Anaemia and Plasmodiasis among children below five years attending OPD at Ishaka Adventist Hospital, Bushenyi District

Article · March 2024

CITATIONS
0

READS
4

4 authors, including:

Yakubu SUNDAY Bot
Kampala International University (KIU)
49 PUBLICATIONS **339** CITATIONS
SEE PROFILE

Emmanuel Ifeanyi Obeagu
Kampala International University (KIU)
1,422 PUBLICATIONS **11,224** CITATIONS
SEE PROFILE

Elite Journal of Haematology. Volume 2 issue 2(2024), Pp. 34-45

https://epjournals.com/journals/EJH

Anaemia and Plasmodiasis among children below five years attending OPD at Ishaka Adventist Hospital, Bushenyi District

Anslem O. Ajugwo[1,2], Yakubu Sunday Bot[1], Emmanuel Ifeanyi Obeagu[1] and Moses Mugabiza[1]

1. Department of Medical Lab. Science, Kampala International University, Ishaka
2. Department of Medical Lab. Science, Madonna University Nigeria

Abstract

Anaemia impacts on the quality of life of people by inducing such symptoms as loss of stamina, rapid heart rate and shortness of breath. This work was carried out to determine the risk factors and prevalence of anaemia in malaria positive children below five years attending outpatient department at Ishaka Adventist Hospital Bushenyi District. This was done using a sample size of 152 malaria positive participants whose haemoglobin level was determined using cyanmethaemoglobin method. 47(31%) were positive for malaria and anemia while 105 (69%) had malaria but without anaemia. The study revealed that the prevalence of anemia in malaria positive children attending Ishaka Adventist hospital was 31%. There is need for government to expediate action on distribution of insecticide-treated mosquito nets and also screening test for anaemia should be added whenever malaria test is requested.

Keywords: *anaemia, plasmodiasis , children, five years*

Introduction

Malaria and anemia are both important causes of mortality and morbidity in African children.[1-4] The World Health Organization[5] has defined severe anemia in complicated malaria as a haemoglobin concentration (Hb) <5g/l or a haematocrit <15% in the presence of a parasitaemia >10 000/l of blood, with a normocytic blood film.[6]

Anemia is a known complication of malaria. It has a profound effect on the quality of life of people by inducing such symptoms as loss of stamina, rapid heart rate and shortness of breath. It has also been reported that over half of malaria related deaths are attributable to severe anemia. Ignorance, poverty and gender bias, also significantly contribute to high prevalence of anemia in malaria positive children. Malaria is the most important parasitic disease of man. It is a major cause of anemia in endemic areas, and in areas of higher transmission malaria is one of the most common reasons for blood transfusion. Six species of the genus *Plasmodium* infect humans commonly, and all cause anemia. Most malaria attributable deaths and severe disease are caused by *Plasmodium falciparum*. [7-19] The study was done to determine the prevalence of anemia in malaria positive

Citation: Ajugwo AO, Bot YS, Obeagu EI, Mugabiza M. Anaemia and Plasmodiasis among children below five years attending OPD at Ishaka Adventist Hospital, Bushenyi District. *Elite Journal of Haematology, 2024; 2(2):* 34-45

children below five years attending outpatient department at Ishaka Adventist hospital Bushenyi district

Methodology

Study design

The study was a prospective, qualitative and cross-sectional laboratory based

Study area

This research was carried out at Ishaka Adventist hospital located in in Ishaka municipality 2km from Bushenyi district headquarters along Mbarara –Kasese road, The Hospital offers, ART Services, Antenatal services as well as general management of all related diseases, outpatient Department, Medical Ward, Laboratory Services, Pediatrics ward and dental services among others.

Study Population

The study was conducted among all malaria positive children below five years who attended outpatient department at Ishaka Adventist hospital Bushenyi District from the period of January 2023 to June 2023.

Sampling method

Simple random sampling technique was applied during the study, where by only malaria positive children below five years were selected as they come according to the hospital (between 8am to 5pm) on daily basis from Monday to Friday, until the required number of clients will be reached. Malaria positive children were got from the outpatients laboratory register daily after their results for malaria have been processed.

