EVALUATION OF THE BLOOD CROSS MATCHES PRACTICES FOR PERI OPERATIVE PATIENTS AT THE UNIVERSITY TEACHING HOSPITAL, LUSAKA, ZAMBIA.

By

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DECLARATION

I **MWEWA S. MWAPE** do hereby declare that this dissertation herein presented for the degree of **Master of Medicine (General Surgery)** represents my own work. It has not been previously submitted either in whole or in part for any other degree at this or any other university, nor is it currently being submitted for any other degree.

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ABSTRACT

Blood cross-matching for peri-operative patients is an important component in the management of surgical patients undergoing major operations. Depending on the efficiency of the laboratory, blood bank and delivery system within hospitals, different centers practice either cross matching or group and save for selected major operations. At the University Teaching Hospital in Lusaka, Zambia, patients undergoing major operations all get cross matched with at least 2 units. An audit showed 65 elective cases cancelled due to unavailability of blood between January and March 2015 from Phase V (emergency theatre), Phase III (main operating theatre) and D block (children's theatre) theatres.The general objective was to evaluate the effects of the cross-matches made for patients undergoing major surgical operations at the University Teaching Hospital, Lusaka, Zambia. It was also hoped to help in the developing a protocol on, which major cases need cross-matches. This was a cross-sectional observational study. The number of cross-match units ordered from patients' files and theatre lists and the actual blood units supplied were noted. Then the number of units transfused within a period of 48 hours (2 days) was also noted.In this study, the target was 865 patients, but 79.4% was done. Of these 436 (63.5%) were males. Age distribution ranged from 19 years old to 69 years old. The modal age range was 36 to 50 years old. The elective cases were 626 which translates into 91.1%. Most of the patients were of stable general condition. These accounted for 618 (89.9%) of all the patients. However only 324 (47.2%) patients had hemoglobin within normal range. Only 14.1 % cross-matches in the elective cases were actually transfused, while in emergency cases 71.8% (107 out 149 cross matches) were transfused.There was a significant difference between the actual transfusions (284) that occur and the cross-matches (1403) that are made for the peri-operative patients at the University Teaching Hospital. 79.8% of the cross matches were not transfused. Of note was a huge number 363 (52.8%) of elective cases that had baseline hemoglobin below the normal range.

Keywords: Peri-operative, cross matches, blood transfusion, elective surgery

DEDICATION

To my supportive and lovely wife, Dr C. J. Chomba, for her motivation, constant love and support. To my loving parents, mum and dad, for teaching and encouraging me to always do my best and the confidence they have in me. To all my teachers and supervisors, particularly Prof E.B. K. Odimba, Dr P. Tembo and Dr R. Zulu for the guidance and motivation. Tomy siblings, for always believing in me. To all my class mates for the knowledge we exchanged and the valued critic. To the clerks who helped with data collection. I thank you all. Finally but not the least, to all the patients who agreed to be part of the study I say thank you very much. May this study help the institution better manage the limited blood stocks.

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ABBREVIATIONS

BT	Blood transfusion
2,3-DPG	2,3 Diphosphoglycerate
DO2	Oxygen delivery
ECG	Electrocardiogram
Hb	Hemoglobin
rVIIa	Recombinant activated factor VII
RBC	Red blood cell
X match	Blood cross match
TRALI	Transfusion-related acute lung injury
US	United States
UTH	University Teaching Hospital

DEFINITIONS

Blood transfusion is generally the process of receiving blood products into one's circulation intravenously. Blood transfusion can be allogeneic or autologous or Syngeneic (from identical twin).

Cross match is the combination of portion of donor's blood and patient's plasma or serum to check for agglutination which would signify incompatibility

Group and save is the determination of patient's blood group, checking the serum for antibodies and saving the serum. This is done for patients for whom the likelihood of blood transfusion is less than 30%. This allows for rapid blood delivery in case of an emergency.

Blood wastage refers to supplied blood that is not transfused nor returned to blood bank within an hour of it being issued out of Blood bank.

