SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Medicine

Blood Transfusion in Children Aged 1-59 Months at Aguié District Hospital (Niger)

Chaka Keita[1*], Kadiatou BA[1] ,Ouazoun Coulibaly[3], Ibrahim Mounkeila[2], Abdoul Rahim[2], Moussa Hassan Saley[2], Sidi Toure[4], Fatoumata Sylla[1], Boubacar Niare[5], Hachimi Poma[6], Salia Ouonogo[1], Djita, B. A[7], Hawa Coulibaly[1], Kassoum Ouattara[1], Isabelle Traore[7], Abdramane Traore[8], Oumar Diallo[9], Souleymane Diawara[1], Harouna Ouattara[10], Salif Djiguiba[1], Samou Diarra[11]

[1]Reference Health Centre of the Commune 2 of Bamako, Mali
[2]Aguié District Hospital, Niger
[3]Reference Health Centre of the Commune 1 of Bamako, Mali
[4]Kayes Hospital, Mali
[5]Bamako Regional Directorate, Mali
[6]Sikasso Hospital, Mali
[7]Reference Heath Centre of the Commune 3 of Bamako, Mali
[8]University Hospital of Kati, Mali
[9]University Hospital of Luxembourg, Mali
[10]Mopti Hospital, Mali
[11]Reference Health Centre of Kayes, Mali

DOI: 10.36347/sasjm.2023.v09i06.011 | **Received:** 22.04.2023 | **Accepted:** 30.05.2023 | **Published:** 07.06.2023

***Corresponding author:** Chaka Keita
Reference Health Centre of the Commune 2 of Bamako, Mali

Abstract **Original Research Article**

Introduction: Blood transfusion is a common practice in paediatrics. According to the WHO, in 2022, up to 54% of transfusions in low-income countries were given to children under 5 years of age. The aim of this study was to determine the frequency of transfusion in children aged between 2 and 59 months in the paediatric ward of the Aguié district hospital. ***Patients and method***: This was a retrospective descriptive study from 1 January to 31 December 2022. All children aged 1 to 59 months hospitalised and transfused in the paediatric ward were included. ***Results***: Of 5349 patients hospitalised, 1140 were transfused, i.e. a frequency of 21.31%. Females were predominant (50.70%), and the age group 13-24 months was the most represented (38.72%). The majority of patients were transfused on the first day (89.36%). The indications were dominated by severe anaemia associated with infectious diseases (59%) and nutritional diseases (20.92%). Severe malaria accounted for 99.83%. Red cell concentrate was the blood product used. Transfusion reactions were observed in 4.8% of patients, mainly fever and chills. The majority of patients were transfused in October (31%), with a mortality rate of 2.37%. ***Conclusion***: Blood transfusion is fairly frequent in the paediatric department of the Aguié district hospital. Awareness-raising to prevent malaria and malnutrition would reduce its frequency.

Keywords: Blood transfusion, children, Aguié.

INTRODUCTION

According to the World Health Organization (WHO) blood transfusion consists of the transfer of blood or its constituents from one individual (donor), to another individual (transfused) (WHO, 2007).

It is a common practice in paediatrics where anaemia is one of the main morbid conditions with a frequency of 70 to 80% in sub-Saharan Africa (DIOUF S *et al*., 2015).

Used correctly, it saves lives and improves health. However, there is a potential risk of immediate or delayed complications. It should only be prescribed for the treatment of conditions that cause significant morbidity and mortality and for which effective prevention or management cannot be achieved otherwise (Simaga O, 2021).

In 2022, according to the World Health Organisation, in low-income countries, up to 54% of blood transfusions will be given to children under the

age of 5, while in high-income countries, the most frequently transfused patient group will be the over-60s, who will account for up to 76% of transfusions (WHO, 2022).

In 2014, a study carried out in 11 French-speaking African countries among children aged between 6 months and 5 years showed a frequency of anaemia of 72.4%, including 4.9% of severe anaemia requiring a blood transfusion (DIOUF S *et al*., 2015).

