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## UTILIZATION OF INTEGRATED BLOOD TRANSFUSION GUIDELINES BY NURSES IN A COUNTY REFERRAL HOSPITAL IN KENYA

Kimani Salome Wanini<sup>1\*</sup>, Mwenda Catherine, Syombua<sup>1</sup> & Fatuma Affey<sup>2</sup>

1. School of Nursing, Mount Kenya University- Thika
2. Department of Nursing, Umma University, Nairobi

\*Corresponding author: [kimwani2004@yahoo.com](mailto:kimwani2004@yahoo.com)

### ABSTRACT

**Background:** Blood transfusion guidelines and policies help to improve the organization of blood transfusion process in hospitals and also act as a guide to the staff. Nurses should have sufficient knowledge of situations, amount, and methods of using blood components and possible side effects to improve patient's outcome. The study evaluated the utilization of integrated blood transfusion guidelines by nurses at Murang'a County Referral Hospital.

**Methodology:** A descriptive cross-sectional study where a self-administered questionnaire and an observation checklist were used to collect data. The study population was the qualified nurses working in Murang'a County Referral Hospital. All the 160 nurses working in the hospital were eligible to participate in the study and they were identified through stratified sampling and systematic random sampling methods whereby a target sample of 110 was identified.

**Results:** Nurses' knowledge (p-value 0.039) use of guidelines (p-value 0.044) and attitude towards blood transfusion guidelines (p-value 0.040) had significant influence on utilization of integrated blood transfusion guidelines

**Conclusion:** High levels of knowledge on blood transfusion positively influenced the right practice during transfusion. A positive attitude towards blood transfusion guidelines was evident as participants were willing to use.

**Recommendation:** We recommend strategies to improve utilization of integrated blood transfusion guidelines which includes training related to blood transfusion, availability of blood transfusion guidelines in the departments and infrastructures to help maintain quality.

**Keywords:** Knowledge, attitude, transfusion, nurse, guidelines

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## Introduction

Blood transfusion is a safe, common procedure in which blood is given to a person through an intravenous (IV) line in one or more of the blood vessels., (National Heart and Lung Blood Institution, 2012). A blood transfusion boosts blood levels that are low, either because the body is not making enough or because blood has been lost during surgery, injury or disease (NHLBI, 2012). If blood is transfused correctly, it can save lives and improve treatment outcomes. According to Ndugulile (2010), improper handling of blood and blood products may cause acute or delayed complications.

The World Health Organization (WHO) has been at the forefront in the movement to improve global blood safety since 1975 as reported in the (Blood Transfusion Services, 2014).The main objective of the WHO program on blood transfusion safety has been to ensure provision of universal access to safe, quality and efficacious blood and blood products for transfusion, their safe and appropriate use and also ensuring blood donors and patients' safety (Oduor, 2009)

Blood transfusion guidelines are aimed at providing guidance on the appropriate storage and collection of blood products as well as safe administration and management of transfused patients (Australia New Zealand Standard Blood Transfusion, 2011). Guidelines must indicate a practice which is considered mandatory based on expert opinion following review of available evidence and should also indicate practice which is recommended and where

compliance would be expected for good clinical practice (ANZSBT, 2011).

MOH (2004) highlights nurses' roles in blood transfusion as: taking blood sample for compatibility testing, arranging for or collecting blood and blood components prior to transfusion, carrying out the procedures of pre-transfusion checks and the administration of blood and blood components, monitoring patients during transfusion and carrying out appropriate actions in the event of adverse reactions, maintaining adequate documentation, Reporting transfusion reactions or other incidents related to the transfusion and attending CMEs for updates.

Nurses have a responsibility to provide the highest standard of care and all patients have the right to expect this (NMC, 2004). They are integral to the transfusion process and they are often involved in pre-transfusion sampling, provision of patient information, requesting blood from the laboratory, collecting blood, administration of the transfusion and monitoring patient's response, during and after the transfusion event (NMC, 2004).