CHAPTER ONE
INTRODUCTION

1.1 Background

The University Teaching Hospital, Lusaka, Zambia is the only tertiary hospital in Zambia offering specialized care for various diseases. Among these are patients requiring surgical interventions.

There is an increasing demand placed on the surgical department for patients requiring operations as evidenced by the number of operations done in the monthly audit.

A number of these operations require blood transfusions before, during or after operations. This has translated into an increase on the demand for blood and blood products from the Blood bank. Unfortunately, it has been noted that there are a lot of requests been made for cross matches on cases that generally do not need transfusion. The result is blood being shared between really deserving cases and cases that do not need blood transfusion. An audit showed 65 elective cases cancelled due to unavailability of blood between January and March 2015 from Phase V (emergency theatre), Phase III (main operating theatre) and D block (children's theatre) theatres. The exact number is actually more but cannot easily be extracted due to lack of recording system of reasons for most cancelled cases. This study hopes to show the discrepancy between the cross matches and the actual transfusions that occur. It is also hoped that this study will show which cases really need cross match and which ones just need group and save in our setting. This will reduce work load for those working in blood bank and hence improve efficiency by letting the short staffed personnel concentrate more on cases that truly need cross matching.

1.2 Statement of the Problem

The demand for allogeneic blood transfusion for patients undergoing surgical procedures at the University Teaching Hospital, Lusaka, Zambia has increased. The increase is partly due to increase in surgical procedures being done, though there is no actual documentation of the transfusions that are done. Certain procedures despite being major operations generally do not need blood transfusions. Among these include hernia repairs, colostomies formation or reversal, thyroidectomies, laparatomies (due to adhesions, intussception, volvulus,), appendectomies. Consequences of these cross matches are as follows:

1. Some of the blood units not transfused end up being wasted.
2. Some operations deserving of cross match end up not being done as limited blood stocks are shared with others cases that do not really need cross match.
3. Some cases that do not need blood end up being cancelled due to lack of blood.
4. Also other anemic patients staying longer in hospital due to unavailable blood for transfusion.

1.3 Study Justification

There is no protocol on cross matches for patients undergoing surgical operations at the University Teaching Hospital, Lusaka, Zambia. As a result of this, cases that can otherwise be done are cancelled, some patients receive unnecessary blood transfusions, some blood units are wasted, some deserving cases are not done and other patients are deprived of blood.

It is imperative to do a research that will show the magnitude of the discrepancy between cross matches and the actual transfusions that occur and also help develop a protocol on cross matches for surgical patients and management of the limited blood stocks at the University Teaching Hospital, Lusaka, Zambia.

1.4 Research Question

1. Of the total cross matches done for patients undergoing surgical operations what proportion ends up in actual necessary transfusions at the University Teaching Hospital, Lusaka, Zambia?
2. Are there cases that are cancelled due to lack of blood, including hemo dynamically stable patients?
3. What is the wastage rate of cross matches for surgical patients undergoing operations?

1.5 Hypothesis

There is significant difference between the cross matches and the actual transfusions that occur for patients undergoing surgical procedures at the University Teaching Hospital, Lusaka, Zambia.

1.6 General Objective

To evaluate the outcomes of the cross matches made for patients undergoing surgical operations at the University Teaching Hospital, Lusaka, Zambia.

1.7 Specific Objectives

i. To determine the prevalence of the cross matching requests.
ii. To determine the prevalence of the baseline haemoglobin.
iii. To compare the cross matches with the actual blood transfusion that occur at the University Teaching Hospital, Lusaka.
iv. To determine the proportion of cases cancelled due to lack of blood, to those that were scheduled for operation.
v. To determine the wasted rate of cross matched units for patients undergoing surgical operations, due to being cross matched and not transfused.

CHAPTER TWO
LITERATURE REVIEW

Blood transfusions have a number of indications in both surgical and non surgical conditions. It has its own merits and demerits. Efforts must be made to ensure that only cases deserving blood transfusions receive blood and thereby reducing patients being subjected to the adverse effects of blood transfusions.