Specific data on blood transfusion at the level of health districts are rare in Niger in general and do not exist at the level of the hospital of the health district of Aguié, hence the interest of the present study on the frequency of blood transfusion in children hospitalised in the paediatric department of the hospital of the district of Aguié.

MATERIALS AND METHOD

We conducted a retrospective descriptive study over a 12-month period from 1 January to 31 December 2022 at the aguie district hospital. This hospital is a first referral public health establishment located in the department of Maradi, 750 km from Niamey, in south-central Niger (Dramé Y *et al*., 2007). It has a 90-bed inpatient department (paediatrics and intensive nutritional recovery and education centre) and receives paediatric referrals from the 11 IHCs in the health district. The study population consisted of children aged 1 month to 5 years hospitalised in the paediatric ward during the study period and who had received a blood transfusion. Transfusions were indicated according to WHO 2015 criteria. The parameters studied were: age, sex, blood grouping and rhesus, haemoglobin level, transfusions given within 24 hours, nature of the product transfused, causes of anaemia, course. Data were entered and analysed using Microsoft Office Excel 2019 and Epi info version 7.2.1. The consent of the district hospital administration was obtained before starting the study.

RESULTS

Of 5349 hospitalised patients, 1140 were transfused, i.e. a frequency of 21.31%. Of our patients, 21.05 were severely acutely malnourished and 78.95% were paediatric patients. In our study, 50.70% of patients were female, i.e. a sex ratio of 1.04. The mean age was 17 months, with extremes ranging from 1 to 59 months; the 13-24 month age group was the most represented (38.72%), while the 0-6 month age group was the least represented (3.69%). (Table I) 89.36% of patients were transfused on the first day.

Table I: Socio-demographic characteristics of transfused patients

Socio- demographic characteristics	Frequency	Percentage
Sex		
Male	562	49,30%
Female	578	50,70%
Age		
1 to 6 months	42	3,69%
7 to 12 months	162	14,21%
13 to 24 months	441	38,72%
24 to 36 months	277	24,32%
36 to 59 months	218	19,14%

Most transfusions were given in October (31%). Followed by November 16% Figure 1.

