, K., Hussein, M. M., & Barr, O. (2013). Knowledge of blood transfusion among nurses. Journal of Clinical Nursing, 22(17–18), 2536–2550. https://doi.org/10.1111/j.1365-2702.2012.04078.x

Hoffbrand, A. V., & Pettit, J. E. (1980). Essential Haematology. Blackwell Scientific.

Jeter, E. K., & Spivey, M. A. (1995). Noninfectious complications of blood transfusion. Hematology/Oncology Clinics of North America, 9(1), 187–204.

Krishnan, L. A., & Brecher, M. E. (1995). Transfusion-transmitted bacterial infection. Hematology/Oncology Clinics of North America, 9(1), 167–185.

Marshall, C. S., Dwyre, D., Eckert, R., & Russell, L. (1999). Severe hemolytic reaction due to anti-JK3. Archives of Pathology & Laboratory Medicine, 123(10), 949–951. https://doi.org/10.5858/1999-123-0949-SHRDTA

Mattia, D. D., & Andrade, S. R. D. (2016). NURSING CARE IN BLOOD TRANSFUSION: A TOOL FOR PATIENT MONITORING. Texto & Contexto - Enfermagem, 25(2). https://doi.org/10.1590/0104-07072016002600015

McClelland, D. B. L. (2007). Handbook of Transfusion Medicine. TSO.

Rowe, R., & Doughty, H. (2000). Observation and documentation of bedside blood transfusion. British Journal of Nursing (Mark Allen Publishing), 9(16), 1054–1058. https://doi.org/10.12968/bjon.2000.9.16.12449

Sinha, R. T. K., Rai, P., & Dey, A. (2016). A Study of Transfusion Related Adverse Events at a Tertiary Care Center in Central India: A Retrospective Evaluation. Journal of Medical Sciences and Health, 2(3), 6–12. https://doi.org/10.46347/jmsh.2016.v02i03.002

Tavares, J. L., Barichello, E., Mattia, A. L. D., & Barbosa, M. H. (2015). Factors associated with knowledge of the nursing staff at a teaching hospital on blood transfusion. Revista Latino-Americana de Enfermagem, 23(4), 595–602. https://doi.org/10.1590/0104-1169.0024.2593

Thompson, C. L., Edwards, C., & Stout, L. (2008a). Blood transfusions 1: How to monitor for adverse reactions. Nursing Times, 104(2), 32–33.

Thompson, C. L., Edwards, C., & Stout, L. (2008b). Blood transfusions. 2: Signs and symptoms of acute reactions. Nursing Times, 104(3), 28–29.

Tosswill, J. H., Taylor, G. P., Tedder, R. S., & Mortimer, P. P. (2000). HTLV-I/II associated disease in England and Wales, 1993-7: Retrospective review of serology requests. BMJ (Clinical Research Ed.), 320(7235), 611–612. https://doi.org/10.1136/bmj.320.7235.611