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Transfusions reactions at Katwa and Kitatumba General Hospitals, in the eastern part of Democratic Republic of Congo

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Abstract

Background: Transfusions reactions are frequently reported among patients treated with blood products worldwide. Data are lacking to provide guidance regarding the common transfusions reactions in poor health facilities. **Method:** In this descriptive study, we reviewed the medical records of all patients who have been transfused at two hospitals in Butembo City, and who had adverse transfusion reactions. Descriptive statistics followed by binary logistic regression were conducted. Data were analyzed using STATA 14.2. **Results:** Between January 2014 and December 2019, a total of 1628 transfusion patients received blood products and 55 (3.4%) had transfusion reactions. The common reactions were the non-hemolytic fever and the allergic reactions. The predictors of transfusions reactions were lifetime history of transfusion therapy (aOR= 1.55, 95%CI= 1.02-2.84; p=0.02), the AB blood group (aOR=5.2; 95%CI: 4.0-11.6; p=0.001), and the acute transfusions reactions (a0R= 0.35, 95%CI= 0.26-0.62, p=0.001), with immediate life threatening (aOR= 1.55, 95%CI= 1.02-2.84; p=0.02). Death has occurred in 3.6% of case. **Conclusions:** The mortality rate from blood transfusion is 3.6%, nearly the prevalence of transfusion reactions. Lifetime history of transfusion, blood group, the occurrence and the severity of clinical features are the predictors of transfusions reactions. This study highlights the importance of specific guidelines for transfusion therapy to patients with severe anemia in low and middle income countries. Blood transfusions must be carefully administered to patient to reduce either the adverse reactions or the increased for next transfusions therapy.

Keywords: Transfusion reactions, rural hospital, eastern part of DRC.

INTRODUCTION

Blood transfusions are given to patients with severe anemia [1] Transfusions reactions have been classified as acute and delayed, mild or severe; immunological or non immunological; based respectively on time, severity and the etiology [2]. Studies evidenced that frequent transfusion reactions are fever, chills, pruritus; dyspnea, hematuria, loss of consciousness, hemolytic reactions, the post-transfusion purpura, the graft/host disease; transfusion related acute lung injury, sepsis, and iron overload [3, 4]. World Health Organization (WHO) encourage either to restrict transfusions therapy [5] or to use to transfuse safe blood products received from the bank blood [5, 6]. Recent research showed that professional errors increased the transfusion related fatality; due to poor application of blood transfusions policies [6, 7].

In low and middle income countries, nearly 400 000 patients are treated by blood products received from the volunteers [8]. However, infections were significantly the long-term outcomes of transfusion therapy due to the lack of blood bank [9]. In addition, repetitive blood transfusions have been suggested to increase the occurrence of transfusions reactions related morbidity [10, 11]. Despite the corpora of studies, there is insufficient guidance on blood transfusions in developing countries. A study on the implementation of hemovigilance in Sub-Saharan Africa found a rising of the notification rates of transfusions reactions from 1.1 to 16.1% per 1000 units [12]. Given that blood transfusion therapy is commonly practiced, we conducted this study to determine the effects of transfusion on patient's well-being in developing settings.

METHODOLOGY

Participants

This descriptive study was carried out from January 2014 to December 2019 at Katwa and Kitatumba

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Hospitals in the Democratic Republic of Congo (DRC). Katwa Hospital has a capacity of 250 beds with about 350 admissions per month. Kitatumba Hospital has a capacity of 128 beds with about 200 admissions per month. All patients who have received blood product and had an established diagnosis of transfusions reactions were included in this study. The study was approved and authorized by the Ethics Committee of North-Kivu. It has been conducted according to good ethical practices.