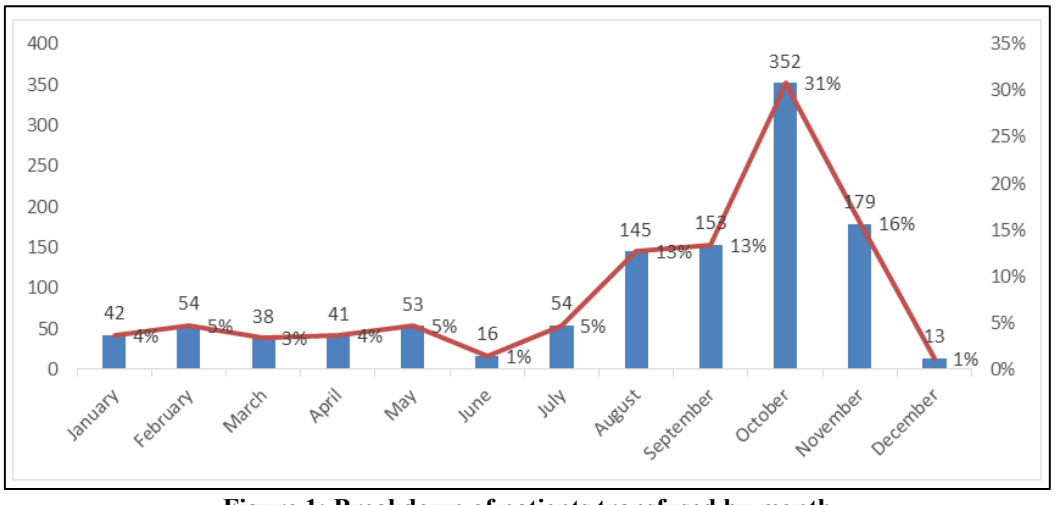

Figure 1: Breakdown of patients transfused by month

Indications were dominated by severe anaemia (haemoglobin level less than 5 g/dl in infants and less than 10 g/dl in newborns) associated with infectious diseases 59% and nutritional diseases 20.92%. Severe malaria accounted for 99.83% and 3.49% of patients had sickle cell disease. The blood product used was packed red blood cells. The most common blood types and rhesus groups among the children transfused were 0-positive 42.89%, followed by B-positive 24.21% and A-positive 24.09% (Table II). Most patients 80% were transfused within 24 hours of request. Transfusion reactions were observed in 4.8% of patients, mainly fever and chills.

Table II: Biological characteristics of transfused patients

	Frequency	Percentage
Blood type of patients		
O+	489	42,89%
0+	32	2,81%
A-	7	0,61%
A+	274	24,04%
B+	276	24,21%
B-	14	1,23%
AB+	45	3,95%
AB-	3	0,26%
Hemoglobin level before transfusion		
0 to 5 g/dl	676	59%
5 to 8 g/dl	420	37%
8 g/dl and above	44	4%

The majority of patients had a favourable outcome 96.84%. We noted a mortality rate of 2.37%.

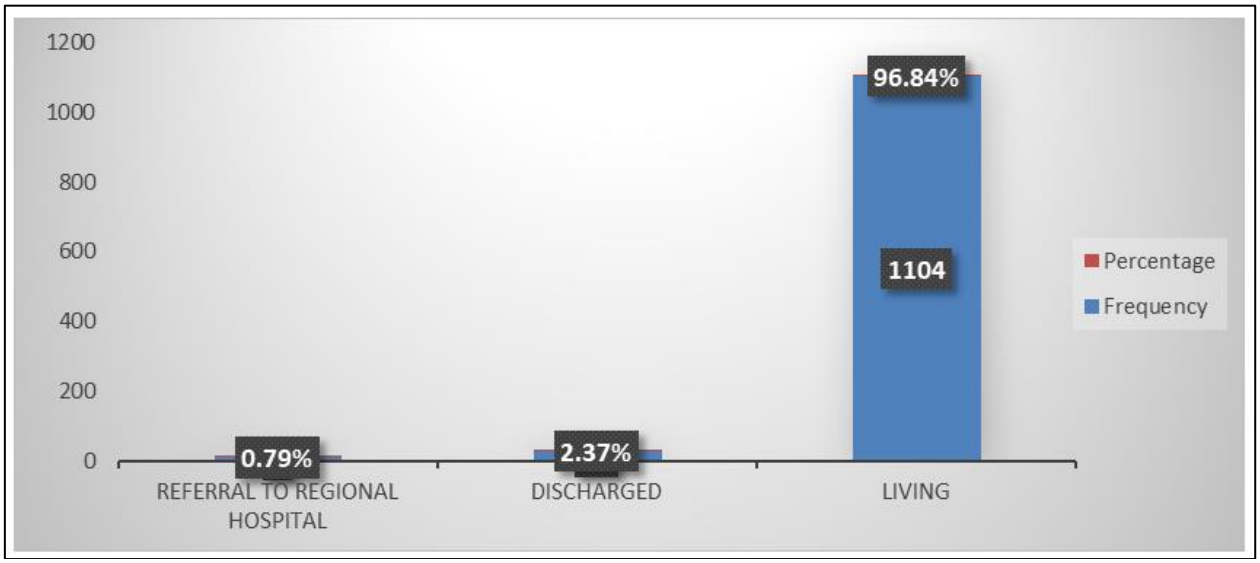

Figure 2: Breakdown of patients transfused by outcome

DISCUSSION

In our study, the frequency of blood transfusion among hospitalized children was 21, 31%.Our result is almost superposable to that of (K Ba *et al*., 2023) in Mali 22% however higher than that of (JB. Diouf *et al*., 2018) in Senegal 11.8%, (Bobossi *et al*., 2006) in Central African Republic 11.5% and (INO-EKANEM M B *et al*., 2016) at the pediatric unit of Uyo teaching hospital in Nigeria 4.3%. This could be explained by our target population of 1-59 months and the community-based nature of our study. There was a 50.70% female predominance with a ratio of 1.04. Our result is identical to that of (K Ba *et al*., 2023) who found a female predominance of 52%. But it is different from that of (CHEGONDI M *et al*., 2016) who found a male predominance.