For many decades, the decision to transfuse red blood cells was based upon the "10/30 rule": transfusion was used to maintain a blood hemoglobin (Hb) concentration above 10 g/dL (100 g/L) and a hematocrit above 30 percent [1]. However, concern regarding transmission of blood-borne pathogens and efforts at cost containment caused a re-examination of transfusion practices in the 1980s. The 1988 National Institutes of Health Consensus Conference on Perioperative Red Blood Cell Transfusions suggested that no single criterion should be used as an indication for red cell component therapy, and that multiple factors related to the patient's clinical status and oxygen delivery needs should be considered [2]. During the subsequent 25 years, a large body of clinical evidence was generated, resulting in the publication of many guidelines for red blood cell (RBC) transfusion in different settings [3-9]. A common theme of these guidelines is the need to balance the benefit of treating anemia with the desire to avoid unnecessary transfusion, with its associated costs and potential harms. [10].

Anemia is classified as mild if hemoglobin is between 11 and 12.9g/dl, or moderate if between 8 and 10.9g/dl and severe if less than 8g/dl in adult males. Their normal hemoglobin being 13 g/dl to 16 g/dl. While in females the normal ranges from 12g/dl to 14 g/dl. In adult females hemoglobin less than 8g/dl is also considered to severe anemia, while hemoglobin between 8 and 10.9 g/dl is moderate and if between 11 and 11.9g/dl it is considered to be mild.

A number of clinical strategies are well known as measures to manage acute hemorrhage and anemia without blood transfusion. Among these strategies are; [11-18]

1- Prompt arrest of bleeders by use of meticulous hemostasis and surgical techniques, use of hemostatic surgical instruments (electrosurgery/electrocautery, laser, ultrasonic scalpel) and mechanical occlusion of blood vessels.
2- Judicious volume resuscitation of hemo dynamically unstable patients plus supplementary oxygen. The goal is to maintain normovolemia and oxygen support. Laboratory evidence has shown that moderate crystalloids infusion may induce a state of hypercoagulability while large volumes can cause edema, impaired pulmonary function and dilutional coagulopathy.
3- For surgery with potential for high blood loss consider use of blood salvage with leukocyte depletion filters or intraoperative blood irradiation.
4- Control of intraoperative blood pressure and avoid intraoperative hypertension.
5- Augument clotting factors activity with drugs such as desmopressin, vitamin K, and recombinant activated factor rVIIa.

It is worth noting also that another important aspect in avoiding or reducing transfusions is to adequately manage the anemia in stable elective anemic surgical patients with use of erythropoiesis stimulant therapy (erythropoietin or darbepoetin) and hematinic support (iron, folic acid, vitamin B12 supplements).

Anemia results in reduced oxygen delivery. Oxygen delivery (DO2) is determined by the formula: **DO2 = cardiac output x arterial oxygen content.**

In healthy patients, DO2 can be raised by increasing cardiac output (increased heart rate in conscious patients and increased stroke volume in anesthetized patients).

At rest, there is a large reserve in oxygen delivery, since the rate of delivery normally exceeds consumption by a factor of four. Thus, if intravascular volume is maintained during bleeding and cardiovascular status is not impaired, oxygen delivery theoretically will be adequate until the hematocrit falls below 10 percent, because of greater cardiac output, rightward shift of the oxygen-hemoglobin dissociation curve, and increased oxygen extraction can compensate for the decrease in arterial oxygen content.

These predictions were confirmed in a study in which healthy resting individuals underwent acute isovolemic reduction of their Hb to 5 g/dL (equivalent to a hematocrit of approximately 15 percent) [10]. Though some individuals did develop electrocardiogram (ECG) changes consistent with myocardial ischemia, there was little evidence of inadequate oxygen delivery, and the fall in Hb was associated with progressive increases in stroke volume and heart rate (and therefore cardiac output), and a progressive reduction in the systemic vascular resistance. Heart rate was found to increase linearly in response to the acute isovolemic anemia [11]. Of note, cognitive function measured by reaction time and immediate memory was impaired when the hemoglobin concentration was reduced to 5 g/dL [12].

Compensatory mechanisms in Normovolemic anemia include; increased cardiac output, redistribution of blood flow, increased tissue oxygen extraction and decreased oxygen affinity of hemoglobin.

