

Research Article

Assessment of Knowledge and Practice regarding Blood Transfusion among Staff Nurses

Uzma Iqbal¹, Dilshada Wani², Suby Annu³, Sumera Hassan⁴, Kavita Bharti⁵, Rameez Nabi⁶

^{1,4,5,6}MSc Medical Surgical Nursing Student, Mader-e-Meherban Institute of Nursing Sciences and Research, SKIMS, Soura, Srinagar, Jammu and Kashmir, India.

²Principal and Head, ³Tutor, Department of Medical Surgical Nursing, Mader-e-Meherban Institute of Nursing Sciences and Research, SKIMS, Soura, Srinagar, Jammu and Kashmir, India.

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Corresponding Author:

Uzma Iqbal, Mader-e-Meherban Institute of Nursing Sciences and Research, SKIMS, Soura, Srinagar, Jammu and Kashmir, India.

E-mail Id:

uzmaiqbal008@gmail.com

Orcid Id:

<https://orcid.org/0000-0003-1945-6190>

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A B S T R A C T

Background: Blood transfusion is the transfusing of a compatible donor's whole blood or any of its components to the recipient to correct/ treat any related clinical condition. The transfusion of blood products is essential for restoring the body's oxygen transport capacity, or replenishing lost or depleted blood components in various medical conditions.

Objectives: To assess knowledge and practice score regarding blood transfusion among staff nurses and to identify the association of knowledge score and practice score with selected demographic variables.

Methodology: A descriptive research design that involved convenience sampling technique to collect data from the 60 staff nurses working at Sher-i-Kashmir Institute of Medical Sciences, Kashmir, using a "self-structured knowledge questionnaire and practice checklist".

Results: The study revealed that most of the staff nurses, i.e. 53.3%, had fair knowledge, 41.7% had poor knowledge, and only 5% of staff nurses had good knowledge regarding blood transfusion. The mean $\pm$ SD knowledge score of the staff nurses was 23.516 ± 4.59 . Most of the staff nurses, i.e. 66.7%, had satisfactory practice, and 33.3% had unsatisfactory practice. The mean $\pm$ SD practice score of staff nurses regarding blood transfusion was 49.26 ± 6.40 . A statistically significant association was found between nurses' knowledge and demographic variables viz., age, professional qualification, clinical experience, the approximate number of blood transfusions performed in past 6 months, and in-service training programme attended regarding blood transfusion, and practice with demographic variables, viz., gender and clinical experience at $p \leq 0.05$.

Conclusion: The study concluded that deficiency of knowledge among nurses regarding blood transfusion threatens patients' safety, and may also put patients in life-threatening conditions.

Keywords: Blood transfusion, Practice, Knowledge, Nurses

Introduction

Blood transfusion is a highly effective and potential life-saving manoeuvre. Blood transfusion has been recognized as one of the eighth key life-saving interventions by WHO.¹ According to the World Health Organization (2011), over nine million patients in 90 different countries receive blood in a year. Approximately 85 million units of red blood cells (RBCs) are transfused annually worldwide.² Each year in the United States, nearly 21 million blood components are transfused to approximately 4.5 million patients. In India, every year more than 40 lakh units of red blood cells, platelets, and plasma are transfused to treat clinical conditions. More than 1200 road accidents occur every day, 60 million surgeries, 240 million major operations, and 331 million cancer-related procedures like chemotherapy are performed, and 10 million pregnancy complications occurring in India, all of which require a blood transfusion.³

Nurses' role is extremely important in blood transfusion service as they are responsible for the most fundamental aspects of safe blood transfusion and patient care. Their responsibilities include understanding the indication to transfuse blood products, pre-transfusion sampling, administration of blood products, patient monitoring for adverse reactions, and proper documentation of blood transfusion-related matters. Additionally, with their knowledge, the nurse can support patient education, and ensure that the consent obtained from the patient is informed in nature. Though over the years, great advances have occurred in the fields of safety and technology in handling and administration of blood products, yet transfusion continues to be a risky procedure.⁴