Procedures

Two trained nurses supervised by the first author collected data using an established questionnaire. Sex, age, hospital name, lifetime history of blood transfusions, blood group and clinical features were collected from the medical record. Blood transfusion reactions were defined as any transfusions related symptoms presented following the transfusion therapy [12]. Severity of the adverse reactions following blood transfusion were classified in 5 grades: Grade 0 (isolated dysfunction without clinical or biological manifestation); Grade 1 (mild reactions with absence of immediate or long-term life threatening); Grade 2 (long-term morbidity with development of irregular antibodies), Grade 3 (immediate life threat which required major therapeutic interventions); and Grade 4 (death of the patient) [13].

Data analysis

Collected data were analyzed using STATA version 14.2. Descriptive statistics were used to express prevalence and associated characteristics expressed in percentages and frequencies Predictors of transfusions were assessed using binary logistic regression. Measure of association was reported as odds ratio with corresponding 95% confidence interval and p-value.

RESULTS

Prevalence of transfusions reactions

Table 1: Prevalence of transfusions reactions among the transfused patients

HGR	Participants	Transfusion incidents (%)
Kitatumba	438	21 (4.8)
Katwa	1190	34 (2.9)
Total	1628	55 (3.4)

A total of 1628 patients have been transfused. Of these, 55 (3.4%) met the criteria of transfusions reactions. Therefore, 21 transfused patients among 438 patients i.e. 4.8% transfused at Kitatumba hospital had transfusions reactions; and 34 patients (2.9%) presented transfusions reactions among the 1190 transfused patients at Katwa Hospital. (Table1)

Predictors of Transfusion reactions

Table 2: Predictors of Transfusions reactions

		Participants	Transfusions reactions				aOR (95%CI	p
			Transfusion reactions	Percent	UOR (95%CI)	p		
Age	1-10	359	13	3.6	1.0			
	11-50	1027	33	3.2	0.75 (0.40-0.96)	0.104		
	51+	242	8	3.3	0.87 (0.55-1.34)	0.552		
Sex	M	672	18	2.7	0.91 (0.85-2.1)	0.069		
	F	956	37	3.9	1.54 (0.90-2.1)	0.21)		
Onset	Acute	1001	30	3.0	1.0			
	Delayed	627	25	4.0	0.3 (0.09-0.88)	0.004	0.29 (0.12-0.62)	0.02
Severity	Grade 1	794	39	4.9	1.0			
	Grade 2	356	10	2.8	1.2 (1.0-2.4)	0.952		
	Grade 3	276	4	1.4	0.4 (0.20-1.19)	0.245	0.35 (0.26-1.01)	0.001
	Grade 4	202	2	1.0	0.9 (0.7-1.7)	0.975		
Number of prior transfusions	Never	1093	32	2.9	1.7 (0.92-2.99)	0.04	1.55 (1.08-2.84)	0.02
	1	431	15	3.5	1.0			
	2+	104	8	7.9	1.3 (0.86-2.90)	0.06		
Blood group	O	648	23	3.5	1.0			
	A	531	18	3.4	0.90 (0.75-1.8)	0.672		
	B	404	11	2.7	1.45 (1.2-3.1)			
	AB	45	3	6.7	6.0 (4.2-10.5)	0.041	5.2 (4.0-11.6)	0.001

The onset of clinical features, their severity, the number of anterior transfusion and the blood group were the predictors of transfusions reactions. Specifically, transfused patients were less likely to have delayed transfusions reactions (aOR= 0.29. 95%CI= 0.12-0.62, p= 0.02). Similarly, these patients were less likely to have immediate threatening reactions which required major therapeutic interventions compared to those who did not present the transfusions reactions (a0R= 0.35, 95%CI= 0.26-0.62, p=0.001). However, the participants were more likely to have lifetime of transfusions therapy (aOR= 1.55, 95%CI= 1.02-2.84; p=0.02). Lastly the participants with blood group AB were more likely to have transfusions reactions. (aOR =5.2; 95%CI: 4.0-11.6; p=0.001). (Table2)