The preceding considerations represent the optimal clinical response in healthy adults. However, blood transfusion is usually administered to patients who are ill with underlying comorbidities, and there is concern that compensatory mechanisms may be impaired in critically ill patients, particularly in patients with underlying cardiovascular disease.

Blood transfusion comes with merits and adverse effects. Among these adverse effects are: [19-20]

●**Infection** is a risk of transfusion since transfusion-transmitted pathogens (e.g., viruses, bacteria, and parasites) can be transmitted if they are present in

donor blood and if they escape detection by screening assays. In addition, some studies have reported that transfusion-mediated immunosuppression may lead to increased risk of postoperative bacterial infection.

●**Allergic and immune** transfusion reactions can occur in any patient, and are more common in multiply-transfused patients. These include transfusion-associated immune and non-immune-mediated hemolysis and transfusion-related acute lung injury (TRALI).

●**Volume overload** is typically a concern in the elderly, small children, and those with compromised cardiac function.

●**Hyperkalemia** from potassium released from red blood cells during blood bank storage is primarily a concern in massive transfusion, impaired renal function, and infants/newborns.

●**Iron overload** becomes a concern after a large number of transfusions for chronic anemia [19].

Other adverse effects of blood transfusions include; impaired oxygen unloading capacity due to decreased levels of 2,3-DPG. And reversal of hypercoagulable response to hemorrhage due to citrate used to store blood. [21-23]

The guidelines also emphasize that the decision to transfuse should not be based only on hemoglobin level but should incorporate individual patient characteristics and symptoms, (clinical status, co-morbidity,) and the individual wishes of the patient.

According to the survey by Vox Sanguinis 2000;78:96–100, the overall proportions of patients receiving allogeneic red cell (RBC) transfusions were 87% in coronary artery bypass (CABG), 92% in total hip replacement (THR), 84% in total knee replacement (TKR), and 18% in transurethral resection of the prostate (TURP). However, significant inter hospital variation in the RBC transfusion rates was detected: from 53 to 99% in CABG, from 79 to 100% in THR, from 57 to 98% in TKR and from 7 to 31% in TURP

The variable surgical transfusion practices were demonstrated by the SANGUIS-study

Conducted in 43 hospitals in ten EU countries (Sirchia et al. 1994). In this study, hemotherapy associated with six standard surgical operations was carefully recorded, and then correlated with a number of clinical parameters of the patients. After the effect of patient characteristics and surgical variables was excluded, marked differences persisted between countries and hospitals in transfusion practices in each of the six procedures. Infact, the chance of being transfused in equivalent surgical procedures varied from 0% to 100% between European Union hospitals.

CHAPTER THREE
RESEARCH METHODS

3.1 Study design:

This was a cross sectional study. This was a non-interventional, descriptive study on all the eligible clients undergoing surgery.

3.2 Study site:

The study was conducted in the Department of Surgery at the University Teaching Hospital, Lusaka. Patients were recruited upon their being scheduled for a major operation either as an emergency or elective case. Follow up was done on an in-patient basis in the surgical wards.

3.3 Target population:

All patients above 14 years scheduled for major operation. The age of 14 years and above was due to the setting arrangements in the department of surgery. The department of surgery was divided into pediatric surgery which covered clients below the age of 14 years and adult surgery which covered those who are 14 years and above. This study was conducted from adult surgery department

3.4 Study population:

Patients scheduled for major operation satisfying the inclusion criteria.

3.5 Study period:

The study was done from December 2015 to June 2016, after approval.

3.6 Inclusion Criteria

All patients scheduled for major operations during the study period and are 14 years and above and give consent for inclusion.

3.7 Exclusion Criteria

a) Non-consenting patients. Those who refuse to be in the study.
b) Patients who are less than 14 years. They are attended from pediatric department. This study was done in the adult department and not the pediatric.
c) Patients undergoing minor operations. These are operations where body cavities like abdomen, chest, cranium,… are not entered. Examples of minor operations include suturing skin wounds or removing masses from the skin.