Bolton-Maggs in 2013 reviewed a report of Serious Hazards of Transfusion (SHOT) and reported that there were 3,568 reports of incidents, with nine reports of ABO-incompatible red cell transfusions, four of which were classified as "never events" (that is, the reaction resulted in serious harm or death and could have been prevented).⁵ According to SHOT report 2019, "near-miss incidents" (a near-miss event is an unplanned event that did not result in injury or damage but has the potential to do so) may be detected at various points before transfusion. The most common checkpoint where errors were detected was at the bedside (52.4%). This illustrates the importance of accurately completing the bedside check and reinforces the need for nursing staff to know about ABO and D compatibility. The bedside check is vital in preventing transfusion error.⁶ Nursing staff should be vigilant in checking identification details of the component against those of the patient. Every hospital should have a policy for formally checking the identity of the patient against the blood component label at the bedside. Observations of nurses during transfusion also show wide variations.⁷

Nursing professionals are directly involved in the care of patients undergoing blood transfusions. Due to the complexity of the transfusion process, there is a need for skilled and trained nursing professionals to ensure the safety of patients during this process. Therefore, the appropriate practice of blood transfusion and identification of failures depends largely on the performance of the nursing staff. This highlights the importance of the scientific knowledge on blood transfusion and the technical skills of the nursing staff, both of which are required to prevent the occurrence of complication and to ensure patient's safety.⁴

The findings of the previous research studies are as follows.

Majeed H, Parveen K, Hussain M, Afzal M, Gilani SA⁸ revealed nurse's average and poor practices regarding blood transfusion procedures as more than half of the nurses scored less than 50%. Encan B, Akin S⁹ revealed that the nurses had a moderate level of knowledge of blood transfusion with a mean $\pm$ SD score of 23.65 ± 4.13 . Fard FZ, Maali A, Ahmadi MH, Poorkarim H, Rahmani H, Tabatabaei ZS, Azad M¹⁰ revealed that the mean $\pm$ SD knowledge score was 9.58 ± 2.13 , and the mean $\pm$ SD score of performance was 38.96 ± 2.17 . Sapkota A, Poudel S, Sedhain A, Khatiwada N¹¹ reported suboptimal blood transfusion practice, which could be attributed to a substantial knowledge gap among healthcare personnel and the absence of external and internal quality control procedures in blood transfusion practices. Elhy AH, Kasemy ZA¹² revealed that more than half (61.2%) of the nurses had poor knowledge, 38.8% had fair knowledge, and none of the subjects had good knowledge regarding blood transfusion. The study concluded that a deficiency of knowledge among nurses regarding blood transfusion threatens the patient's safety. Al-Nasr MS, Abd-El Razik BG, Mohammed MA, Al-Mezaeni MM¹³ revealed that majority, i.e. 73.9%, of the nurses had unsatisfactory practice scores, and 26.1% had satisfactory scores regarding practices of blood transfusion. The mean practice score among staff nurses regarding blood transfusion was 69.4 ± 8.0 . Petraka E, Kritsioti M, Valsami S, Leivada A, Kalantzis L, Merkouri E et al.¹⁴ revealed that only 5.6% of the nurses had good knowledge, 88% had moderate knowledge, and only 6.5% had poor knowledge. Tavares JL, Barichello E, Mattia AL, Barbosa MH⁴ revealed that there was poor knowledge with an overall average knowledge score (mean $\pm$ SD) of 52.66 ± 10.2 . Hijji BM, Oweis AE, Dabbour¹⁵ revealed that majority of the nurses lacked knowledge regarding patient preparation before blood collection, importance of proper patient identification, and how to perform blood transfusion. Dubey A, Sonker A, Chaudhary RK¹⁶ reported poor knowledge among the nurses, with a mean $\pm$ SD score of 17.34 ± 3.37 .

As per the findings of these studies, majority of the staff nurses were not having professionally sound knowledge

and adequate practice to manage the patients during a blood transfusion process. The lacuna in early assessment and management of blood transfusions among nurses most often is likely to convert the preventable and easily manageable conditions into life-threatening ones. This is further worsened by the paucity in the nursing research regarding blood transfusion, as there are no local studies available on knowledge and practice of blood transfusion among staff nurses in J&K. Hence the researchers conducted the study to assess knowledge and practice regarding blood transfusion among staff nurses working at Sher-i-Kashmir Institute of Medical Sciences, Kashmir. This study assessed the current knowledge and practice among staff nurses which will also act as a database for further researches to be conducted in the field and will help in ascertaining the need for in-service training programmes.

