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Research Article

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Efficiency of Blood Utilization in Elective Surgical Patients at Different Hospitals of Addis Ababa. A Multi-Center Cross-Sectional Study

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Abstract

Background

Blood transfusion is vital for managing patients with significant blood loss perioperatively. However, overordering of blood is prevalent, resulting in increased costs and resource wastage. Implementing various transfusion indices can help reduce unnecessary blood requests for elective surgical patients without compromising patient care.

Objective

To assess the efficiency of blood utilization in elective surgeries and associated factors in Addis Ababa from November 1, 2023, to April 30, 2024.

Methods

A multi-center cross-sectional analytical study was conducted over a period of six months from November 1, 2023, to April 30, 2024, at Tikur Anbessa Specialized Hospital (TASH), Menelik II Hospital (MH), Gandhi Memorial Hospital (GMH), and Lancet General Hospital (LGH). Hospitals were selected using simple random sampling. Using sequential sampling and a structured checklist, data were collected from all elective surgical patients during this period. Blood utilization was assessed using various parameters including cross-match to transfusion ratio (C/T), transfusion probability (%T), transfusion index (TI), and Maximum Surgical Blood Ordering Schedule (MSBOS) based on Mead's criterion for common surgical procedures.

Results

During the six-month study period, 574 elective surgeries were performed across various departments in multiple hospitals, with blood requisitions made for 469 cases (81.7%). The highest requisitions came from the Gynecology/Obstetrics department (36.2%), followed by General Surgery (13.9%), and Cardiothoracic surgery (12.6%). A total of 927 blood units were requested, and 824 units were prepared, with residents requesting 53.1% of the blood. Of the prepared units, 182 were utilized for 126 patients, resulting in a cross-match to transfusion ratio (C/T) of 4.53, transfusion probability (%T) of 26.9%, transfusion index (TI) of 0.39, and Maximal Surgical Blood Order Schedule (MSBOS) of 0.59. Tikur Anbessa Specialized Hospital (TASH) demonstrated relatively efficient blood utilization with a C/T ratio of 3.98, %T of 29.9%, and TI of 0.51, while Gandhi Memorial Hospital (GMH) had the highest %T at 32.6%. In contrast, Menelik II Hospital (MH) and Lancet General Hospital (LGH) exhibited lower efficiency. Neurosurgery had the highest transfusion probability at 65.3%, driven by significant intraoperative blood loss, resulting in a C/T ratio of 2.17 and TI of 1.26. Cardiothoracic surgery also showed efficient utilization with a %T of 34%, C/T ratio of 3.85, and TI of 0.56. Other departments, such as Pediatrics and Orthopedics, showed trends of over-ordering with less efficient utilization.

Conclusion and Recommendations

In this study, we observed that there is a concerning disparity between the quantity of blood requested and cross-matched for elective surgery patients and the actual amount utilized. This excessive crossmatching results in resource wastage, heightened workload, and increased financial burden. Moreover, it poses potential challenges to the blood supply, prompting a need

to revise our blood requisition protocols. To optimize blood utilization, we recommend revising the current blood ordering pattern and minimizing over-ordering. This can be achieved by implementing an updated Maximum Surgical Blood Order Schedule (MSBOS) tailored to our institution, alongside an emergency blood-releasing system. Utilizing parameters such as the Crossmatch-to-transfusion (C/T) ratio and Transfusion Index (TI) can guide the development of the MSBOS, with consideration for a Group Save and Hold (GSH) for procedures with low TI values. Regular surveillance of utilization patterns and feedback mechanisms are essential for continuous improvement in transfusion practices

Keywords: Efficiency of Blood Utilization, Elective Surgeries, Blood Transfusion, Blood Ordering, Intraoperative Blood Usage

