

PREDICTORS OF BLOOD TRANSFUSION AMONG MATERNITY PATIENTS AT MURTALA MUHAMMAD SPECIALIST HOSPITAL, KANO, NORTH-WESTERN NIGERIA

Dalhatu, A¹, Hussaini, M. Aikawa², Adamu Alhaji³, Amina, S. R.¹Khadija, N. N.¹, Halima, H. Bello¹

¹Department of Nursing Sciences, Bayero University Kano-Nigeria

²Department of Science, School of Continuing Education, Bayero University, Kano

³Department of Nursing Sciences, Federal University of Health Sciences, Azare

Corresponding author: Dalhatu, A*. adamudalhatu206@gmail.com, 08039503072

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ABSTRACT

Background: Blood transfusion is a life-saving intervention, but inappropriate usage of blood components in obstetric emergencies is highly likely to increase the risk of maternal morbidity and mortality. Hemorrhage among maternity patients is a common but preventable cause of maternal mortality in sub-Saharan Africa. Safe blood transfusion is an effective panacea to save maternal lives in these circumstances. The study is aimed to investigate predictors of blood transfusion amongst maternity patients at Murtala Muhammad Specialist Hospital.

Materials and Methods: A retrospective design was employed for the study over a period of one year from 1st January to 31st December and 381 formed the sample size. A standardized instrument based on World Health Organization was adapted for the study

Results: The results showed that majority of patients were less than 31 years, with high prevalence rate of blood transfusion (30.64%). Uterine atony, genital laceration, post-partum bleeding and singleton baby were independent predictors of blood transfusion $P < 0.005$.

Conclusions: it was concluded that there is high prevalence rate of blood transfusion and uterine atony, genital laceration among others were independent predictors of blood transfusion among the studied group. Therefore, it is recommended that decision on blood transfusion should be made based on clinical and hematological criteria

Keywords: Blood transfusion, maternity patients, predictors, prevalence

INTRODUCTION

Blood transfusion is a life-saving intervention, but inappropriate usage of blood components in obstetric emergencies is highly likely to increase the risk of maternal morbidity and maternal mortality (Chowdhury *et al.*, 2016 and Bangual *et al.*, 2017). World-wide about 10% of deaths are due to trauma. Deaths from trauma disproportionately affect people in lower income countries, with more than 90% of deaths due to injury occurring in low- and middle-income countries (Kolin *et al.*, 2020).

Approximately 40% of trauma deaths are due to bleeding, making hemorrhage the leading cause of death following injury (Madhushree *et al.*, 2018, Kolin *et al.*, 2020). Appropriate management of traumatic bleeding includes rapid identification of bleeding sources, followed by immediate measures to stem blood loss and restore hemodynamic stability. Trauma patients who require massive transfusion or develop coagulopathy have poor outcomes (Mandar *et al.*, 2022, Kolin *et al.*, 2020).

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Someone in the world requires blood every second for surgery, trauma, severe anemia, or pregnancy difficulties (Muleta *et al.*, 2021). Postpartum hemorrhage is the leading cause of maternal mortality and is typically defined as blood loss ≥ 500 mL within 24 hours of birth. Postpartum hemorrhage occurs in about 6% of all childbirths and is responsible for up to 100,000 deaths each year (approximately one quarter of all maternal deaths). Risk factors for postpartum hemorrhage include prolonged third stage of labor, multiple births, fetal macrosomia, episiotomy and previous postpartum hemorrhage. Almost all (99%) maternal hemorrhage deaths are in low- and middle-income countries. (Kolin *et al.*, 2020, Muche, *et al.*, 2023). Blood transfusions are often given to replace blood lost after traumatic and postpartum hemorrhage. However, in low-income countries there is a limited supply of safe blood for transfusion. Due to transfusion transmitted infections, low donation rates, sub-optimal management of blood stocks and inadequate distribution of blood, many low- and middle-income countries are unable to meet transfusion demand (Kolin *et al.*, 2020, Lottman *et al.*, 2023). Blood products are one of the most precious lifesaving drugs in terms of potential benefit to recipients (Thurn *et al.*, 2019, Sharma *et al.*, 2023). Blood transfusion plays vital roles in the medical and surgical practice. To achieve optimum use of blood, transfusion has to be appropriate and judicious consuming minimal resources and manpower (Kumari, 2017, Kathpalia *et al.*, 2016). According to world health organization (2023) Blood collection rates vary dramatically worldwide, 117 million units of blood are collected annually, but half of this volume comes from just four regions, which account for just 20% of the world's population, the United States (US), Canada, Europe, and Australia. This leaves low- and middle-income countries (LMICs) with an unmet need totaling over 100 million units