The mean age was 17 months with extremes from 1 to 59 months; the 13-24 month age group was the most represented 38.72% and the least represented (1-6 months) 3.69%. Our result differs from that of (JB. DIOUF *et al*., 2018) in whom the 13 to 60 month age group was the most representative and 60.2% of transfused children were under 5 years of age. This situation could be explained by the age range of our study, which was less than 59 months. The majority of

transfusions were performed in October 31%, followed by November 16%. Our result is identical to those of (K Ba *et al*., 2023) in whom the peak of transfusion was observed in October and (JB. DIOUF *et al*., 2018) who found a peak in December 16.3% followed by October 13.1%. This could be explained by the peak period of malaria in our context.

Transfusion was associated with severe malaria in 99.83% of cases. Our results are similar to those of (Mayuku Fukiau G *et al*., 2013) in Congo and (Simaga O *et al*., 2021) in Mali, who found 87.1% and 71% severe malaria respectively. This situation could be explained by the fact that Niger is a malaria-endemic country (Severy Malaria observatoiry 2020).

Severe acute malnutrition was associated with 21.05% of transfusion cases. Our result is higher than that of (Niambélé M B D T *et al*., 2015) 7.9%, but lower than that of (Kouassi K. A. H *et al*., 2000) 90%, which could be explained by the vulnerability of the under-59-month age group to severe acute malnutrition.

In our series, the most representative blood and rhesus groups among transfused children were 0 positive 42.89%. Our result is identical to that of (Mayuku Fukiau G *et al*., 2013) who found that group O rhesus positive children predominated, i.e. 50.9%. On the other hand (K Ba *et al*., 2023) found that group B rhesus-positive children were predominantly 40.4%.

Transfusion reactions were observed in 4.8% of patients, mainly fever and chills. Our result is similar to that of (JB. DIOUF *et al*., 2018) who found that 8.14% of patients had transfusion reactions, mainly urticaria, chills and fever. Post-transfusion reactions in children have been reported in numerous studies throughout the world: (NDIAYE M M *et al*., 2008), (MOSHA D *et al*., 2009) and (FUKIAU GM *et al*., 2016).

In our series, the outcome of the majority of patients was favourable 96.84% with a mortality rate of 2.37%. Our mortality result is lower than that of (JB. DIOUF *et al*., 2018) 5% mortality and (K Ba *et al*., 2023) 9.6% mortality.

CONCLUSION

Blood transfusion is fairly frequent in the paediatric ward of the Aguié district hospital. Raising awareness to prevent malaria and severe acute malnutrition could reduce its frequency and mortality.

Conflicts of Interest: The authors declare that they have no competing interests.