According to American Society of Registered Nurses (2008), a study examining nurses' role in preventing blood transfusion errors, recommendations were made that there was an urgent need for training programs in nursing units that educate nurses on blood transfusion risk reduction, latest safety guidelines, nurse's interventions and decision making. Taylor et al., 2010, assert that nurses' lack of knowledge on blood transfusion guidelines continues to be a real threat to patient's safety.

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## Methodology

The study was conducted at Murang'a County Referral Hospital in Murang'a County. It is about 85 kilometers from Nairobi and in Central Kenya. The hospital has a catchment area of over 1 million people. It serves the neighboring sub-counties of Kangema, Mathioya, and Maragua, Kigumo and Kandara and also neighboring counties like Kirinyaga, Nyeri and Kiambu. The hospital has a bed capacity of 250 beds.

A descriptive cross sectional study design was adopted. The study population included all qualified nurses working in all departments that carried out blood transfusion. A total of 110 nurses were sampled to participate in the research through proportionate and systematic random sampling both the surgical and orthopedic wards.

Data was collected by use of self-administered questionnaires and an observational checklist. The questionnaires were delivered by the researchers to the individual nurses of each ward and purposively walked in the departments undertaking blood transfusion. Quantitative data was organized, coded and standardized then analyzed using Statistical Package for Social Science Program (SPSS) version 20. Both descriptive and inferential statistics were used in analyzing data. Regression analysis was used to calculate the

frequencies, percentages, means and standard deviations.

The researcher sought clearance from Mount Kenya University Research and Ethics committee and also by the National Council of Science Technology and Innovation. Further authorization from Murang'a County Referral Hospital Management team was sought. The respondents were given all the relevant details of the study and requested to consent. The researcher assured the respondents of confidentiality and anonymity throughout out the study period. They were requested to append their signature on the consent form after they agreed to participate in the study and encouraged to read through the questionnaire that had highlighted on those ethical issues. The information collected was kept confidential.

## Results

The study targeted 110 participants but managed to obtain responses from 95 (86.3%). Majority of the participants 63 (66.3%) were aged below 49 years while 63 (66.3%) had more than 15 years. 72 (75.8%) were of female gender as shown in table 1 below.

**Table 1: Demographic characteristics**

Characteristics	Frequency (n)	(%)
<b>Age group</b>		
< 30 years	8	8.4
30-34	12	12.6
35-39	13	13.7
40-44	15	15.8
45-49	15	15.8
50+ years	32	33.7
<b>Gender</b>		
Male	23	24.2
Female	72	75.8
<b>Duration in service</b>		
< 5 years	8	8.4
5-9 years	12	12.6
10-14 years	12	12.6
15+ years	63	66.3

**Table 2: Qualification and duration of deployment**

	Frequency(n)	(%)
<b>Nursing qualification</b>		
EN/M	5	5.3
ECNHN	13	13.7
EN	3	3.2
KRN	3	3.2
KRN/M	8	8.4
KRN/M/PH	2	2.1
KRCHN	52	54.7
BSCN	9	9.5
<b>Whether Ever upgraded</b>		
Yes	54	56.8
No	31	32.6
Continuing	10	10.5
<b>Duration in current department</b>		
< 5 years	75	78.9
5-9 years	12	12.6
10-14 years	4	4.2
15+ years	4	4.2

On Qualifications, duration of deployment and professional upgrading (Table 2) majority of the participants 52 (54.7%) had diploma, 34 (35.8%) were certificate holders and only 9 (9.5%) had degree. Majority 75 (78.9%) of the participants had worked in their current departments for less than 5 years while only 4 (4.2%) had been in one department for over 15 years. On the use and availability of blood transfusion guidelines (Table 3 below) majority of the participants (64.2%) were of the opinion that blood transfusion guidelines are available.

**Table 3: Availability of transfusion guidelines**

	Frequency	%	Valid %	Cumulative %
Available	61	64.2	64.2	64.2
Never available	31	32.6	32.6	96.8
don't know	3	3.2	3.2	100.0
<b>Total</b>	<b>95</b>	<b>100.0</b>		

Some (32.6%) reported that the guidelines are never available and a small proportion (3.2%) did not know whether blood transfusion guidelines were available in hospitals or not.

