ORIGINAL ARTICLE

A comparison of public and private hospital on rational use of blood in Islamabad

Sabeen Afzal

Abstract

Objective: To assess rational use of blood and blood products in adults treated in surgical and allied departments in a public and a private hospital in Islamabad.

Methods: The comparative cross-sectional study was conducted from April 15 to June 15, 2011, in Islamabad. A total of 350 patients were enrolled using universal sampling; 170 (48%) from the public and 180 (52%) from the private hospital. Data was collected using a pre-tested questionnaire on age, gender, department, haemoglobin levels, indications of blood transfusions, types of product advised, total number of units ordered, cross-matched and transfused. Rational use of blood was assessed by determining prevalence of appropriateness using World Health Organisation's clinical practical guidelines and transfusion indices. Ten in-depth interviews were done with doctors to assess their knowledge and practices. SPSS 15 was used for statistical analysis.

Result: In the public hospital, appropriate use of blood was only 54.1% (n=92) as compared to the private hospital where the appropriateness was 69.4% (n=125). The cross-matched-to-transfusion ratio was 1.1 and 2.7, where transfusion index was 2.6 and 2.5 in public and private hospital respectively. Doctors had good clinical knowledge, but were not using any guidelines.

Conclusion: Neither the public nor the private hospital was rational in use of blood.

Keywords: Rational use of blood, Appropriate use of blood, Transfusion indexes, Pakistan. (JPMA 63: 85; 2013)

Introduction

According to current estimates, about 1.2 - 1.5 million units of blood are being transfused annually in Pakistan. About 50% of transfusions are being given in the private sector.[1] As per the WHO criteria, 6-16 units (average of 11 units) of blood are required per hospital bed. At the existing level shortage amounts to as much as 40%.[2] The problem is further compounded by inappropriate use of blood which is up to 25% without separation into its components, with 80-85% of blood being used as whole blood.[3-5] According to the International Red Cross, if blood was used more appropriately, the number of transfusions could be brought down by 30%.[6]

WHO[7] strongly discourages single-unit transfusions in adults and, hence, clinical practice is now dominated by two-unit transfusions. Thus, many units of blood routinely ordered are not utilized, but are held in reserve, imposing inventory problems for blood bank, loss of shelf life and wastage of blood.[8] In the absence of an explicit maximum blood order policy in hospitals, ordering for blood transfusion is frequently based on subjective anticipation of blood loss instead of evidence-based estimates of average requirement in a particular procedure. Implementation of maximum surgical blood ordering schedule (MSBOS) can result in about 60% reduction of cost to the patients.[9]

Rational use of blood implies that right blood product is to be given to the patient only when needed and in the right amount.[10] Therefore, it is essential to look into the existing blood transfusion practices and collect background information about the type of existing blood transfusion practices e.g. requests for single-unit transfusion, fresh blood transfusion, use of whole blood etc. in a hospital setting.

Studies conducted in Pakistan, mainly in public hospitals, focused either on a single department or a single hospital mainly looking at the transfusion triggers.[3-5] The present study was planned to look at the appropriate use of blood and blood products on the basis of transfusion triggers against standard guidelines. The objective of the study was to assess rational use of blood and blood products in adults treated in surgical and allied departments in a public and a private hospital in Islamabad by determining the prevalence of appropriate use of blood and blood products; determining blood cross-match ordering practices; and assessing the knowledge and practices of physicians of different cadres about the rational use of blood and blood products.

Subjects and Methods

The comparative cross-sectional study combining both quantitative and qualitative methodology was done from

Assistant Director General (Health), Ministry of Inter Provincial Coordination, Islamabad, Pakistan.

Correspondence: Sabeen Afzal. Email: drsabeenafzal@gmail.com

April 15, to June 15, 2011 in surgical and allied departments i.e. General Surgery, Urology, Obstetrics/Gynaecology and Orthopaedic etc. of a public and a private hospital in Islamabad. The names are not made public to maintain confidentiality.

The study participants were adult patients of Surgical and allied departments of either gender who were admitted between April 15 and May 15, 2011. All those patients who received blood transfusion irrespective of their haemoglobin levels and also all those who had a haemoglobin level of 9.9gm/dl or less irrespective of whether they were advised and/or received blood transfusion or not, were included in the study. Patients who were admitted twice during the study period, who received massive transfusion (more than 10 units of blood in a 24-hour period, according to American Society of Anaesthesiologists' Practice Guidelines for Blood Component Therapy) and those who were admitted in surgical intensive care unit (ICU) were excluded from the study.