1. Introduction

Efficient blood transfusion practices are vital to preserve this essential resource and minimize risks Associated with unnecessary transfusions. Transfusions should be based on a comprehensive clinical evaluation rather than solely on laboratory metrics. In elective surgeries, optimal blood management involves correcting preoperative anemia, using intraoperative blood salvage, and precise surgical techniques. Adhering to evidence-based guidelines and educating healthcare professionals can improve patient outcomes and conserve blood resources [1–14]. Globally, a significant disparity exists in safe blood availability, with 80% of the population relying on 20% of properly screened blood. In elective surgeries, subjective blood loss estimates and physician assumptions lead to overordering, resource wastage, and increased healthcare costs. Establishing evidence-based blood ordering protocols and continuous education for healthcare professionals can improve blood utilization and reduce expenses. [15-17]. Economic impacts of blood transfusions include both direct costs (blood products, supplies, labor, testing) and indirect costs (hospitalization, ICU services). Only 30% of cross-matched blood is used in elective surgeries, highlighting the need for better utilization practices. Adopting evidence-based transfusion guidelines can minimize unnecessary transfusions, enhance patient care, and optimize resource allocation [18–20]. Unnecessary transfusions increase costs and risks, including adverse events like transfusion-associated lung injury and infections. Historical methods, such as the cross match to transfusion (C/T) ratio, transfusion probability (TP), and Maximum Surgical Blood Ordering Schedule (MSBOS), have aimed to improve blood utilization. A recent study at a tertiary care hospital showed a C/T ratio of 5.95, a %T of 67.7%, and a TI of 0.87, indicating inefficient blood usage. Implementing these metrics and guidelines can significantly enhance blood management practices [4, 21].

1.1. Objectives

Assess blood requisition, transfusion practices, and factors associated with intraoperative transfusion in elective surgeries at various hospitals in Addis Ababa from November 1, 2023, to April 30, 2024.

2. Methods

Study Area and Period: Conducted in Addis Ababa, with a population of over 4 million, from November 1, 2023, to April 30, 2024. Four hospitals were selected using simple random sampling: Tikur Anbessa Specialized Hospital (TASH), Menelik II Hospital (MH), Gandhi Memorial Hospital (GMH), and Lancet General Hospital (LGH). Study Design: Multi-centered cross-sectional study. Population: Source population: All elective surgical patients at the selected hospitals. Study population: Elective surgical patients at selected hospitals during the study period. Eligibility Criteria: Inclusion: Elective surgical patients scheduled during the study period. Exclusion: Patients with incomplete transfusion details and canceled surgeries.

2.1. Sampling

• Sample Size

594 patients determined using the Cochrane formula, considering a 22.7% intraoperative transfusion rate, from a previous study conducted at Tikur Anbessa Specialized Hospital by Gebere Hiwot et. al (2017) [17].

• Sampling Technique

Simple random sampling of hospitals and sequential sampling of patients.

2.2. Variables

• Independent

Age, sex, BMI, preoperative hemoglobin/hematocrit, platelet count, Preoperative anticoagulant usage, co-existing diseases, ASA status, type of anesthesia, type of surgery, intraoperative blood loss, units cross-matched/transfused, and surgery duration.

2.3. Dependent: Intraoperative Blood Transfusion

• Data Collection

Structured questionnaire covering demographics, preoperative status, blood details, and surgical specifics. Collected by residents, anesthetists, and nurses.

• Data Analysis

Data entered into Google Forms, cleaned, and analyzed using SPSS v26. Descriptive statistics, Pearson correlation, and logistic regression were used.

• Blood Utilization Indices

Blood utilization indices were computed with the following equation: Cross-match to transfusion ratio (C/T ratio) = number of units crossmatched/number of units transfused [21-24]. A ratio of 2.5 and below is considered indicative of significant blood usage. Transfusion probability (%T) = number of patients transfused/ number of patients cross-matched × 100. A value of 30% and above was considered indicative of significant blood usage. Transfusion index (TI) = number of units transfused/number of

patients crossmatched. A value of 0.5 or more was considered indicative of significant blood utilization. Maximal Surgical Blood Order Schedule (MSBOS) =1.5 × TI. Designed for the common surgical procedures that have >5 cases

• Data Quality Assurance

Training for data collectors and daily supervision by the principal investigator. Pre-study evaluation of data collection accuracy. Ethical Considerations: Ethical clearance is obtained from relevant committees and authorities. Patient consent and confidentiality are maintained.