each year. A total of 61% of countries including every country in sub-Saharan Africa, South Asia, and Ocean have blood shortages. With approximately 200 million people in the country, Nigeria needs estimated 1.8 million units of blood per annum, but voluntary non-remunerated blood donation accounts for only 10% of total blood collection in the country, raising concerns about the safety of blood units collected from commercial and family replacement donors (WHO, 2023). Although the blood transfusion rate in some studies has been quoted as between 0.16% and 6% in obstetrics, transfusion rates vary among countries, hospitals, and doctors due to different practices. In high resource countries, the frequency of blood transfusion in obstetrics is reported to be 0.2%–3.2%, while a rate of 2.2% has been reported by a study in a resource-poor country like Nigeria. The rates of blood transfusion vary among different clinicians, with junior doctors and surgical specialists more likely to transfuse patients than physicians and anesthesiologists. There are no firm criteria for initiating red cell transfusion (Amadi *et al.*, 2023)

Transfusion decisions are clinical judgments that should be based on the overall clinical assessment of the individual patient and not on laboratory parameters alone. However, accurate evaluation of blood loss, required to determine whether transfusion would be performed, is difficult in obstetric hemorrhage. Obstetric hemorrhage remains the largest risk factor for blood transfusion apart from operative delivery and instrumental delivery.

MATERIAL AND METHODS

Design – The study employed a retrospective design and was conducted at Murtala Muhammad Specialist Hospital Kano. The hospital is committed to providing affordable and accessible healthcare services to its patients.

The hospital is owned and operated by the Kano State Government, and it is one of the major healthcare facilities in the state (Yakubu et al.,2023). The target population for the study were mainly maternity patients who have undergone blood transfusions at Murtala Muhammad Specialist Hospital in Kano, between the period of January 2023 to December 2023.

Sample size -The sample size for the study was determined based on considerations of achieving sufficient statistical power and precision in estimating the prevalence and predictors of bloodtransfusion.

Instrument for data collection- the data collection instrument was adapted based on World Health Organization predicted blood transfusion index. Transfusion from 1st January to 31st December were collected from maternity unit (labor ward, postnatal ward, post-operative ward and eclamptic ward) and the data was extracted from medical records.

Ethical consideration- the ethical approval was sought and granted by the Kano State Ministry of Health Research and Ethics Committee

Table 1: Socio-demographic

Age (yrs)	N	(%)
Age (years)		
<30	228	59.84
>30	153	40.16
Gestationalage (weeks)		
21-30	22	5.77
31-40	315	82.68
>40	44	11.55
Parity		
Primipara	111	29.13
Multipara	270	70.86
BookingStatus		
Booked	200	52.49
Unbooked	181	47.5

Keys: wks -weeks, n – number, % - percentage, yrs - years

Table 2: Predictors of Blood Transfusion among Maternity Patients

Variables	n	%	OR	P-Value
Gynecological predictor				
<input type="checkbox"/> Singleton	342	89.76	3.042	0.0112
<input type="checkbox"/> Multiple	39	10.24	1.023	0.062
Mode of delivery				
<input type="checkbox"/> Vaginal delivery	303	79.53	2.010	0.0812
<input type="checkbox"/> Operational	7	1.84	2.022	0.0421
Obstetric factors				
<input type="checkbox"/> Placental complication				

Table 2 continue

1.	Placental previa	11	2.89	1.201	0.0510
2.	Placental abruption	18	4.72	3.021	0.0721
3.	Placental adhesion	52	13.65	2.087	0.0560
□ Uterine complication					
1.	Uterine rupture	2	0.52	4.051	0.021
2.	Uterine atony	8	2.1	3.022	0.010
□ Other causes					
1.	Postpartum anemia	255	66.93	2.045	0.0621
2.	Genital laceration	15	3.94	2.061	0.0011
3.	Postpartum hemorrhage	16	4.2	3.023	0.0211
4.	Postpartum sepsis	4	1.05	1.003	0.052