The study also included doctors from Surgical and allied departments who were Fellow of the College of Physician and Surgeon, Pakistan (FCPS) and/or had equivalent qualification with a work experience of 5 or more years after fellowship.

Quantitative data collected from the Surgical and allied departments was the main data source and was collected first. All patients fulfilling selection criteria were enrolled. Data was collected using a pre-tested questionnaire about: age, gender, department, status of the patient, diagnosis, haemoglobin levels, stated indications of blood transfusions, type of product advised, total number of units arranged and cross-matched, total number of units transfused, and designation of the advising of doctor. Reasons for transfusion were validate by final diagnosis and clinical record. Blood cross-match ordering practices were validated from blood bank's record books. Appropriate use of blood/blood products was assessed using guidelines given in manual "Clinical Use of Blood in Medicine, Obstetrics, Paediatrics, Surgery and Anaesthesia, and Trauma and Burns" by the WHO. Inappropriate use of blood and blood products for a particular subject was considered a violation of these guidelines and also when indication or reason for transfusion was not cleared.

Although it was planned to have a higher number of interviews from each hospital, only 10 in-depth face-to-face interviews were conducted by the principal researcher to assess their knowledge, attitude and practices concerning rational use of blood and blood products. The major reason stated for refusal to be interviewed was busy schedule of doctors because of heavy load of patients, and also the administration was reluctant and was concerned about the reputation of the hospital. Doctors fulfilling the inclusion criteria were interviewed after taking verbal consent. The interviews were semi-structured, informal and interactive. The interviewer asked questions keeping the outlined format in mind. Each interview lasted from 25 minutes to one hour. All the conversations were recorded on a tape recorder except for two because the interviewee refused to have it recorded. All interviews were later translated and transcribed in English.

SPSS 15 was used for statistical analysis. Evaluation of the available data was carried out first by describing the frequencies of the data and prevalence of appropriate use of blood and blood products in surgical and allied departments. Then data was compared for appropriate use of blood and blood products for variables like haemoglobin level, status of the hospital, department, and cadre of the advising doctor. Fisher Exact Probability Test was used to test the association between categorical variables as appropriate, as cells had an expected frequency of 5 or less.

The number of patients, units of blood cross-matched and number of units transfused was recorded and the Cross-match to Transfusion ratio (CT ratio) and Transfusion index (Ti) was calculated, thus: CT ratio= No. of units cross-matched /No. of units transfused; a ratio of 2.5 is considered indicative of excess cross-matching. Ti= No. of units transfused/No. of patients cross-matched; a value of 0.5 is considered indicative of excess blood utilization.

All the qualitative data collected was typed in English in Microsoft Word version 2003. After extensive reading of the raw data, coding was done. Segments of the text which answered something about the research question were coded. Separate pieces of text with similar concepts were given the same code. Then domains were developed manually by cut-and-paste techniques and placing similarly coded blocks of text together, sub-codes were identified and developed. Domains were then analysed.

Result

Transfusions were evaluated in 350 patients; 254 (72.6%) being female. Of the total, 170 (48%) were from the public-sector hospital and 180 (52%) from the private hospital, with mean age 41.39±16.60 (CI=39.64-43.13); majority in age group of 19-29 years, (30.6% n=107). The majority of the subjects were from Gynaecology and Obstetrics (Gyne/Obs) departments — 101 (59.4%) in the public, and 75 (41.3%) in the private hospital. The most

Table-1: Appropriateness of decision to transfuse by departments in public and private hospitals.

Department	Hospital								
	Public (n=170)				Private(n=180)				
	Appropriate		Inappropriate		Appropriate		Inappropriate		+Statistics
	n	%	n	%	n	%	n	%	p
General Surgery	22	12.9%	15	8.8%	34	18.9%	10	5.6%	0.097
*Gyne/Obs	55	32.4%	46	27%	36	20%	39	21.7%	0.447
Urology	12	7.1%	5	2.9%	18	10%	1	0.6%	0.080
Orthopaedic	3	1.8%	12	7.1%	37	20.6%	5	2.8%	0.000

*Gyne/Obs: Gynaecology/Obstetrics. + Fisher's exact test.

Table-2: Distribution of total number of units of red cell concentrates transfused.

Units of *RCC	Hospital				
	Public(n=36)		Private(n=77)		+Statistics
	n	%	n	%	p
1	4	11.1%	23	29.9%	0.041
2	18	50%	31	40.2%	0.119
3	9	25%	9	11.7%	0.069
4	5	13.9%	8	10.4%	0.211
5	0	0%	2	2.6%	0.470
6	0	0%	2	2.6%	0.470
7	0	0%	1	1.3%	0.684
9	0	0%	1	1.3%	0.684

*RCC: Red cell concentrate. + Fisher's exact test.