• Dissemination

Results to be shared with academic institutions, hospitals, and health bureaus, published in journals, and presented at workshops.

3. Results

Characteristics of surgical patients at TASH, MH, GMH, and LGH: A total of 574 elective surgeries were carried out over a six-month study period. Out of these, 172(30%) were from Tikur Anbessa Specialized Hospital, 150(26%) from Menelik II Hospital, 126(22%) from Gandhi Memorial Hospital and 126(22%) from Lancet General Hospital. All of the 126 elective surgeries at Gandhi Hospital were only females with obstetric and gynecologic surgeries. Of all, the majority of the patients were female 61.8% (355) making the Female: Male ratio 1.6:1. Majority of the patients 390(67.9%) aged between 25 to 55 years were 131(22.8%), 31(5.4%), and 22(3.8%) were age in between 2 and 24, greater than 65 years and less than 2 years old respectively. Those patients with normal BMI were 497(86.6%), and the rest 67(11.7%) and 10(1.7%) were overweight and obese respectively. The majority 291(50.7%) of patients were ASA II and the rest 167(29.1%), 113(19.7%), and 3(0.5%) patients were ASA I, ASA III, and ASA IV respectively. Of all cases, 184(32.1%) of patients come with additional co-morbidity, and 97(52.7%) and 35(19%) of the co-morbidities were Hypertension and Diabetes respectively.

In all hospitals a total of 51(8.9%), 66(11.5%), 240(41.8%), 24(4.2%), 59(10.3%), 73(12.7%), 23(4.0%) and 38(6.6%) elective Pediatric, Orthopedics, Obstetrics and Gynecology, ENT, Cardiovascular, General and Trauma Surgeries, Neurosurgery, and Urological Surgeries were done respectively. The majority 337(58.7%) and 233(40.6%) of cases were done under general anesthesia and Spinal with or without epidural anesthesia respectively. Most 341(59.5%) of surgeries were done by consultants and the rest 112(19.5%), and 118(20.6%) of elective surgeries were done by fellows and senior residents. The majority 249(53.1%) of blood requests were made by residents. For all patients, blood groups were determined during the preoperative time, and 269(46.9%), 143(24.9%), 104(18.1%), and 58(10.1%) of patients have blood groups O, A, B, and AB respectively. The majority 410(71.4%) of patients had preoperative hemoglobin (Hgb) of above 12 g/dl and after adjustment for age and sex, 26.0% of all cases were found anemic. Of 574 elective surgical patients, those with platelet count less than 150,000 were only 69(12%), and those patients taking anticoagulant prophylaxis were only 54(9.5%). Three hundred sixty-five (63.6%) cases had intraoperative blood loss of less than 15%, and from those cases, 19 cases were transfused with a transfusion probability of 3.3%. Two hundred nine (36.4%) of cases have intraoperative blood loss of above 15% with a transfusion probability of 18.8%. Surgery duration was more than three hours in only 149(26%) of patients. The median number of blood units cross-matched from the preoperative period to 24 hours of the postoperative period was 2 units (1-5) with a median number of blood transfused one (1-4) unit. Out of 574 patients, 57 patients were admitted to ICU, and only 8(1.4%) patients were unstable.

Socio-demographic Characteristics		TASH	MH	GMH	LGH	Frequency	Percentage
Sex	Male	89	79	0	51	219	38.2%
	Female	83	71	126	75	355	61.8%
Age	< 2 year	8	12	0	2	22	3.8%
	2 to 24 yr	50	37	21	23	131	22.8%
	25 to 65 yr	104	91	104	91	390	67.9%
	> 65 yrs	10	10	1	10	31	5.4%
BMI	18.5-24.9	159	136	92	110	497	86.6%
	25-29.9(overweight)	11	13	30	13	67	11.7%
	≥30(obesity)	2	1	4	3	10	1.7%
ASA Class	Class One	71	53	7	36	167	29.1%
	Class Two	69	69	91	62	291	50.7%
	Class Three	29	28	28	28	113	197%
	Class Four	3	0	0	0	3	0.5%