Material and Methods

A descriptive research design was used for the study. The study was conducted at Sher-i-Kashmir Institute of Medical Sciences, Kashmir. The sample for the study comprised of 60 staff nurses who were working in non-COVID-19 wards of Sher-i-Kashmir Institute of Medical Sciences Kashmir from 12/09/2020 to 05/10/2020. The convenience sampling technique was adopted for the study.

Inclusion Criteria

Staff nurses:

- Having a minimum of 6 months of work experience in clinical areas
- Involved in direct bedside nursing care
- Available at the time of data collection
- Willing to participate in the study

Exclusion Criteria

Staff nurses:

- Having less than 6 months of work experience
- Not involved in direct bedside nursing care (nursing administrators and ward in-charges)
- Not available at the time of data collection
- Not willing to participate
- Working in Covid-19 wards

After seeking ethical clearance from the Institutional Ethics Committee (IEC) SKIMS, permission was obtained from the principal of Madr-e-Mehrbaan Institute of Nursing Sciences and Research, SKIMS, Soura Srinagar, and medical superintendent of Sher-i-Kashmir Institute of Medical Sciences, Kashmir, to conduct the study. Permission was obtained from staff nurses by taking informed consent from them, before their inclusion as subjects in the study. Privacy, confidentiality, and anonymity were given due consideration. The data were collected by demographic data questionnaire, self-structured knowledge questionnaire, and checklist.

The demographic data questionnaire comprised of 6 demographic variables (age, gender, clinical experience, professional qualification, the approximate number of blood transfusions performed in the past 6 months, and in-service programme attended regarding blood transfusion). The 45 items multiple choice questionnaire and 59 items true-or-false questions type practice checklist had been developed by the researchers and then revised by 10 research experts and clinicians specialized in the concerned field, and based on their expert opinions, corrections were done to modify the tool. For both, questionnaire and practice checklist, each correctly answered item scored 1 point and each incorrect answer scored 0 points.

Reliability

Tool was tested for reliability; Karl Pearson's correlation reliability coefficient was calculated from scores obtained in test-retest of tool separately for knowledge and practice which was found out to be " r " = 0.82 for "self-structured knowledge questionnaire" and " r " = 0.86 for "practice checklist".

Scoring Key

Based on the criterion developed by Elhy AH, Kasmey ZA¹² in their study, the knowledge score was categorised into various levels i.e., poor - < 50%, fair - 50% to 75%, and good - > 75%. Based on the criterion developed by Al-Nasr MS, Abd-El Razik BG, Mohammed MA, Al-Mezaieen MM¹³ in their study, the practice score was categorised into various levels, i.e., unsatisfactory - < 80% and practice satisfactory - $\geq$ 80%.

Result

The data analysis was done using the Statistical Package for the Social Sciences (SPSS), version 25, and Microsoft excel. Data analysis included descriptive statistics and inferential statistics, such as Chi-Squared (χ^2) was used to find an association between knowledge and practice and selected demographic variables at a 5% significance level.

Most of the staff nurses were in the age group of 20-30 years, females, nursing graduates had a clinical experience of 2-3 years, performed blood transfusion 1-4 times or >12 times, and had not received any in-service training.

Knowledge Score of Staff Nurses regarding Blood Transfusion

The study revealed that most of the staff nurses, i.e. 53.3%, had fair knowledge, 41.7% had poor knowledge, and only 5% of staff nurses had good knowledge regarding blood transfusion. The mean $\pm$ SD knowledge score of the staff nurses was 23.516 ± 4.59 .

Association of Knowledge Score of Staff Nurses regarding Blood Transfusion and Demographic Variables

There was a significant association between the knowledge

score and demographic variables [age ($p = 0.050$), professional qualification ($p = 0.006$), clinical experience ($p = 0.037$), the approximate number of blood transfusions performed in the past 6 months ($p = 0.048$), and in-service training programme attended regarding blood transfusion ($p = 0.009$)], while no significant association was found with gender ($p = 0.349$) (Table 1).

Practice Score Staff Nurses regarding Blood Transfusion

Most of the staff nurses, i.e. 66.7%, had satisfactory practice, and 33.3% had unsatisfactory practice. The mean $\pm$ SD practice score of staff nurses regarding blood transfusion was 49.26 ± 6.40 .