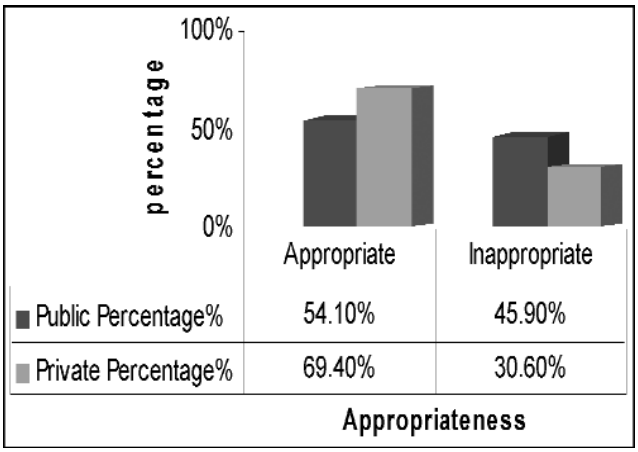

Figure: Appropriateness of transfusion by hospital.

frequently used rationale was anaemia plus surgery, particularly in the public hospital (n=40; 23.4%) while surgery was the most often stated reason in the private hospital (n=68; 37.8%).

In the public hospital appropriate use of blood was only 54.1% (n=92) compared to the private hospital where appropriateness was 69.4% (n=125) (Figure). Gynaecology and Obstetric Department had the most inappropriate use of blood in both the settings (Table-1).

In public hospital, CT ratio for whole blood came out to be 1.4, and Ti was 0.95. No whole blood was transfused in the private hospital. For pack cell, the CT ratio was 2.7, and Ti was 2.5 compared to CT ratio of 1.1 and Ti of 2.6 in the public hospital.

Single-unit transfusion of whole blood in the public hospital was seen mainly in the Gyne/Obs followed by Orthopedics. Practices regarding transfusion of single and multiple units of blood and its components were analysed. The study revealed that single unit transfusion of packed cells was low (n=4; 11.1%) in the public hospital (Gyne/Obs) compared to the private hospital (n=23; 29.9%) (Table-2). In the private hospital, maximal single-unit transfusion was by the Surgical Department followed by the orthopedics.

Doctors had diverse opinions on the use of a single unit of blood. Generally they said it is practised because of the scarce availability of blood from donors. They also said that if the patient needs one unit, they should receive one unit only. "As blood is not easily arranged so we transfuse what is available at that time, usually a single unit." "We transfuse what we get. People don't donate blood. They barely arrange one unit of blood. So we transfuse whatever is arranged, usually a single unit. Something is better then nothing."

Rational use was defined by the doctors generally as when there was a reason or clinical evidence supporting transfusion. It was "careful" use of blood. "You should have a reason if you want to transfuse."

But at the same time, they said that it was the duty of the official at the blood bank to ensure that transfusions were rational. They recommended that transfusion practices can be improved and made rational by increasing the capacity of the blood bank, by the availability of facilities for component therapy preparation and storage. Blood

bank should cerate awareness among doctors about component use and should also create awareness in general public that it is very essential to donate blood and it does not do any harm to the donor, the doctor said.

Discussion

Blood transfusions are a common practice in hospital settings. However, rational use of blood transfusion remains variable among healthcare institutions and patient populations. Despite mounting evidence demonstrating significant harm from unnecessary blood transfusions, results of several studies conducted in developed countries documented a generalised lack of compliance with appropriate transfusion guidelines as well as tremendous variation in transfusion practice among different institutions and among individual physicians within the same institution.[11-13] The limited available information from developing countries also suggests that blood transfusion practices are not in accordance with international guidelines for safe and rational use of blood transfusions. Doctors do not consistently follow any standard guidelines and base their decision to transfuse on anticipated blood loss, past experience, subjective personal judgment, misconceptions, myths and prescribing by habit.[14-16]

It was found that criteria for appropriate transfusion were fulfilled by 54% in the public and 69% in the private hospital. This finding was, however, lower compared to previous studies conducted in other hospitals in Pakistan where appropriate transfusions were 80-85% but in those studies no standard guidelines had been used or at least not mentioned in the methodology.[3-5] Even in developed countries[17] inappropriate transfusion is in the range of 18-35%, while in India the range varied from 30% to 60%[18,19] which is almost the same as in this study.