Table 1: Socio-Demographic and Clinical Characteristics of Surgical Patients at TASH, MH, GMH, LSH (N = 574)

Clinical characteristics		TASH	MH	GMH	LGH	Frequency	Percentage
Preoperative Hemoglobin	Above 12	95	113	99	103	410	71.4%
	10 to 12	62	35	23	21	141	24.6%
	Less than 10	15	2	4	2	23	4.0%
Preoperative platelet of patient	Above 150,000	153	133	108	111	505	88.0%
	Less than 150,000	19	17	18	15	69	12.0%
Treatment anticoagulant	Yes	28	10	2	14	54	9.5%
	No	142	138	124	112	516	90.5%

Table 2: Clinical Characteristics of Surgical Patients at TASH, MH, GMH, LGH Ethiopia, 2024(N = 574)

Clinical characteristics		TASH	MH	GMH	LGH	Frequency	Percentage
Comorbidity	Yes	57	49	39	38	183	31.9%
	No	116	100	87	88	391	68.1%
Type of comorbidity Others=like HIV, CLD, CKD	Diabetes	10	10	7	8	35	19.0%
	Hypertension	23	27	24	23	97	52.7%
	Cardiac disease	9	2	1	4	16	8.7%
	Asthma/COPD	1	2	3	2	8	4.3%
	Sepsis	0	4	1	0	5	2.7%
	Thyroid Disease	3	1	3	1	8	4.3%
	Others	10	3	1	0	15	8.2%

Table 3: Clinical Characteristics of Surgical Patients at TASH, MH, GMH, LGH Ethiopia, 2024(N = 574)

Type of surgery done	TASH	MH	GMH	LGH	Frequency	Percentage
Pediatric surgery	15	30	0	6	51	8.9%
Orthopedic	34	19	0	13	66	11.5%
Obs/Gyn	34	40	126	40	240	41.8%
ENT	12	4	0	8	24	4.2%
Cardiothoracic surgery	25	26	0	8	59	10.3%
General and Trauma Surgery	23	13	0	37	73	12.7%
Neurosurgery	16	4	0	3	23	4.0%
Urology surgery	13	14	0	11	38	6.6%

Table 4: Distribution of Different Elective Surgeries at TASH, MH, GMH, LSH Ethiopia, 2024(N = 574)

Clinical Characteristics		TASH	MH	GMH	LGH	Frequency	Percentage
Duration of Surgery	Less than 3 hour	109	90	111	115	425	74.0%
	Above 3 hours hour	63	60	15	11	149	26.0%
Intraoperative Blood Loss	Less than 750ml(<15%)	72	94	98	101	365	63.6%
	Above 750ml (>15%)	100	56	28	25	209	36.4%
Post-operative patient disposal	Ward	146	137	119	115	517	90.1%
	ICU	26	13	7	11	57	9.9%
Patient Condition in the first 24 hours of the postoperative period	Stable	161	148	126	124	559	98.6%
	Unstable	5	1	0	2	8	1.4%

Table 5: Clinical Characteristics of Surgical Patients at TASH, MH, GMH, LGH Ethiopia, 2024(N = 574)

3.1. Blood Requisition and Utilization in Respective Departments

During the six-month study period, out of a total of 574 elective surgeries across various departments, blood requisitions were made for 469 cases (81.7%) in all studied hospitals. Of these, 170 cases (36.2%) were from the Gyn/Obs department, 43 cases (9.2%) from Pediatrics surgery, 23 cases (4.9%) from Neurosurgery, 59 cases (12.6%) from Cardiothoracic surgery, 65 cases (13.9%) from General surgery, 64 cases (13.6%) from Orthopedics, 15 cases (3.2%) from ENT, and 30 cases (6.4%) from Urosurgery. A total of 927 units of blood were requested, and 824 units of blood were prepared (103 units of blood were not prepared due to unknown reasons). 53.1% of blood was requested by Residents. 182 units of blood were utilized for 126 patients, making cross-match to transfusion ratio(C/T) of 4.53, transfusion probability (%T) of 26.9%, transfusion index (TI) of 0.39, Maximal Surgical Blood Order Schedule (MSBOS) of 0.59.