Inclusion criteria

All malaria positive children below five years attending outpatient department at Ishaka Adventist Hospital, presenting with signs and symptoms of being anemic.

Children below five years whose caretakers or parents consented for the study and have ever tested for malaria positive for the last two months.

Children who are malaria positive were selected from the la

Exclusion criteria

Children above five years were excluded from the study and those who are not malaria positive

Children below five years whose caretakers or parents will not consent for the study will also be excluded from the study.

Sample size estimation

The sample size of this study was calculated using the statistical formula below

$$N = \frac{ZX^2P(1-P)}{d^2}$$ (Swinscow, 1997)

N= Sample required

P= prevalence of anemia which is 1.3%

ZX= Level of significance (1.96) for confidence interval 95%
d= standard error of deviation = 0.05
$N = \frac{1.96^2 \times 0.1(1-0.013)}{0.05^2}$
N= 151. 6663 subjects
Therefore, 152 participants were involved and sampled for the study.

Specimen Collection

Venus blood was collected from the reception following the standard operating procedures by Monica Cheesbrough part two (pg.1015).
Procedures elaborated more in appendix 6

Laboratory examination
The blood samples were processed and analyzed for haemoglobin estimation using photometric method or Drabkin method.

Data Management and Analysis
Results were written down basing on the calculations after carrying out tests. For every entry, the patient's identification number, age, sex and test results will be indicated on the form designed for the study. Raw data was analyzed using a SPSS version 20.0 computer software with help of Ms excel. Data will be presented using tables, graphs and pie charts.

Ethical Consideration
Permission and a written introductory letter from the Dean School of Allied Health sciences at KIU-TH was obtained and presented to the Administration, management and staff of Ishaka Adventist Hospital along with detailed explanation of the researcher's intention of carrying out the study in the area.

Results
This chapter presents the findings of the study from the field. The whole study was about the Prevalence of anemia in malaria positive children below five years attending Ishaka Adventist Hospital from April to June 2023. The presentation, analysis and interpretation of results were done following the respective study objectives using Microsoft excel and SPSS version 16 and presented using pie charts, tables and graphs.

Table 1: Social demographic characteristics of the study respondents

Characteristic	Frequency	percentage	P. valve
Sex			
Female	96	63.20%	0.076
Male	56	36.80%	0.056
Age in months			
1 -6 months	22	14.70%	0.354
6-12month	34	22.30%	
1-3years	44	29%	0.47
3- 5 years	52	34%	0.52
Sign and symptoms.			
Fever	58	38%	
Loss of consciousness	33	21.70%	
Difficulty in breathing	43	28.20%	
Jaundice	18	11.80%	0.324
Use of ITN			
Yes	98	64.50%	
No	54	35.50%	

Citation: Ajugwo AO, Bot YS, Obeagu EI, Mugabiza M. Anaemia and Plasmodiasis among children below five years attending OPD at Ishaka Adventist Hospital, Bushenyi District. *Elite Journal of Haematology, 2024; 2(2):* 34-45

The table above shows the demographic characteristics of the study respondents where according to age 1-6 months 22 (14.70%),6-12month 34(22.30%), 1-3years 44 (29%), 3-5 52 (34%) years and according to sex, Female had a frequency of 96 (63.20%) and value of 0.076 and Males had 56(36.80%) and value of 0.056 than duration of illness <3 days had a frequency of 65 (42.70%) and > 3 days 87 (57.30%), on Residence where many children were from the villages with a percentage of 98(64.40%) and town with 54(35.60), According to signs and symptoms ,fever had 58(38),loss of consciousness had 33(21.70),difficulty in breathing had 43 (28.2) and lastly jaundice 18(11.80)and lastly the use of insect side treated nets 98(64.50) were using nets in their families while 54(35.5) were found not to use nets according to the study survey.

The figure below shows the prevalence of anemia among malaria positive children below 5 years attending Ishaka Adventist hospital were 47(31%) were the children positive for malaria and had anemia after testing while 105 (69 %) had malaria but they had no anemia and therefore they were regarded negative for the anemia among children below 5 years.

