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Nurses' Knowledge and Practices Regarding Blood Transfusion Safety at Isra University Hospital, Hyderabad

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ABSTRACT

Purpose: *This study aimed to assess the knowledge and practices of staff nurses regarding blood transfusion safety at Isra University Hospital, Hyderabad.*

Design/Methodology/Approach: *A descriptive cross-sectional study was conducted from July to September 2024 with 50 staff nurses from different hospital wards. Descriptive statistics, including frequencies and percentages, were analyzed using IBM SPSS Statistics Version 23*

Results: *The results highlighted that female participants 94% were female and 6% were male. Hence, in both the areas of knowledge and practice, there were gaps: 88% of nurses had significant knowledge of blood transfusion protocols. 54% of participants identified that O-negative was a universal donor, while 40% provided the correct temperature for storing red blood cells. Further, 64% of them knew that cloudy blood bags should be sent back to the blood bank while only 52% of them understood that leaking blood bags should also be returned to the blood bank.*

Conclusion: *The study concluded that nurses' knowledge and practice of blood transfusion safety were average. Educational interventions were recommended to address gaps in understanding RBC storage, blood bags, and transfusion safety. Targeted training for patients could enhance their compliance with safety measures, ultimately improving patient outcomes.*

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Introduction

Blood transfusion is a valuable clinical management tool that is required in numerous hospitals and healthcare facilities to save lives and treat injuries, disorders, and illnesses such as anemia, post-surgery complications, or bleeding(Jogi et al., 2021). Knowledge and skills

of healthcare professionals are important in building and enhancing the aspects of blood transfusion services (Encan & Akin, 2019). Still, the issue of transfusion safety and efficacy mainly concerns appropriate attitude toward blood transfusions and the proper management of the process (Ahmed et al., 2023). Blood transfusion has always involved much risk and nurses are central to the process of identifying the correct blood type, preparing the transfusion process, and continually observing the patient throughout the process. Their level of knowledge, practical experience as well as compliance with the proper guidelines is vital to minimize the potential reactions as well as provide the highest level of patient protection (Shaikh et al., 2023). However, there is still a gap in assessing the knowledge as well as the level of compliance of health care practitioners, especially the nurses with the protocols concerning blood transfusion services (Uzun et al., 2024). It has been the finding in many research that poor practice or no knowledge of certain important aspects of transfusion may result in complications like transfusion reactions, infection, and sometimes death. Therefore, knowledge and attitudes toward blood transfusion safety among nurses must be established to assess knowledge deficiency and to promote best practices (bin Yazid et al., 2023; Boukhris et al., 2024). Blood transfusions involve some risks that can only be minimized through compliance with individual patient care protocols by healthcare workers. Since nurses are the caregivers who are most likely to handle transfusions, they should have optimal knowledge of fundamental issues related to transfusions; these include blood group compatibility, risks and complications, consent, and storage conditions of the blood. For instance, the right designation of the blood units and the corresponding matching of the unit to the patient can help in reducing fatal errors such as that of ABO incompatibility (Azizan et al., 2024). Furthermore, some factors that a practitioner needs to have included, the blood storage conditions such as temperature conditions for red blood cells to ensure the blood transfused is viable and does not pose a risk of transmitting infections(Ahmed et al., 2023; Edea et al., 2024). Over the recent past, various occurrences of the wrong administration of blood transfusions have led to questions concerning the competency of knowledge of some workers in the health sector. In addition, patient safety is central to the nursing profession, and transfusions are among the most sensitive actions in which mistakes might be disastrous. Blood transfusion management means that risks have to be reduced and hence, it means that the nurses need to be fully informed of the different blood transfusion risks, benefits, and protocols (Azizan et al., 2024). Another recent concern is the concept of informed consent before giving a blood transfusion. For this reason, the ethical standards require that the patient is informed of the dangers of transfusing blood and then give their consent to the process (Shaikh et al., 2023). Yet, the majority of research pays attention to the fact that not all healthcare providers provide patients with all necessary educational information and receive their consent, which can result in some ethical violations and legal problems. This study seeks to assess the knowledge, and practices of nurses regarding essential aspects of blood transfusion, including blood group compatibility, transfusion protocols, storage conditions, informed consent, and monitoring of patients.