3.8 Sampling

Sampling strategy:

Convenience (or opportunity) sampling was used. This means patients were recruited that satisfied the inclusion criteria based on ready availability, that is, on being scheduled for operation.

3.9 Sample Size

The Sample size was calculated to be 865 using the "Prevalence sample size formula" as follows:-

Sample size (n) = $Z^2 \times P(1 - P) / (Ɛ)^2$,

Where Z = Z statistic (usually 1.96);

P = the expected prevalence (conservative 0.9); and

Ɛ = acceptable accuracy range (+/- 0.02)

Thus; $n = (1.96)^2 \times 0.9(1 - 0.9) / (0.02)^2$

$= 3.8416 \times 0.9(0.1) / 0.0004$

$= 3.8416 \times 0.09 / 0.0004$

$= 0.9604 / 0.0004$

$= 864.36$

$\sim$ **865**

4.0 Study Procedures

Procedure

Patients that presented with surgical condition requiring a major operation were recruited. They underwent a careful history followed by clinical examination and investigations to determine the surgical pathology and possible type of major operation to be performed on them by managing surgeon. Data was collected using a data collection sheet from those that met the inclusion criteria. The data was collected after the theatre list was made. Data was copied from the files and theatre lists. The transfused units are checked with those supplied and those documented in the file. The cross matches and transfusion included blood and its products (whole blood, packed cells, platelets,).

After proper patient counseling, patients were required to fill in a written informed consent. Patients were followed up for 48 hours (2 days) after the operation to see if they receive blood after the operation. Data was collected by the principal investigator and 6 (six) clerks who had undergone an orientation of the data to be collected and the cases that meet the inclusion criteria. Then the principal investigator got the data sheets and analyzed the data with assistance from the statistician. Reasons were checked for the cases that were cancelled and those that were cancelled due to lack of blood were recorded.

4.1 Variables

Dependent (outcome) variable: number of cross match units, number of transfused units, and number of cancelled cases due to lack of blood.

Independent (exposure) variables: These included age, sex, type of operation, baseline hemoglobin, urgency of operation, stability of patient.

Categorical variables included sex (male/female),

Continuous variables included age, baseline Hb, number of cross matches.

4.2 Data Management

Data collection: This was done with the aid of theatre lists prepared for peri-operative patients. The patients' names were not captured. Attached is a modified list-to avoid names of patient to appear. (Appendix A)

Data entry: The data collected was entered into an excel spread-sheet for analysis.

Statistical analysis: A statistical software, SPSS version 23, was used to analyse the collected results. A statistician was consulted for guidance.

4.3 Ethical Considerations

Permission was obtained from UTH Management and Surgery department. Ethical approval was obtained from the ERES Converge IRB.

Participation in this study was voluntary. This study did not affect the patient's management during period of study. Patients were not remunerated. All information obtained was kept confidential. Patients were free to withdraw from the study at any time and with no penalty to them.

CHAPTER FOUR

RESULTS

4.1 CHARACTERISTICS OF PATIENTS

This study enrolled 687 patients. The initial target was 865. This represents 79.4% of the targeted sample size. All of them fulfilled the inclusion criteria. None of the patients that met inclusion criteria and were enrolled withdrew.

4.1.1 Sex distribution

Of the 687 participants, 63.5% (n = 436) were males while 36.5% (n=251) were females.