Association of Practice Score of Staff Nurses regarding Blood Transfusion and Demographic Variables

There was a significant association between practice score of blood transfusion and demographic variables [gender

($p = 0.021$), and clinical experience ($p = 0.006$)], while no association was found between the practice score and other demographic variables viz., age ($p = 0.098$), professional qualification ($p = 0.425$), the approximate number of blood transfusions performed in the past 6 months ($p = 0.147$), and in-service programme attended regarding blood transfusion ($p = 0.309$) (Table 2).

Discussion

Nurses play an integral role in blood transfusion, and hence nurses must have adequate knowledge of all processes of transfusion to maintain patients' safety.

The current study revealed that majority (53.3%) of staff nurses had a fair knowledge of blood transfusion, only a few (5%) had good knowledge, and approximately half had poor knowledge of the same. Similarly, previous studies have revealed that nurses' overall blood transfusion knowledge scores have been poor to moderate in general. Results consistent with the present study are as follows:

Table 1. Association of Knowledge Score of Staff Nurses regarding Blood Transfusion with Demographic Variables

(n = 60)

Demographic Variables		Level of Knowledge as per Score			Chi-square	p-value	df	Result
		Poor	Fair	Good				
Age in years	21-30	17	18	1	9.47	0.050*	4	S*
	31-40	5	14	1				
	41-50	3	0	1				
Gender	Male	2	6	1	2.10	0.349	2	NS
	Female	23	26	2				
Professional qualification	GNM	4	0	0	14.30	0.006*	4	S*
	BSc Nursing	19	18	1				
	MSc Nursing	2	14	2				
Clinical experience	6 months- 1 year	4	1	0	13.43	0.037*	6	S*
	2-3 years	14	7	1				
	4-5 years	3	13	1				
	> 5 years	4	11	1				
The approximate number of blood transfusions performed in the past 6 months	Not at all	6	1	0	15.60	0.048*	8	S*
	1-4 times	9	5	1				
	5-8 times	3	9	0				
	9-12 times	4	7	0				
	> 12 times	3	10	2				
In-service programme attended regarding blood transfusion	No	24	32	2	9.51	0.009*	2	S*
	Yes	1	0	1				

S*- Significant, NS -Not significant.

Table 2. Association of Practice Score of Staff Nurses regarding Blood Transfusion with Demographic Variables

(n = 60)

Demographic Variables		Levels of Practice as per Score		Chi-square	p-value	df	Result
		Un satisfactory	Satisfactory				
Age (years)	21-30	15	21	4.65	0.098	2	NS
	31-40	3	17				
	41-50	2	2				
Gender	Male	0	9	5.29	0.021*	1	S*
	Female	20	31				
Professional qualification	GNM	2	2	1.71	0.425	2	NS
	BSc Nursing	14	24				
	MSc Nursing	4	14				
Clinical experience	6 months to 1 year	1	4	12.43	0.006*	3	S*
	2-3 years	4	18				
	4-5 years	4	13				
	> 5 years	11	5				
The approximate number of blood transfusions performed in the past 6 months	Not at all	1	6	6.80	0.147	4	NS
	1-4 times	4	11				
	5-8 times	3	9				
	9-12 times	3	8				
	> 12 times	9	6				
In-service programme attended regarding blood transfusion	No	20	38	1.03	0.309	1	NS
	Yes	0	2				

S*- Significant, NS -Not significant.

Majeed H, Parveen K, Hussain M, Afzal M, Gilani SA⁸ found nurses' practices regarding blood transfusion procedures to be average and poor. Encan B, Akin S⁹ found that overall the nurses had a moderate level of knowledge. Tavares JL, Barichello E, Mattia AL, Barbosa MH⁴ found nurses' knowledge regarding all steps of blood transfusion to be insufficient. In addition, Diakité, Diawara, Tchogang,¹⁷ found that about half of the participants had insufficient knowledge related to blood transfusion. This result was also consistent with Kabinda J, Miyanga S, Donnen P, Ende V Dramaix M¹⁸ who cited that the lack of continuous and regular training in blood transfusion had resulted in insufficient knowledge among nursing staff about safe transfusion practices. Ehly AH, Kasemy ZA¹² found that more than half of the nurses had poor knowledge regarding blood transfusion. Petraka E, Kritsioti M, Valsami S, Leivada A, Kalantzis L, Merkouri E et al.¹⁴ found that the majority of staff nurses had moderate knowledge. In agreement, researchers explained that inadequate educational programmes provided to the nurses to refresh their knowledge had led to these findings.