Aim of study

- This study aims to assess the knowledge and practices of staff nurses regarding blood transfusion safety at Isra University Hospital, Hyderabad**.**

Literature Review

Blood and blood components transfusion is one of the important lifesaving processes Hence the protection of this is one of the major challenges in the delivery of the healthcare system particularly to the nursing profession where the management of this process is mainly

assigned (Bazezew et al., 2023). Several studies have revealed that, although nurses as a whole have reasonably good knowledge of transfusion protocols, there are still knowledge deficits and obstacles that can threaten patient security. Research by Shah et al. (2021) within hospital settings highlighted that nurses often demonstrate good theoretical knowledge of blood transfusion safety but struggle with its practical application(Mudenda et al., 2024). The study found that while 80% of nurses were aware of the correct procedures for identifying blood group compatibility, only 60% consistently verified patient details and blood compatibility before transfusion. Kaur, et al., (2022) pointed out that nurses do not follow safety measures like identification of the patient and utilization of the correct PPE accurately and consistently. Their study stated that while nurses are fully aware of these measures, barriers to implementation include workload, lack of appropriate amount of training, and time constraints. (Iqbal et al., 2021). These findings are consistent with those of the current study whereby while 94% of the nurses reported awareness of transfusion safety measures some differences were noted in practice. The knowledge of nurses about blood transfusion-related reactions such as allergic and hemolytic was evaluated in Saudi Arabia by Alzahrani et al. (2020). The survey exposed that even though nurses had adequate knowledge concerning the signals and features of transfusion reactions, their practice involved critical omissions, especially in managing and reporting complications. Srinivasan et al. (2019) noted similar trends in India; while the perceived risks of blood transfusions were high, the practicality of mitigating the risks was uneven concerning the follow-up of the patient after a transfusion. From these studies, it can be concluded that it is necessary to establish educational courses and practical training to narrow the knowledge-practice gap (Rakhi et al., 2022). Hand washing is one of the basic principles of infection prevention control in healthcare settings; nevertheless, most of the nurses lack compliance with the basic best practices in washing as indicated by the survey when using alcohol bases hand rubs rather than soap and water. This confirmed the study findings which revealed that 68% of the nurses were not fully confident in the use of alcohol-based sanitizer when hands were not visibly dirty (Malhotra et al., 2022). Moreover, Hassan et al. (2023) examined how specific educational strategies affect blood transfusion safety measures (Jogi et al., 2021; Prasad et al., 2024). The study established that after structured educational programs, the nurses displayed positive changes in the conduct when it comes to blood transfusion procedures; the structured education to check on blood compatibility was more maker and the transfusion reaction checks were better monitored.

Material and Methods

Study Design and Setting: This was a descriptive cross-sectional study conducted from July to September at Isra University Hospital, Hyderabad. The hospital serves patients from various regions of Sindh, and data was collected from BSN staff working in different wards, including the Emergency Room (ER), Intensive Care Unit (ICU), Medicine, Surgery, and other specialized units.

Sampling Method and Sample Size:
The sampling used in the study was a non-probability convenience sampling technique. The sample size was estimated using Raosoft online software where with a 5% margin of error and 95% confidence level the actual sample size was estimated to be 50 participants.
Data Analysis: Descriptive statistics; frequencies, and percentages were employed using IBM SPSS Statistics Version 23.

Inclusion and Exclusion Criteria:

- **Inclusion Criteria:**
  - All male and female staff nurses were willing to participate and present during the data collection period.
- **Exclusion Criteria:**
  - Staff nurses who were not available during the data collection period.
  - Nurses who were not willing to participate.
  - Student nurses and midwives.

Results

Table 1: Demographic Characteristics of Participants

Variable	Category	Frequency (n)	Percent (%)
Total Participants		**50**	**100%**
Age in Years	20-25	38	76**%**
	26-30	7	14**%**
	31-35	1	2**%**
	36-40	1	2%
	Above 40	3	6 %
Gender	Male	3	6%
	Female	47	94%
Qualification	Diploma	7	14%
	Post RN BScN	4	8%
	BSN	39	78%
Years of Experience	Less than 1 year	34	68%
	1-3 years	9	18%
	4-7 years	5	10%
	More than 7 years	2	4%
Area of working	Intensive Care Unit	2	4.0%
	Gynecology	3	6.0%
	Medicine	14	28.0%
	Surgery	3	6.0%
	Emergency Room	6	12.0%
	Others	22	44.0%

The demographic characteristics of the 50 staff nurses involved in the study are summarized in Table 1. The majority of participants were young, with 76% falling within the 20-25 year age range. Most of the participants were female (94%), and 78% of the population had a BSN degree. 68% of nurses had less than a year's work experience, 18% had one to three years, and 10% had four to seven years.. Only 4% of the nurses had more than 7 years of experience. The nurses were spread across various departments, with the highest percentage working in the Medicine department (28%). Additionally, a substantial number of nurses worked in the other category (42%). Fewer nurses worked in

specialized departments such as the Intensive Care Unit (4%) and the Emergency Room (12%). Only a small proportion was employed in Gynecology (6%) and Surgery (6%).