Keys: n – number, % - percentage, OR – odd ratio P<0.005

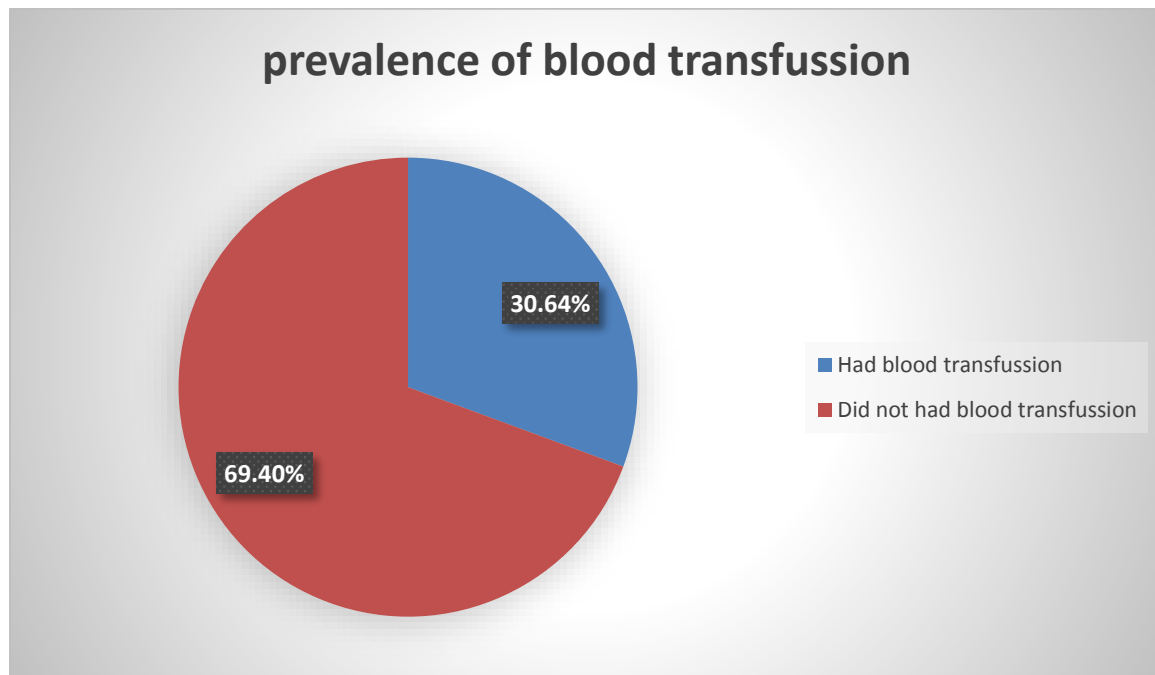


Figure 1. The results show a prevalence rate of 30.64% for blood transfusion among the studied group

DISCUSSION

In this study the demographic dynamics of the respondents showed that majority of the subjects were in their third decades of age. Similar observation was reported by another study by (Chowdhury *et al.*,2016). The

possible explanation to this similarity in demographics could be linked to regional and tribal manifestation of the respondents. In most tribes common to Hausa and others give hands of their children in marriage at early age of life.

More so, individuals who are more inclined to particular religion do expose to marriage at earlier ages as opposed to their relatives' counterparts. The present study showed that majority of the subjects had transfusion within the gestational age between 31-40 weeks. The possible explanation to this finding could have been associated with preponderance of obstetric factors linked to transfusion at these gestational ages as documented in the previous literature. This observation was equally reported by (Chawla *et al.*,2018,Lotterman and Sharma, 2023). The study revealed high prevalence rate of blood transfusion. This high prevalence recorded is not counter intuitive looking at the study setting where most participants present late and also being a secondary health care facility there is a reduced quality of obstetric services which might further aggravate the striking prevalence. This finding is not in line with other previous studies (Jegasothy *et al.*,2018,Kathpalia *et al.*, 2016). The possible explanation for the differences could have been linked to methodological approaches in the two studies in obstetric transfusion, in which the later seems to measure the extent to which blood transfusion was influenced by changing maternal and pregnancy characteristics

In this study uterine atony, postpartum bleeding, genital laceration and singleton baby were found as independent predictors to blood transfusion among the studied group. This finding is not surprising as most medical literature documented those factors as major predictors blood transfusion in Low- and Middle-income countries, perhaps this could be associated with poor obstetric services and late presentation. Similar findings were reported in another studies (Bengal *et al.*,2017),and possible explanation to this similarity could be due to regional similarity and patients' demographic dynamics. The study also found that subjects who were unbooked were at increased risk of blood transfusion, which is counter intuitive ,but the subjects' educational level was relatively lower to understanding the benefits of attending health care services. This present finding was not in line with other previous studies (Chowdhury *et al.*,2016,Aneke *et al.*, 2017). The possible differences for the study could be associated with demographic variations on educational level among the studied groups.

Conclusion

The study concludes that there is high prevalence of blood transfusion and uterine atony,genitallaceration, postpartum bleeding and singleton baby were the independent predictors of blood transfusion among the studied group

Recommendation

The study recommends that decision for blood transfusion should made based on both clinical and hematological criteria and a well-functioning blood bank should be established to provide blood and blood products in the time of emergencies

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