The findings of the present study had revealed that there was a statistically significant relationship between nurses' knowledge and selected demographic variables (age, professional qualification, clinical experience, approximate number of blood transfusions performed in the past 6 months, and in-service training programme attended regarding blood transfusion), while no significant association was found with the other demographic variable (gender at $p \leq 0.05$). In agreement with the present study, Elhy AH, Kasemy ZA¹² found that there were statistically significant relationships between nurses' knowledge and their demographic variables (age, gender, level of education, experience, number of performing blood transfusion, and in-service programme regarding blood transfusion). Al-Nasr MS, Abd-El Razik BG, Mohammed MA, Al-Mezaen MM¹³ found that there was a significant association between nurses' knowledge regarding blood transfusion with education level, while no significant association was found between nurses' knowledge regarding blood transfusion with their demographic variables (gender and age) at $p < 0.05$. Nunes da Silva KF, Duarte RF, Floriano DR, Andrade

LF, Tavares JL, Felix MM et al.¹⁹ revealed a significant association between nurses' knowledge regarding blood transfusion with demographic variables (in-service training received, post-graduation status, and the number of blood transfusions performed per month), while no significant association was found between nurses' knowledge regarding blood transfusion with their gender. Encan B, Akin S⁹ revealed that there was a significant association between nurses' knowledge regarding blood transfusion with their age, while no significant association was found between nurses' knowledge regarding blood transfusion with other demographic variables (gender, in-service training received, educational status, and blood transfusion performed per week) at $p < 0.05$. Lim SL, Abdul Rahim NA, Tuan Din SA²⁰ found a significant association between nurses' knowledge and demographic factors such as age, and years of service, while no significant association was found between nurses' knowledge and socio-professional variables (gender, education level, frequency of blood transfusions performed) at $p < 0.05$.

This implies that nurses' knowledge is influenced by their age, clinical experience, frequency of blood transfusions performed, professional qualification, and in-service training attended regarding blood transfusion, and does not depend on gender.

The findings of the present study revealed that 2/3rd (66.7%) of the staff nurses had satisfactory practice, while 1/3rd (33.3%) had unsatisfactory practice. The mean practice score among staff nurses regarding blood transfusion is 49.26 ± 6.40 . Contrary to the current study, Al-Nasr MS, Abd-El Razik BG, Mohammed MA, Al-Mezaeni MM¹³ revealed that the majority, i.e. 73.9%, of the nurses had unsatisfactory practice scores, and 26.1% had satisfactory scores regarding practices of blood transfusion.

The practice results of the present study are inconsistent with the findings of other studies as self-reported practice was used instead of observation by the investigator. Hence the researcher concluded that the actual practice score may be less than that reported by the study.

The findings of the present study revealed a significant association between the practice score of staff nurses with gender and clinical experience, whereas no significant association was found between the practice score and demographic variables (age, professional qualification, the approximate number of blood transfusions performed in the past 6 months, and in-service training programme attended regarding blood transfusion) at $p \leq 0.05$. These results are inconsistent with the study conducted by Al-Nasr MS, Abd-El Razik BG, Mohammed MA, Al-Mezaeni MM¹³ in 2017, which reported that there was a significant association between nurses' practice scores regarding blood transfusion with their education level, while no significant association

was reported between practice scores regarding blood transfusion, with other demographic variables (gender and age) ($p < 0.05$).

Conclusion

The study concluded that almost half of the staff nurses had fair knowledge, and only a few had good knowledge regarding blood transfusion. In practice, two-third of the staff nurses had satisfactory practice, and only one-third had unsatisfactory practice. These results highlight the possible unsafe blood transfusion practices in clinical settings. Urgent action from managerial authorities is required in this regard which includes providing training courses to disseminate relevant knowledge by formulating standard operation protocols regarding blood transfusion. Continuous assessment of knowledge and competencies of nurses as well as regular audits need to be conducted to ensure proper blood administration practice.

Limitations

- A small sample size limits the generalization of research findings.
- A large sample could not be included due to the time restraints of the researcher.
- The blood transfusion practices being followed were assessed by self-reported responses of staff nurses rather than actual observation.
- Reduced access to general wards because of COVID-19.

Recommendation

Educational and training programmes are essential for all staff to improve nurses' knowledge and practice regarding blood transfusion.

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Conflict of Interest: None

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