Table 2: **Universal donor blood group**

Categories	Frequency	Percentage
O + Ve	21	42%
O – Ve	27	54%
AB + Ve	1	2%
AB – Ve	1	2%
Total	**50**	**100%**

Among the 50 participants, the majority (54%) identified O-negative as the universal blood donor type, while 42% identified O-positive as the universal donor.

Table 3: **The frequency of blood donation is:**

Categories	Frequency	Percentage
1 Month	3	6%
2 Month	6	12%
3 Month	21	42%
4 Month	20	40%
Total	**50**	**100%**

Most participants (42%) stated frequency of blood donation is 3 months, followed by 40% donating every 4 months, and 12% donating every 2 months.

Table 4: **RBCs stored Temperature?**

Categories	Frequency	Percentage
+2degrees C To 6 Degrees C	17	34%
-2degrees C To -6 Degrees C	11	22%
+7degrees C To +8 Degrees C	2	4%
+9degree C To 10 Degrees C	20	40%
Total	**50**	**100%**

Among the respondents, 40% believe RBCs are stored at +9°C to +10°C, while 34% think they are stored at +2°C to +6°C.

Table 5: Do you think informed consent should be taken before a Blood transfusion?

Categories	Frequency	Percentage
Yes	42	84%
No	1	2%
Sometimes	2	4%
Not know	5	10%
Total	**50**	**100.0**

84% of respondents believe informed consent should be obtained before a blood transfusion, 2% do not, 4% think it should be done sometimes, and 10% are unsure**.**

Table 6: **Do you think Nurse should be aware that written orders are complete including the name of the blood unit, the number of units, time, and duration of transfusion?**

Categories	Frequency	Percentage
Yes	44	88%
No	1	2%
Sometimes	3	6%
Not know	2	4%
Total	**50**	**100%**

The majority (88%) of participants agree that the assigned nurse should ensure all transfusion orders are complete.

Table 7: **Pre-Blood Transfusion Checks**

Categories	Frequency	Percentage
Right Patient, MR #, Blood Group	39	78%
Vital signs A, B	7	14%
Obtain small bore I/v access	1	2%
Not know	3	6%
Total	**50**	**100**%

78% of respondents correctly identify the need to check the patient, medical record number, and blood group before starting a transfusion.

Table 8: **Can blood be refrigerated again if the administration is delayed for 30 minutes or more after being issued from the blood bank?**

Categories	Frequency	Percentage
Yes	24	48%
No	12	24%
Sometimes	4	8%
Not know	10	20%
Total	**50**	**100**%

48% of respondents agreed that delayed blood can be refrigerated again and 24% disagreed.

Table 9: **Action for Cloudy/Foamy Blood Bags**

Categories	Frequency	Percentage
Can Start	1	2%
Return to blood bank	32	64%
Allow for complaints within four hours	11	22%
Not know	6	12%
Total	**50**	**100%**

Most respondents (64%) correctly identified that cloudy or foamy blood bags should be returned to the blood bank.

Table 10: **What are adverse reactions during Blood transfusion?**

Categories	Frequency	Percentage
Improper identification	13	26%
Human error	1	2%
ABO Incompatibility	3	6%
All of the above	33	66%
Total	**50**	**100**%

The majority **(**66%**)** of participants recognized multiple factors, including improper identification and ABO incompatibility, as potential causes of transfusion reactions.

Table 11: What are serious hazards can be transferred by Blood transfusion?

Categories	Frequency	Percentage
Dengue fever	4	8%
HIV	4	8%
Hepatitis A, B, C, E Virus	6	12%
All of the above	36	72%
Total	**50**	**100**%

The data shows that 72% of respondents are aware of all listed infections related to blood transfusion, while 8% recognize Dengue fever, another 8% recognize HIV, and 12% are aware of Hepatitis viruses.