When examining each hospital's transfusion indices (Table Three), Tikur Anbessa Specialized Hospital had a crossmatch to transfusion ratio (C/T) of 3.98, a transfusion probability (%T) of 29.9%, a transfusion index (TI) of 0.51, and a Maximal Surgical Blood Order Schedule (MSBOS) of 0.76. Menelik II Hospital showed a C/T ratio of 5.59, a %T of 21.3%, a TI of 0.29, and an MSBOS of 0.43. Gandhi Memorial Hospital recorded a C/T ratio of 3.72, a %T of 32.6%, a TI of 0.40, and an MSBOS of 0.6. Finally, Lancet General Hospital had a C/T ratio of 6.04, a %T of 23.3%, a TI of 0.28, and an MSBOS of 0.42. When examining the cross-match to transfusion ratio (C/T) of each hospital, all exhibit less efficient blood requisition and utilization, with C/T ratios of 3.98 at TASH, 5.59 at MH, 3.72 at GMH, and 6.04 at LGH. Among the studied hospitals, TASH demonstrated relatively efficient blood utilization with a transfusion probability (%T) of nearly 30%, second only to GMH's %T of 32.6%. In contrast, MH and LGH had lower %T values of 21.3% and 23.3%, respectively. Regarding the transfusion index (TI), TASH showed a more efficient blood usage with a TI of 0.51, compared to MH, GMH, and LGH, which had TIs of 0.29, 0.40, and 0.28, respectively (Table Six).

In neurosurgery, from a total of 23 cases, 82.6% had hemoglobin levels above 12g/dl, indicating the lowest percentage of anemic patients among all surgical units. Despite this, neurosurgery exhibited the highest transfusion probability at 65.3% (29 units transfused for 15 patients out of 63 units cross-matched), primarily due to significant intraoperative blood loss (over 80% of patients experienced more than 15% blood loss). This resulted in the lowest cross-match to transfusion (C/T) ratio of 2.17 among all departments. Craniotomy for brain tumor excision was the most frequently performed procedure, demonstrating encouraging blood usage. Neurosurgery also showed relatively efficient blood ordering and utilization, with a transfusion index (TI) of 1.26 (Table Four).

In cardiothoracic surgery, out of 61 surgeries, 46 cases (75%) had hemoglobin levels above 12g/dl. Additionally, 35 patients (57%) had comorbidities, predominantly hypertension. Over 54.1% experienced more than 15% intraoperative blood loss, and more than 57% had surgeries lasting over 3 hours. Despite the high preoperative hemoglobin levels, significant intraoperative blood loss, longer surgery durations, and comorbidities contributed to higher blood usage with relatively efficient blood ordering and utilization. Out of 59 cases with 127 units cross-matched, 20 cases received 33 units of blood, resulting in a transfusion probability of 34%, a C/T ratio of 3.85, and a TI of 0.56 (Table Four).

In all surgical units except for Cardiovascular and Neurosurgery, there was a trend of overordering with less efficient blood utilization. The transfusion indices (C/T, %T, and TI) for these

Department	Cases CM	Cases TD	Units CM	Units TD	C/T	%T	TI
TASH	167	50	338	85	3.98	29.9	0.51
MH	127	27	207	37	5.59	21.3	0.29
GMH	89	29	134	36	3.72	32.6	0.40
LGH	86	20	145	24	6.04	23.3	0.28
Total	469	126	824	182	4.53	26.9	0.39
*CM=cross-matched, TD=Transfused, C/T=Cross match to transfusion ratio, %T= Probability of transfusion, TI= Transfusion index							

Table 6: Blood Ordering and at each Hospital December 2023 Utilization Indices 2024(N=574) from to May