On source of guidance when carrying out blood transfusion it was evident that the most common source of guidance came from the physicians (Mean=0.49) followed closely by the guidelines (Mean=0.48). It came out strongly that nurses hardly relied on the internet as a source of guidance since it had a mean of 0.00. Consulting colleagues also was relatively low (Mean=0.12) as well

as relying on one's experience. Participants' response on the frequency of blood transfusions in six months ranged from 1-4 times (41.7%), 5-8 times (24.0%), 9-12 times per month (18.85) and more than 12 times (15.6%).8% and 15.6% respectively.

Participants use of blood transfusion guidelines showed 55 (57.3%) used blood transfusion guidelines at times while 25(26.0%) used guidelines all the time and 15 (16.7%) never used them at all.

**Table 4: Documentation and practices during blood transfusion**

<b>Documentation/practices</b>	<b>Present</b>		<b>Absent</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Blood transfusion request form	95	100		
Patients 3 names			95	100
Inpatient number	56	58.9	39	41.1
Reasons for transfusion	95	100		
Department/ward	95	100		
Date	95	100		
History of previous blood transfusion			95	100
History of adverse reaction			95	100
Blood transfusion observation chart	95	100		
Pre-transfusion observation	48	50.5	47	49.5
Observation at 15 minutes after initiation of transfusion	88	92.6	7	7.4
Record of observation during the entire period of transfusion	22	23.2	73	76.8
Time blood transfusion started	83	87.4	12	12.6
Time blood transfusion ended	37	38.9	58	61.1
Cold chain is maintained from laboratory to patient bedside 2-6°C			95	100
Patient is correctly identified, names, IP number at bedside	51	53.7	44	46.3
Nurse confirms expiry date, batch no, blood group, screening, compatibility at bedside	58	61.1	37	38.9
Aseptic technique is maintained throughout the transfusion process	14	14.7	81	85.3
Nurse confirms clinician's instructions and follows them	43	45.3	52	54.7
Nurse correctly instructs the patient on what to report on in case of a blood reaction			95	100
Nurse slowly starts the transfusion checking on any reaction in the first 5 minutes then regulates accordingly	33	34.7	62	65.3

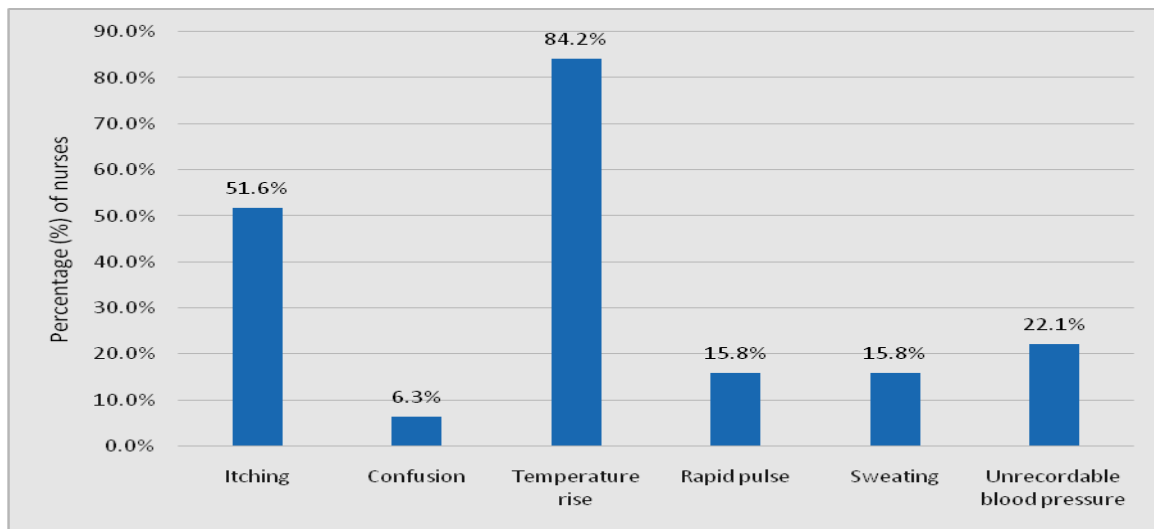
As shown in table 4, practices like provision of blood request forms, reasons for transfusion and availability of observation chart was at a 100% in all the files, patients' three names, history of previous blood transfusion history of any adverse reactions, maintenance of cold chain and correct patient instructions was missing during the transfusion exercise.