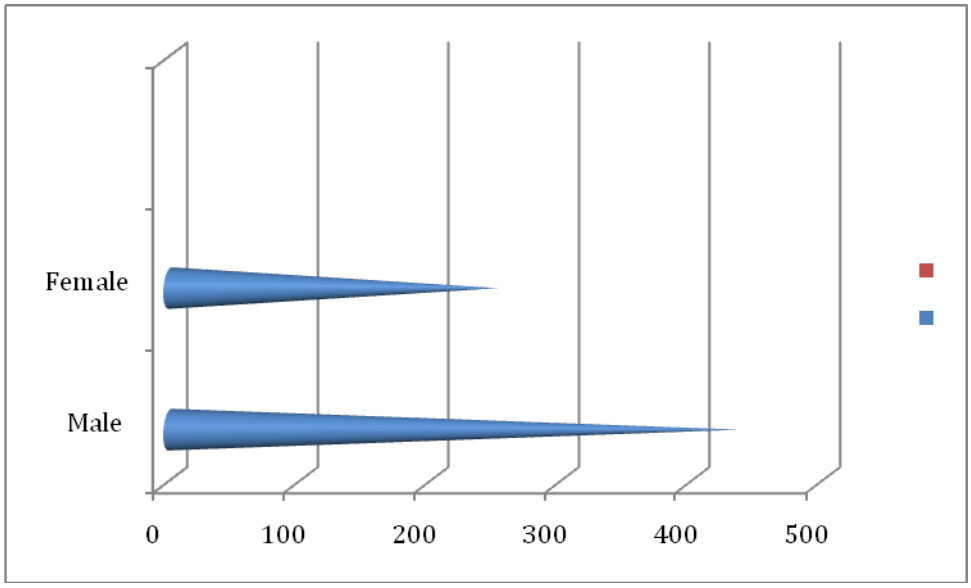


Figure 1 Sex distribution of patients in the study

4.1.2 Age distribution

The age distribution ranged from 19 years old to 69 years old. The modal age range was 36 to 50 years old.

Table 1 – Age distribution of patients

Age (yrs)	Frequency	Percent	Cumulative Percent
15-35	204	29.7	29.7
36-50	318	46.3	76.0
51+	165	24.0	100.0
Total	687	100.0	

4.1.3 Distribution by urgency

The majority of the patients were elective cases (n = 626, 91.1%)

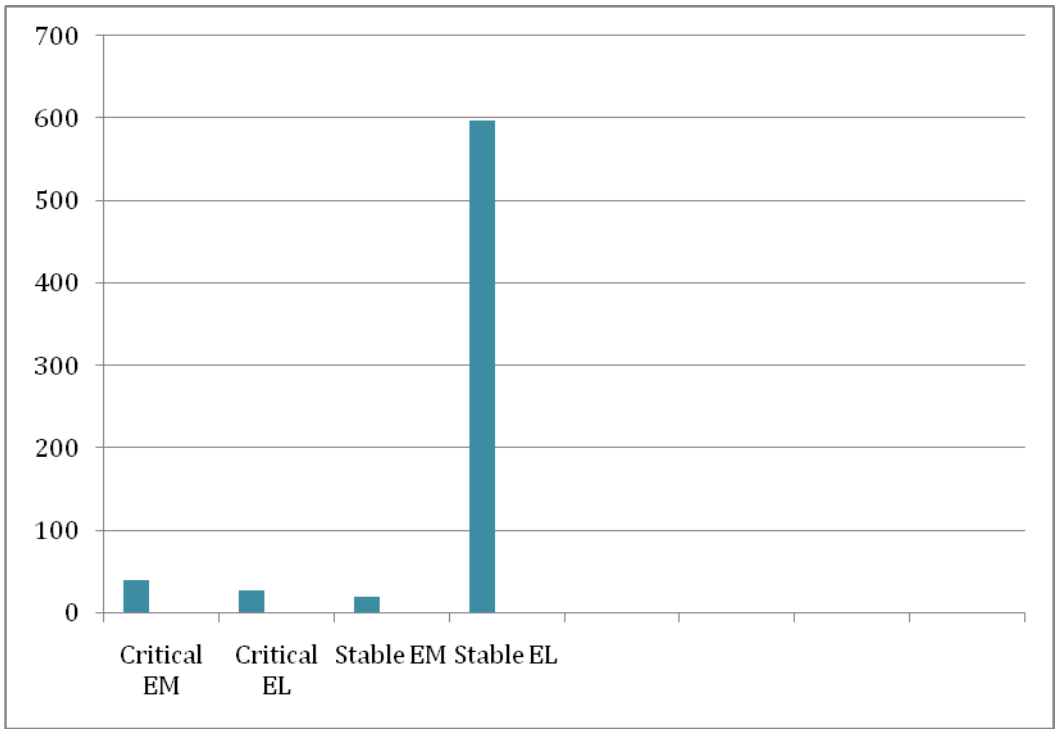
Table 2 – Distribution of patients by urgency of operation

Urgency	Frequency	Percent
Emergency	61	8.9
Elective	626	91.1
Total	687	100.0

4.1.4 Distribution by stability

The majority of the patients were stable. (n=618, 90.0%).