Table 12: **Blood sample should be visually checked or inspected by a nurse before transfusing to the patient?**

Categories	Frequency	Percentage
Yes	42	84%
No	4	8%
Sometimes	3	6%
Not know	1	2%
Total	**50**	**100**%

Most respondents (84%) believe that blood samples should be visually inspected before transfusion.

Table 13: What do you do, if you double puncture the blood bag by mistake and it starts leaking?

Categories	Frequency	Percentage
Start transfusion	3	6%
Return to the blood bank	26	52%
Allow for completion within	9	18%
Not know	12	24%
Total	**50**	**100**%

52% of respondents would return a leaking blood bag to the blood bank, while 6% would proceed with the transfusion.

Table 14: Do you think blood should be transfuse fast to the patient?

Categories	Frequency	Percentage
Yes	15	30%
No	16	32%
Sometimes	5	10%
Not know	14	28%
Total	**50**	**100**%

A majority (32%) recognize that blood should not be transfused rapidly, indicating awareness of the potential risks.

Table 15: Due to late administration blood can be refrigerated again after the issue?

Categories	Frequency	Percentage
Yes	15	30%
No	16	32%
Sometimes	5	10%
Not know	14	28%
Total	**50**	**100**%

About 30% of respondents agreed that blood can be refrigerated again, while 32% disagreed.

Table 16: **How many times do you monitor the patient?**

Categories	Frequency	Percentage
Vital signs before transfusion	13	26%
Vital signs after 30 minutes	10	20%
Observe periodically	25	50%
Vital signs after the one hour	2	4%
Total	**50**	**100**%

The most common practice is periodic observation **(**50%**),** followed by checking vital signs before transfusion **(**26%**)** and after 30 minutes **(**20%**).**

Discussion

The findings provide valuable insights into healthcare staff knowledge and practices regarding blood transfusion procedures. Most respondents correctly identified O-negative as the universal blood donor type, but there was some confusion, with a significant portion selecting O-positive. This finding highlights the importance of accurate blood typing to prevent transfusion reactions, especially in emergency settings where time is critical (Cheng et al., 2024; Mohammed Idris & Taha Ali Omer, 2024). Regarding blood donation frequency, the majority of participants reported donating every three to four months, which is consistent with blood donation guidelines that recommend donation intervals of at least two months for

safe recovery of red blood cell count(Carson et al., 2023; Gelaw et al., 2023). This supports the recommendation for regular donation to ensure a sustainable blood supply and maintain donor health. However, the knowledge about RBC storage temperature was not accurate; a good number of them had the impression that RBCs were stored at warmer temperatures than the appropriate +2°C to +6°C (Carson et al., 2023; Sizemore, 2023). This shows that there is a lack of sufficient training and or protocols guiding the storage of blood in various centers may be handling blood 'products' in ways that compromise the productivity and safety of transfusion. Regarding the issue of complete transfusion orders, most of the respondents demonstrated a good understanding of the nurses' role in enhancing compliance in line with set protocols aimed at preventing transfusion errors (Boukhris et al., 2024; Iqbal et al., 2021). Further, the majority believed that ABO incompatibility and patient misidentification were the main causes of transfusion errors as supported by recent studies pointing to aforementioned aspects as primary causes of transfusion complications (Yiadom et al., 2021). Regarding transfusion-transmissible infections, most participants recognized correctly HIV, hepatitis, and dengue as the main risks related to blood transfusions. This awareness goes to reveal the practice of screening blood products for Transfusion Transmitted Infections remains an imperative tool in enhancing safety in blood transfusion globally (Begum et al., 2024). There was more variability, in the blood bag protocols, including the handling and refrigeration of the bags emphasizing that the practices could be suboptimal and might deviate from the recommended standards and need to be highlighted.

Conclusion

It was concluded that the performance of nurses in knowledge and practice of blood transfusion safety was average. A comparison of assessed competencies reveals strengths and weaknesses, where quite adequate knowledge of universal donor types and risks associated with transfusion could be noted, the lack of knowledge regarding blood storage, and ways to handle blood bags is a vital weakness. This knowledge may improve the adherence of nurses to the requirements of transfusion safety and increase their competency to a good level successfully reducing the percentage of patients' safety issues related to transfusions.

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Disclosure/Conflict of Interest
No competing interests were identified for this work. This study did not involve any funding.

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