While assessing participants knowledge on blood products and handling blood samples, it was evident that only a small number of 23 (24.2%) were aware of the type of blood sample to be sent to laboratory for cross-matching and only 2 (2.1%) of the

participants were aware that blood should be transfused immediately once collected from laboratory. Majority 71 (74.7%) were aware of the common blood products while none 0 (100%) did know of cryoprecipitate as a blood product.

***Knowledge on signs of blood transfusion reaction***

Majority 80 (84.2%) of the participants mentioned temperature rise as one of the most common sign of transfusion reaction, while a small proportion 4 (6.3%) mentioned confusion as a sign transfusion reaction.



***Figure 1: Knowledge on signs of blood transfusion reaction***

Participants descriptive knowledge on blood transfusion guidelines (Fig.1) revealed high knowledge levels on the blood transfusion guidelines with majority 92 (96.8%) being aware that patients should be educated on transfusion reaction before blood transfusion. Majority 82 (86.3%) listed 3 areas of verification by nurses before

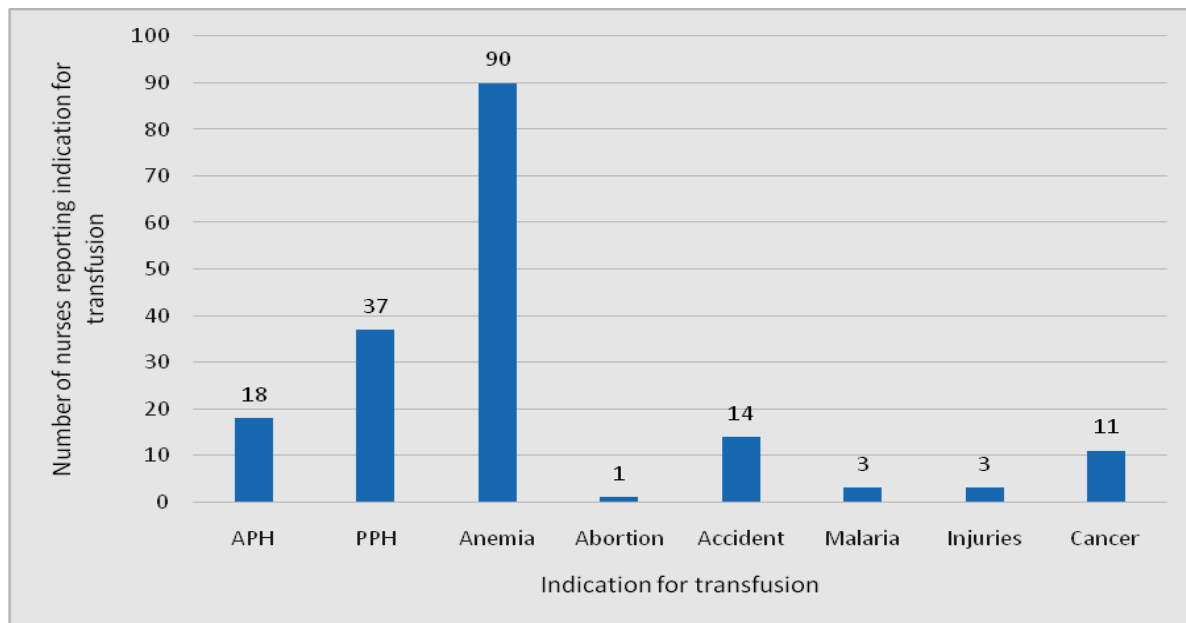
transfusion while 79 (83.3%) were aware that blood should be started slowly then gradually increased after 15 minutes. An area of concern was recommendation on stopping of transfusion with majority 83 (87.4%) not being aware of the recommendation.