Figure 2 – Patients General Condition



4.1.5 Patient baseline hemoglobin

Quite a good number of the patients (n = 324, 47.2%) had normal baseline haemoglobin. Only 2.2 % of the patients had severe anemia.

Table 5 – baseline hemoglobin

Baseline Hemoglobin level g/dl	Frequency	Percent
Normal (13+)	324	47.2
Mild (11- 12.9)	218	31.7
Moderate (8- 10.9)	130	18.9
Severe (<8)	15	2.2
Total	687	100.0

4.2 A comparison between the cross-matched units and the actual blood transfusion

4.2.1 Summary of the cross-matched units and the actual blood units transfused.

Table 4 – Summary of cross matched units and actual blood units transfused.

	Total	Elective	Emergency
X matched units	1403	1254	149
Actual BT units	284	177	107
Utilization %	20.2	14.1	71.8

X matches= cross matches, BT= Blood transfusion

CHAPTER FIVE
DISCUSSION

In this study, 687 patients were enrolled. The calculated sample size was 865. This represents 79.4%. All of them fulfilled the inclusion criteria. Of the 687 participants, 63.5% (n = 436) were males while 36.5% (n = 251) were females. Thus the ratio of male to female participants was nearly 2:1. The target sample size was not attained due to time lost by two (2) months waiting for feedback from ethics committee after resubmitting the corrections. However the remaining percentage would not significantly change the percentage results.

The age distribution of the participants ranged from 19 years to 69 years old. Three hundred and eighteen of the participants (46.3%) were between 36 and 50 years. The youngest patient was 19 years who had irreducible right inguinal hernia. Most of the patients were in the age range of physiologically fit population and had no significant co-morbidities. They were in ASA classification ranging between I and III.

The majority of the patients enrolled were elective cases (626, 91.1%). These ranged from reducible hernia, femur fractures to advanced abdominal malignancies. Among the emergency cases were intestinal obstructions, hemoperitoneum, irreducible hernias, traumatic amputation of lower limbs and pelvic fractures with bladder rupture.

Sixty nine of cases were in critical condition. Of these critical conditions, 41 were emergency cases and included hemoperitoneum, peritonitis due to perforated viscus, raptured spleen, diaphragmatic rapture, pelvic fractures with bladder rapture. The twenty-eight elective critical cases included, feeding tubes, BKA for diabetic foot, abdominal tumors, advanced maxillofacial tumors.

Of the 618 stable patients only 20 were emergency cases. However despite most of the patients in the study being elective cases, only 47.2% had baseline

haemoglobin within normal range at the time that they were being scheduled for operation. This was partly due to the conditions that some patients had, like advanced tumors. But mostly it was due to inadequate pre-operative management of patients such putting them on hematinics for those that were anemic or treating other comorbid conditions like sepsis. Among the 15 (2.2%) who had severe anemia were those with ruptured spleen, pelvic fracture with bladder rupture and intra-abdominal tumours and gastric outlet obstruction.

A total of 1403 cross matches were made for the 687 patients. Of these cross matches only 284 units were actually transfused. This represents 20.2%. Of these 1403 cross matches, 149 were for emergency cases and 1254 for elective cases. For emergency cases 107 out of 149 (71.8%) were transfused while only 14.1% (177 out of 1254) were transfused. This means that most cross matches end up not being transfused and if blood is not kept well ending up being wasted. If not discarded these units which are returned to blood bank and given to other patients. These units stay out the ideal blood bank storage conditions. This puts the patients who later receive these units at risk of various adverse effects of blood transfusions. Among these are infections, DIC, hyper-kalemia and others. As the cases that are attended to in emergency setting have no adequate time to optimize the hemoglobin with non-blood transfusion therapy and these cases included those of acute hemorrhage, it is not surprising to see that most of the cross-matched blood was transfused (71.8%).