REFERENCE

- World Health Organization. (2007). Global consultation on universal access to safe blood transfusion. Canada: WHO; 2007. https://www.who.int/bloodsafety/publications (Consulté le 30/05/2023)
- Diouf, S., Folquet, M., Mbofung, K., Ndiaye, O., Brou, K., Dupont, C., ... & Tetanye, E. (2015). Prévalence et déterminants de l'anémie chez le jeune enfant en Afrique francophone–Implication de la carence en fer. *Archives de pédiatrie*, *22*(11), 1188-1197.
- Simaga, O. (2012). L'activité transfusionnelle dans le service de pédiatrie de l'hôpital du Mali , Thèse de médecine USTTB, Mali, 21M372.
- OMS: Sécurité transfusionnelle et approvisionnement en sang (2022). https://www.who.int/fr/news-room/fact-sheets/detail/blood-safety-and
- availability#:~:text=L'OMS%20aide%20les%20pays,r%C3%A9pondre%20aux%20besoins%20des%20patients. (Consulté le 23/05/2023 à 07h45 mn)
- Dramé, Y., & Berti, F. (2008). Les enjeux socio-économiques autour de l'agroforesterie villageoise à Aguié (Niger) TROPICULTURA, 26(3), 141-149.
- Diouf, J. B., Sougou, N. M., Kane, M., Sylla, A., & Ndiaye, O. (2018). Transfusion sanguine chez l'enfant à Guédiawaye Médecine d'Afrique Noire, 65(6), 340-346.
- OMS. (2015). Mémento de Soins hospitaliers pédiatrique, PRISE EN CHARGE DES AFFECTIONS COURANTES DE L'ENFANCE, Deuxième édition.
- Ba, K., Keita, C., Coulibaly, O., Sylla, F., Traoré, B. A., Ouattara, K., Diawara, S., Maiga, B., Bah, D., Traoré, I., Sama, P., Dembélé, D., Maiga, M., Dao, S. Z., Niaré, B., Sylla, M., Diakité, A. A., Dicko, F., & Togo, B. (2023). Profil des enfants transfuser dans le servivce pédiatrie de la commune II de Bamako, MALI, *Jaccr Africa*, 7(2), 99-104.
- Bobossi-Serengbe, G., Ndomakrah, A. B., Fioboy, R., Ouitembona, C., Kozemaka, A., & Siopathis, R. M. (2006). Les problemes transfusionnels en milieu pediatrique centrafricain: Cas du Complexe Pédiatrique de Bangui. *Médecine d'Afrique noire*, *53*(5), 273-276.
- Ino-Ekanem, M. B., & Bassey, E. O. (2016). Overview of blood transfusion in a paediatric medical setting of a tertiary hospital in south Nigeria. *Int J Health Sci Res*, 6(7), 47-51.
- Chegondi, M., Sasaki, J., Raszynski, A., & Totapally, B. R. (2016). Hemoglobin threshold for blood transfusion in a pediatric intensive care unit. *Transfusion medicine and hemotherapy*, *43*(4), 297-301.
- Fukiau, G. M., Situakibanza, H., Mbayo, F., Kalumbu, D. K. N., & Kulimba, D. M. (2013). Évaluation de l'efficacité de la transfusion sanguine chez l'enfant à Kinshasa: expérience de trois formations médicales. *Transfus Clin Biol*, *20*(3), 361.

- Niambélé, M. B. D. T. (2015). Les besoins transfusionnels dans le département de la pédiatrie du centre hospitalier universitaire Gabriel Touré. Thèse Med Bamako; n° 102.
- Kouassi, K. A. H. (2000). Les besoins transfusionnels dans le service de pédiatrie de Yopougon. *Afr Noire*, 8(9), 357-360.
- Severy Malaria Observatory. (2020). https://www.severemalaria.org/fr/pays/niger (Consulté le 30/05/2023)
- Ndiaye, M. M. (2008). Pratique de la transfusion erythrocytaire au centre hospitalier national d'enfants Albert Royer. These Med, Dakar, N° 130.
- Mosha, D., Poulsen, A., Reyburn, H., Kituma, E., Mtei, F., & Bygbjerg, I. C. (2009). Quality of paediatric blood transfusions in two district hospitals in Tanzania: a cross-sectional hospital based study. *BMC pediatrics*, *9*(1), 1-6.
- Fukiau, G. M., Kalumbu, F. M., & Tuma, H. S. (2013), Evaluation de l'efficacité de la transfusion sanguine chez l'enfant à Kinshasa : expérience de trois formations médicales. *Transfus Clin Biol Poster*, 238(20), 295-369.