**Table 5: Awareness on blood transfusion guidelines**

Transfusion guideline	Nurses aware of recommendation		Nurses unaware of recommendation	
	n	%	n	%
Transfusion should be stopped at 1°C temperature rise	12	12.6	83	87.4
Severity of transfusion reaction is often related to amount of blood transfused	28	29.5	67	70.5
Listed at least three things that a nurse must verify before transfusion (patient name, batch number, compatibility, expiry date, screening)	82	86.3	13	13.7
RBC is usually started at a slower rate and increased after 15 minutes if tolerated	79	83.2	16	16.8
Patient health education should include signs and symptoms of transfusion reactions	92	96.8	3	3.2
Maximum duration over which blood can be transfused is 2-4 hours	35	36.8	60	63.2
Each unit of RBC transfused raises hemoglobin by 1g/dl in a non-bleeding adult	48	50.5	47	49.5

Assessment of participant's knowledge on blood transfusion errors and indications for blood transfusion (Fig 2) showed that majority of the 75 (83.3%) showed high knowledge on transfusion errors related to clerical errors and poor patient

identification. 8 (8.95%) were not sure of the risks of prolonged blood storage and 54 (56.8%) of the participants were aware of the risks of prolonged blood storage that can lead to adverse reactions while 90 (94.7%) of them identified anaemia as the leading indication for blood transfusion.



**Figure 2: Indications of blood transfusion**

**Table 6: Attitude towards blood transfusion guidelines**

Item	Mean	Standard deviation
Availability of blood transfusion guidelines encourages use	3.73	0.881
Frequent updates on blood transfusion guidelines helps improve one's performance	3.97	0.736
Remaining in one department affects one's performance	2.68	0.878
Hospital administration is supportive	2.80	0.941
Frequent updates on blood transfusion guidelines helps improve one's attitude	3.41	0.995
Blood transfusion guidelines helps to improve on the standard of care	3.47	0.977
<b>Overall</b>	<b>3.33</b>	

While assessing participants attitude towards blood transfusion guidelines (Table 6) a likert- scale with items ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was used. Means of between 2.68 - 3.97 and standard deviations of between 0.736- 0.977 were also registered. It was clear from the

study findings that frequent updates on blood transfusion guidelines improves ones performance (Mean 3.97) as well as Availability of blood transfusion guidelines encourages use (Mean 3.73). However, participants disagreed with the aspect that hospital administration had been supportive



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on blood transfusion practice (Mean 2.80). Similarly, participants were of the view that remaining in one department for long did not affect one's performance in blood transfusion (Mean 2.68)

The findings (Table 6) show that availability of blood transfusion guidelines and frequent updates had significance influence on utilization of blood transfusion guidelines while remaining in one department did not seem to affect the practice of blood transfusion. It is also evident from the table that hospital administration support was not adequately felt as far as blood transfusion performance was concerned.

## Discussion

The study findings revealed that there was a positive relationship ( $r= 0.764$ ) between the variables under study which were demographic factors, knowledge and attitude towards the use of blood transfusion guidelines.

The study found that 33.7% of the participants were over 50 years of age and this relates with study findings in (Yosef et al., 2010) which showed that the Nurses interviewed were between 34-56 years which amounted to 31.4%. Regarding duration of employment 66% of the participants had 15 years work experience and this is contrary to (Yosef et al., 2010) study whose participants had 27.6% with 11-28 years' experience. This displays a work force with elderly personnel and who have many years of experience. The outcome does not however correspond with the 49.5% of the nurses who have to rely on

physicians for guidance during blood transfusion in comparison with 16.8% of the nurses who reported to rely on their work experience during blood transfusion.

The findings contradict the results of (Hijji et al., 2012) whose study on measuring Nurses' knowledge on blood transfusion reveals a much younger work force of 79% of the nurses aged between 21-30 years, and 68% having 5 years or less work experience. Practice was assessed through the observation check list which showed that about 92.6% of the patients were observed within the first 15 minutes of initiating transfusion and only 53.7% of the transfused patients were correctly identified as per the guidelines.