Surgical Units	Cases CM	Cases TD	Units CM	Units TD	C/T	%T	TI
Pediatric	43	6	48	5	9.60	14%	0.12
Orthopedic	64	11	121	14	8.64	17.2%	0.22
Obs/Gyn	170	49	276	68	4.05	28.8%	0.4
ENT	15	4	27	8	3.38	26.6%	0.53
Cardiovascular	59	20	127	33	3.85	33.9%	0.56
General and trauma surgery	65	17	116	21	5.52	26.2%	0.32
Neurosurgery	23	15	63	29	2.17	65.3%	1.26
Urology	30	4	46	4	11.50	13.3%	0.13
Total	469	126	824	182	4.53		

Table 7: Blood Ordering and Utilization Indices of Different Surgical Departments from November 1, 2023 to April 30, 2024, G.C. (N=574)

Intraoperative blood loss (%)	Cases CM (%)	Cases	Units CM	Units TD	C/T	%T	TI
TD(%)	Units CM	Units TD	C/T	%T	TI	14%	0.12
<15%	278	18	442	18	24.56	6.5%	0.06
15-30%	191	108	382	164	2.33	56.5%	0.86
Duration of Surgery < 3 hr	322	54	503	62	7.74	16.8%	0.19
Duration of Surgery > 3 hr	147	72	321	120	2.68	49%	0.82
No Comorbidity	314	86	548	114	4.81	27.4%	0.36
Has Comorbidity	155	40	276	68	4.06	25.8%	0.44
Nerve block	4	1	8	1	8.00	25%	0.25
Spinal Anesthesia	168	24	263	27	9.74	14.3%	0.16
General with or without Spinal Anesthesia	297	101	553	154	3.60	34.0%	0.52

Table 8: Transfusion Indices in Terms of Blood Loss, Comorbidity, Anesthesia Type and Duration of Surgery at TASH, MH, GMH, LGH Hospitals, Addis Ababa, Ethiopia from November 1, 2023, to April 30, 2024. *CM=cross-matched, TD=Transfused *CM=Cross-Matched, TD=Transfused

4. Discussion

In our study, it was determined that most elective surgical patients (78%) did not require blood transfusion, aligning closely with findings from a previous study at TASH in Ethiopia in 2017, where 77.3% of operations did not necessitate intraoperative blood preparations. Furthermore, our investigation revealed that almost one-fifth of cross-matched blood was utilized which is comparable with previous studies conducted at TASH in Ethiopia in 2017 (20.4%) and in Nepal in 2009 (17.24%), where utilization rates of cross-matched blood were lower [4, 8]. Nevertheless, the findings of this study reveal a lower blood utilization rate compared to other regions. For instance, in Zambia in 2015, blood utilization stood at 23.8% while in India in 2012 it was 26% and in Egypt, in 2011 it reached 25.2%(7) Moreover, in Nigeria in 2014, blood utilization was notably higher at 34.51% (8) and in the University of Gondar Hospital in Ethiopia in 2013, it was even higher at 36%(4) Despite variations in the extent of blood utilization across different regions, these statistics collectively indicate a common challenge worldwide, particularly in developing countries like Ethiopia [16, 25].

Various transfusion indices are employed to assess the effectiveness of blood utilization systems. Boral Henry proposed the cross-match to transfusion ratio (C/T ratio) in 1975 as a metric for this purpose [5]. Since then, numerous researchers have utilized the C/T ratio to evaluate blood transfusion practices, with a ratio of 2.5 or below considered indicative of efficient blood usage. Ideally, this ratio should be 1.0, signifying a one-to-one correlation between cross-matched blood and actual transfusions This study revealed a concerning cross-match to transfusion (C/T) ratio of 4.53, which exceeds the recommended threshold of $\leq$ 2.5, indicating inefficient blood usage [26]. However, this finding is consistent with previous studies at TASH in Ethiopia in 2017 (4.9) and in Malaysia in 2002 (5.0). Compared to studies in Nepal in 2009 (11.7) and India in 2000 (6.6), which reported even higher C/T ratios, the Rajouri study shows relatively better efficiency [4,17]. Nevertheless, it also highlighted significant blood wastage when compared to regions like Egypt (C/T ratio of 3.9), Zambia (C/T ratio of 2.8), and Gondar Hospital in Ethiopia (C/T ratio of 7 for elective surgical patients), which demonstrate more efficient blood utilization practices [18].