Most indications for whole blood transfusion are now well-managed exclusively with blood component therapy, yet the use of fresh whole blood was still seen in the public hospital on a routine basis, when there was no compelling evidence for the use of whole blood in preference to component therapy for its routine.[20]

A study conducted in a tertiary care public hospital in Venezuela showed high inappropriate use of packed cell, similar to the current study.[21] The limited appropriate use of blood components was due to use of only a laboratory criterion, i.e. haemoglobin level as the basis for the blood transfusion and almost non-existing, poorly functioning transfusion committee.[21] However, in the developed countries where there is effective transfusion audit, and initiation of the Better Blood Transfusion programme and acceptance of transfusion triggers supported by published data and guidelines, there has been a decline in the use of red cell concentrates (RCC) by 16%.[22] Also in Pakistan, hospitals with effective transfusion audit, a decline of 23.3% in unjustified use of Fresh Frozen Plasma (FFP) was seen. Regular transfusion audit can thus alter clinical practice which may also translate into risk reduction.

Practices regarding transfusion of single and multiple units of blood and its components revealed that single unit transfusion was seen in both the hospitals. Although WHO[7] suggests that that there is no benefit in transfusing 1 unit of RCC, as it is insufficient to correct anaemia, a study conducted in Canada to address the role of single-unit transfusions as a blood-saving technique revealed that a single-unit transfusion strategy could be an effective, simple, practical and cost-saving method of reducing the risks associated with allogenic blood exposure.[10] Transfusion of a single unit should not be considered inappropriate by itself. However, its use without appropriate clinical judgment is not acceptable.[10] In a country like Pakistan, where there are resource constraints, the use of single-unit transfusion can thus be acceptable.

Gynaecology and Obstetric Departments in both hospitals were not only the highest users of blood and blood products, but also had the highest level of inappropriate use of blood. In developing nations, including Pakistan, transfusion is used more often in pregnancy-related complications. Haemorrhage leading to blood loss is the main cause of maternal deaths. The management of these cases often requires safe and timely blood transfusion.[23]

Cross-matching blood only when genuinely required reduces the number of cross-matches, saves the patient from a serious transfusion reaction and it is certainly cost-effective. The ideal CT ratio is considered 1.[24] Ratio beyond 2 is indicative of excessive ordering. A ratio of more than 2.5 means that unnecessary cross-match is being done.[24] With a CT ratio of 1.4 for whole blood and 1.1 for packed cells the practice in the public hospital was comparatively better than in the private hospital which showed unnecessary cross-match with a CT ratio of 2.7 for packed cells.

The average number of units used per patient cross-matched is indicated by the Ti and signifies the appropriateness of the number of units ordered. A procedure which uses less the 0.5 units of blood per procedure does not require a pre-operative cross-match.[24] The study showed that Ti was high in both the public (Ti=2.6) and private (Ti=2.5) hospitals indicating excessive ordering.

There is an aggressive need to change attitudes and

orientation. It does not require substantial capital or technology. Moreover, this basic approach of collecting representative data of current practices may be a useful first step towards improving rational use of blood. It is high time for Pakistan to implement policies towards educating doctors regarding current practices in blood transfusion. Frequent audit of transfusion practices is highly needed. Compliance with standard guidelines can reduce unnecessary costs to hospitals and patients and the well-known risks of blood transfusion. Strict clinical governance by senior physicians and external quality checks are necessary to modify physicians' behaviour in ordering unnecessary transfusions. By developing and implementing comprehensive blood management programmes focusing on implementation of evidence-based transfusion guidelines to reduce variability in transfusion practice in hospitals can promote safe and clinically effective blood utilisation.

Conclusion

Both the hospitals in the study were not rational in use of blood. The private hospital was using the right product for the right person, but in excessive amounts as indicated by high CT ratio and Ti. The public hospital was giving the right amount to the right person as indicated by their near-to-ideal CT ratio, but was not using right product and was still transfusing whole blood.

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An audit of appropriate use of blood products in adult patients in a Venezuelan general university hospital. Int J Qual Health Care. 1999;11(5):391â€“5.Â A comparison of public and private hospital on rational use of blood in Islamabad. J Pak Med Assoc. 2013; 1(63):85â€“9. The research was developed at the University Hospital of the Universidade Federal de Sergipe, involving participation of health professionals in the stage of training, during the month of February 2011, in addition to the monitoring of blood transfusions performed in the pre- and post-intervention periods. Transfusion practices were investigated upon request for transfusion or devolution of unused blood components. Knowledge of health professionals was assessed based on the responses to a questionnaire about transfusion practices. Results: during the educative campaign, 63 professionals were t