Transfusion Reactions observes according and their department's origin

Table 3: Transfusions Reactions

Reactions	Frequency	Percentage
Febrile Non-Hemolytic	27	49.1
Allergic reaction	8	14.5
Hemolytic	6	10.9
Pulmonary edema	5	9.1
Pulmonary embolism	3	5.5
Hypotension	6	10.9

The commonest transfusions reactions were febrile non hemolytic (49.1%) and allergic reactions (14.5%). (Table3)

DISCUSSION

This study showed that 3.4% of transfused patients had transfusion reactions at Katwa and Kitatumba hospitals. The onset of clinical features, their severity, the blood group; and lifetime history of blood transfusions were predictors of transfusion reactions. Death has occurred in 3.6% of cases. These findings have implication for the clinical indication of blood transfusions and the importance of close monitoring during and after the transfusion therapy.

The findings of this study are consistent with the literature on transfusion reactions related studies [1, 12, 14]. Prevalence of transfusion reactions is in contrast with the findings of Hendrickson *et al*. who showed a prevalence of 1%. The incongruity could be attributed to the contextual differences; given that our study was conducted in limited health facilities could explain this difference given that the blood transfusion process is done according to the recommended policies in developed countries, the settings of Hendrickson's study [15]. The application of recommended policies of WHO by developed countries could explain the lower prevalence in Hendrickson 'study. This study showed a significant likelihood of acute transfusions reactions in transfused patients. This bears resemblance with the findings of Strandenes *et al.* [16]. The close monitoring following transfusions therapy provides insight of early diagnosis. Moreover, this study illustrated that the transfusions were complicated by mild adverse reactions which required however immediate major intervention. This lies the findings of Devries *et al*. which evidenced the high prevalence of mild form, diagnosed during the transfusion therapy [1].

This study has established that the absence of previous transfusion was a significant predictor of transfusions reactions. This is in contrast with the findings of Stramer *et al.* [11] who showed that the lifetime history of blood transfused was associated with an increased risk of transfusions reactions. Transfusion therapies in limited health facilities are supplanted of insignificant adverse reactions given that it's conducted in emergency settings without available blood bank.

This study found that the transfusion reactions were common among AB blood group patients. Similar observations were evidenced by Shander *et al.* [6] This is probably due to the fact that AB as considered as an universal receiver of blood productions from A, B and O blood groups. The limitation of this study is secondary to its descriptive nature, which can't explore the cause-effect. A prospective study is suggested to determine the clinical and demographics features of transfusions.

CONCLUSION

This prevalence of transfusion reactions at Katwa and Kitatumba Hospitals is higher compared to the developed countries average. Lifetime history of transfusion, blood group, the occurrence and the severity of clinical features are the predictors of transfusions reactions. This study highlights the importance of specific guidelines for transfusion therapy to patients with severe anemia in low and middle income countries. Blood transfusions must be carefully administered to patient to reduce either the adverse reactions or the increased for next transfusions therapy.

Abbreviations

WHO: World Health Organization

a0R: adjusted odds ratio

p: p-value

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Authors' contribution

Kambale Maliro. Jean-Bosco and Mutume Nzanzu Vivalya participated in conception and conception of the the study, collection of and analysis of data; and drafting of the manuscript. Kalima Nzanzu Adelard, Mumbere Vagheni Martial, Kakule Muhongya and Mukonkole Mbo Jean-Paulin made substantial contribution during the analysis of data and drafting of the manuscript. Paluku Sivihwa Juvenal, Ossinga Bassanja Jacques and Kayembe Tshilumba Charles contributed in reviewing the manuscript. All the authors reviewed and approved the final version of the manuscript.

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Competing interests

The authors declare no competing interests.

Ethics and consent to participate:

We sought ethical approval from Ethics committee of North-Kivu. Confidentiality and privacy were applied during this study.

Consent for publication

"Not applicable"

Availability of Data and Materials

The data used to support the findings of this study are available from the corresponding author upon request.

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