Recent studies from India and Western countries, such as Aga Khan University Hospital, Pakistan in 2001 (where 97.56% of patients had C/T ratios higher than 2.5) and Leicester, UK in 2013 (C/T ratio of 2.1), have shown near-standard transfusion indices achieved through continuous auditing and the formulation of maximum surgical blood ordering schedules (MSBOS). The findings suggest a need for similar strategies to improve blood utilization efficiency in Rajouri, focusing on both awareness campaigns for blood donors and systematic auditing [18]. The probability of a transfusion (%T) was suggested by Mead et al. in 1980 [19]. A value of 30% and above is suggested as appropriate [26]. Based on what is recommended in the above literature, the results of the present study showed an overall probability of transfusion (%T) of 26.9% which was still indicative of inappropriate utilization compared to units of blood crossmatched.

But this study shows better than the previous study done at TASH Ethiopia (2017) which was %T of 22.7% and in other countries like Zambia (20%) and Nepal (13.5%), Indian tertiary care hospitals where %T ranged from (11.1% to 25%) Transfusion index (TI) one of the measurements for efficient utilization of blood, which is the average number of units used per patient crossmatched is indicated by and signifies the appropriateness of several units cross-matched. A value of 0.5 or more is indicative of efficient blood usage The findings from the study underscore a critical issue in blood utilization practices within the healthcare system. It appears that there is a prevailing culture of over-ordering blood supplies for surgical patients, leading to inefficiencies and wastage of valuable resources [5, 17, 25-28]. This practice not only contributes to an artificial shortage of blood reserves but also consumes technical time and expensive reagents unnecessarily. Moreover, the study highlights the broader challenge of blood supply shortages, with the healthcare system collecting less than half of the national requirement. In the face of limited blood availability, it becomes imperative to prioritize the judicious use of blood and blood products to ensure that the available supply is utilized efficiently and effectively.

To address these challenges, healthcare institutions may need to implement strategies aimed at optimizing blood utilization and conserving resources. This could involve developing evidence-based guidelines for blood ordering and transfusion, enhancing communication and collaboration between clinicians and transfusion services, and implementing measures to reduce unnecessary blood wastage during surgical procedures.

Additionally, efforts to increase blood donation rates and improve blood collection practices could help alleviate supply shortages over the long term. By promoting a culture of responsible blood management and implementing targeted interventions, healthcare systems can work towards ensuring that blood resources are utilized in a manner that maximizes patient benefit while minimizing waste. Contrary to the wealth of research and inquiry into the effectiveness of blood usage, there remains a significant challenge in delineating which surgical patients genuinely require blood transfusions and the appropriate quantity needed preoperatively. This difficulty stems from the diverse array of patient variables and healthcare environments.

5. Conclusion

In our study hospitals, there was a concerning disparity between the quantity of blood requested and cross-matched for elective surgery patients and the actual amount utilized. This excessive cross-matching results in resource wastage, heightened workload, and increased financial burden. Moreover, it poses potential challenges to the blood supply, prompting a need to revise our blood requisition protocols.

Recommendation

To optimize blood utilization for elective surgery patients, it is recommended to revise the current blood ordering practices and minimize overordering. This can be achieved by implementing an updated, institution-specific Maximum Surgical Blood Order Schedule (MSBOS) alongside an emergency blood release system. The Cross match-to-Transfusion (C/T) ratio and Transfusion Index (TI) for each procedure should serve as guiding parameters for determining the MSBOS. The TI values obtained from this study can inform the recommendation of a Group Save and Hold (GSH) for procedures with low TI. For ongoing improvement of transfusion practices, regular surveillance of utilization patterns and periodic feedback are essential.

Funding

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Conflict of Interest

Non-declared

Ethical Approval

Before commencing the study, ethical clearance was obtained from the Departmental Research and Ethics Review Committee (DRERC) of the Department of Anesthesia, School of Medicine, College of Health Sciences of Addis Ababa University (DOS/RES/REC/49/2023), as well as from the Addis Ababa Health Bureau, Addis Ababa, Ethiopia (Ethical Clearance Number A/A/H/10442/227).

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