This finding correlates with study findings of (Aslani et al., 2010) which reported that only 30% of the interviewed nurses thought that proper patient identification was necessary before blood transfusion. The checklist further reveals that none of the transfused patient had three names for identification and only 58% of the transfused patients had their Inpatient numbers. Majority of the participants 57.3% reported that they did not use blood transfusion guidelines while only 16.7% used the guidelines during blood transfusion. Majority of the participants with a mean of 0.49 relied on physicians for guidance on blood transfusion. It is worth noting that cold chain was not maintained from laboratory and this constituted 100% of all transfused patients as it was displayed from the checklist.

The study revealed that 75.8% of the participants showed overall satisfactory knowledge level. 90% of the participants

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indicated anaemia as one of the indication of blood transfusion, 86.3% reported correctly three important areas of verification before blood transfusion. A study in Turkey evaluating Nurses Knowledge and performance in blood transfusion showed that most nurses had a score of 50 out of 100 which was an average score (Yosef et al., 2010). A study in France on nurse's knowledge and performance of blood transfusion reported weak level of knowledge of 54%.

These finding are supported by a study on measuring nurse's knowledge level reported by (Hajji et al., 2012) which shows 62% of nurses having a score of 50 and above. However lack of training on blood transfusion courses that was reported by 73.3% of the participants can be detrimental to the outcome of the patients during blood transfusion as this can lead to increased transfusion errors. This is further supported by findings reported by (Hijji et al., 2012) in his study whereby 92.4% reported having never received any in-service training on blood transfusion and therefore urges that this knowledge deficit have the potential to threaten patient safety and reduce the effectiveness of transfusion.

The study reviewed that 87.4% participants were of the opinion that guidelines were appropriate and effective if available and 61.1% strongly believed that training on blood transfusion guidelines would help improve their practice. 52% of the nurses were of the opinion that remaining in the same department did not affect their outcome. This however contradicts the study findings reported by (Mark, 2013) on evaluation of nurses perception on transfusion training which showed that

majority thought that the trainings had no benefit in their practice. 77% of the participants thought the administration's support was lacking in blood transfusion since they had not provided guidelines nor provided training on blood transfusion exercise. (Yosef et al., 2010) study on evaluation of Nurses Knowledge on blood transfusion recommends that blood transfusion committees in the hospitals be activated so as to increase quality of common procedures and control reports of blood transfusion. This will help prevent possible complications and develop and execute in service training programs for personnel emphasizing weak points to increase their information and knowledge and continuously supervise this task.

### **Conclusion and Recommendations**

The study revealed that Socio-demographic characteristics: Age, duration in services, training on transfusion and frequency of transfusion in the units, showed significant association on the level of knowledge on blood transfusion guidelines. There was however no noted improvement or change in practice on the nurses who had upgraded, this can be improved if a component of blood transfusion is included on the nursing curriculum which tends to lack it.

Regarding the use of blood transfusion guidelines, knowledge of blood transfusion and frequency of transfusion had strong positive association on the practice of nurses during blood transfusion. However it was worth noting that cold chain was not maintained from Laboratory to the recipient. This calls for supply of cold boxes and fridges in the department where

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blood can be stored before administration. Majority of the nurses were not using blood transfusion guidelines and a study to establish why they were not using the guidelines can be carried out.

Knowledge on blood transfusion: high levels of knowledge on blood transfusion positively influenced the right practice during transfusion. However it should be noted that none of the nurses was aware of cryocipitate as a component of blood transfusion. This should call for intensifying trainings within the hospital (CMEs) which should be Multidisciplinary

A positive attitude towards blood transfusion guidelines was evident as participants were willing to use them but the hospital administration support was not adequately felt as it was expressed by majority of the participants.

Utilization of blood transfusion guidelines can be improved through planning of regular short courses on blood transfusion guidelines, regular updates through CMEs, intensified supervision and on job training need to be over emphasized in order to improve patient outcome during blood transfusion procedures.

Regular transfusion audits to assess competence, utilization of blood transfusion guidelines and to identify any gaps in the practice need to be planned for. This can be achieved through formation of active hemovigilance committee in the hospital.

Equipment's and facilities to improve blood storage and maintenance of cold chain need to be adequate. Also blood transfusion guidelines which are easy to follow and

easily accessible should be made available in the departments.

Quality services through appropriate patient monitoring during blood transfusion and reporting of adverse transfusion reactions should be ensured through employment of adequate nurses.

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