The number of cancelled were not analyzed as the reasons given were either lack of theatre time or lack of blood with an added reason like lack of investigation results (electroytes, echo, ECG)

CHAPTER SIX

CONCLUSION

6.1 Conclusion

There was a significant difference between the actual transfusions (284) that occur and the cross matches (1403) that are made for the peri-operative patients at the University Teaching Hospital. 79.8% of the cross matches were not transfused. The consequence was that some stable elective cases were cancelled when blood is not available in theatre. This entails that a number of major operations being done at the University Teaching Hospital do not need cross-matching. For these cases group and save would be a more appropriate and efficient way to go. Also of note was a huge number 363 (52.8%) of elective cases that had baseline hemoglobin below the normal range.

6.2 Study Limitations

This study needed to have been done in a long period of at least 8 months.
This would take care of the delays from ethical committee.

6.3 Recommendations

1. There is need for the surgical team to ensure that elective patients are as much as possible adequately managed for their anemic state.
2. There is need for a follow up research to show more comprehensively which cases need cross matching.
3. A high discrepancy of 79.8% between cross matches and actual transfusions means group and save is a more economical and efficient way to go.
4. There is need to strengthen the blood bank theatre courier system to foster speedy deliver of blood and utilize the group and save system for cases that are less likely to bleed more than a litre.
5. Blood bank should endeavor to keep blood aside for emergency cases.
6. Blood units that are returned to blood bank followed up to see if they eventually get transfused and the possible adverse effects after transfusion that may have been noted.
7. A follow up study to tabulate average estimated blood losses for different major cases would also be helpful.

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APPENDICES

APPENDIX A

DATA COLLECTING TOOL

FILE NUMBER: SEX: AGE:

DATE AND TIME OF ADMISSION:

TYPE OF OPERATION:
MINOR/MAJOR

INDICATION FOR OPERATION

DATE AND TIME OF OPERATION:

PATIENT'S GENERAL CONDITION:

BASELINE HAEMOGLOBIN: BLOOD GROUP:

NUMBER OF BLOOD UNITSS REQUESTED:

ACTUAL NUMBER OF BLOOD UNITS TRANSFUSED:

CONSQUENCE OF UN-TRANSFUSED BLOOD UNITS:

SURGEON (INTERN, PG1, PG2, PG3, PG4, SR, CONSULTANT)

CASE CANCELLED: REASON:

DATA COLLECTED BY:

SIGNATURE:

DATE: SOURCE OF DATA:

APPENDIX B

ii) INFORMED CONSENT FORM [ENGLISH VERSION].

INFORMATION ABOUT THIS RESEARCH;

This study focuses on evaluation of the cross matches and actual blood transfusion for patients admitted to the University Teaching Hospital (UTH) and are scheduled to undergo major operations. It will reveal the magnitude of the discrepancies between the cross matches and the actual blood transfusions that occur for these patients.

The purpose of this research is to evaluate how much of the cross matches results into actual transfusions for patients undergoing major operations at UTH.

Participation in this study is voluntary. Your decision whether to participate or not will not affect the services that are normally provided by the hospital. And any information obtained in connection with this study will remain confidential. No names and residence will be captured.

Please fill in the form below to indicate that you agree to take part in the study.

CONSENT OF PARTICIPANT:-

The purpose of this study has been explained to me and I understand the purpose of the study. I further understand that:

If I agree to take part in this study I can withdraw at any time without having to give an explanation and that taking part in this study is purely voluntary.

I…… ……. (Names)

agree to take part in both the interview and group discussion (or in the study).

Signed / thumbprint……. Date ……. (Participant)

Signed…….. Date …… (Witness)

Name: ……

Signed…….. Date …….. (Researcher)

Mwape S. Mwewa,

University Teaching Hospital, Department of Surgery, P.O.Box 50 110, Lusaka.

Phone number: +260 977 662875 or +260 955 662875.

Two copies shall be signed. One copy to be given to the participant and copy to be kept by researcher.