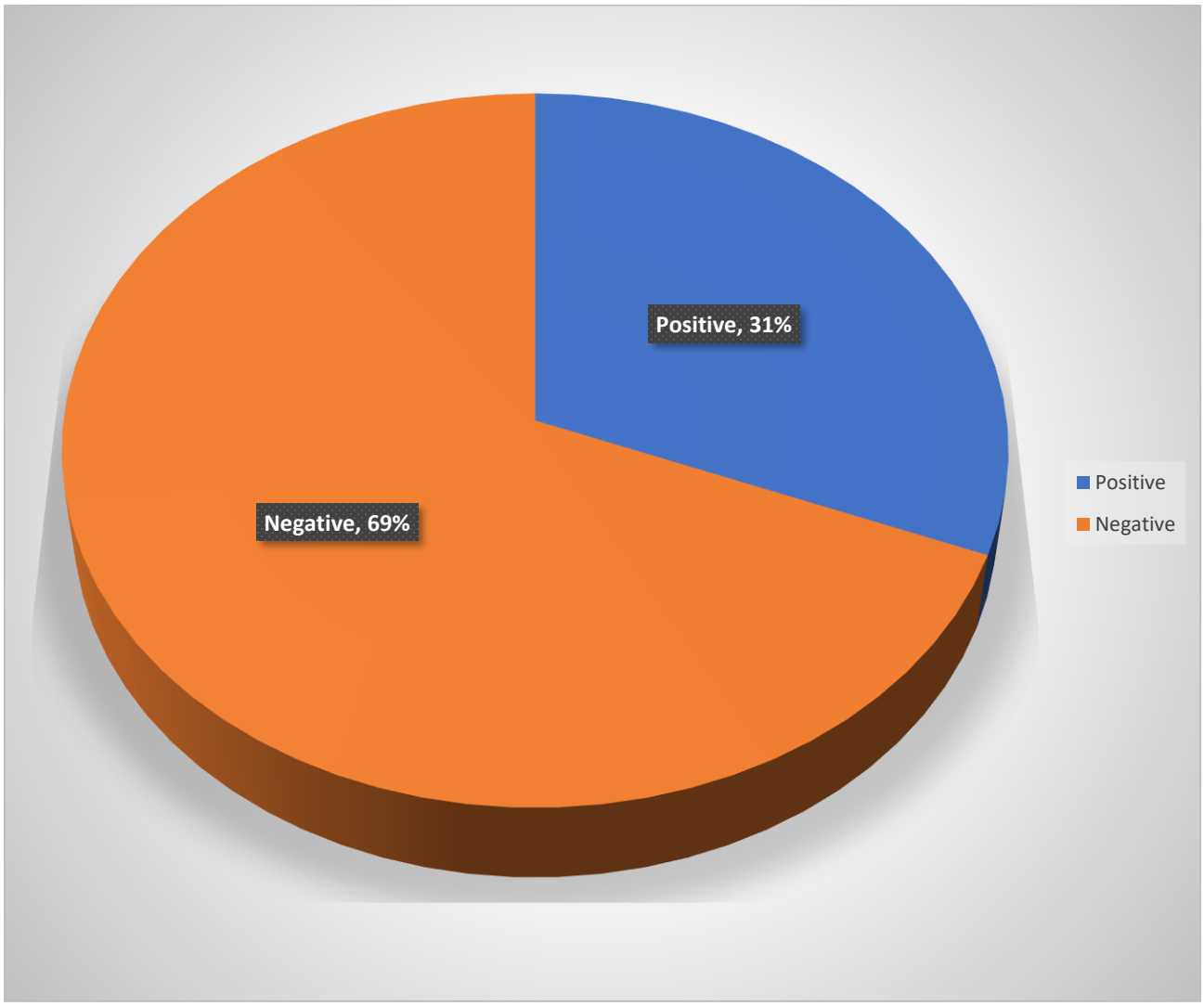

Figure 1: Prevalence of anemia among malaria positive children below 5years

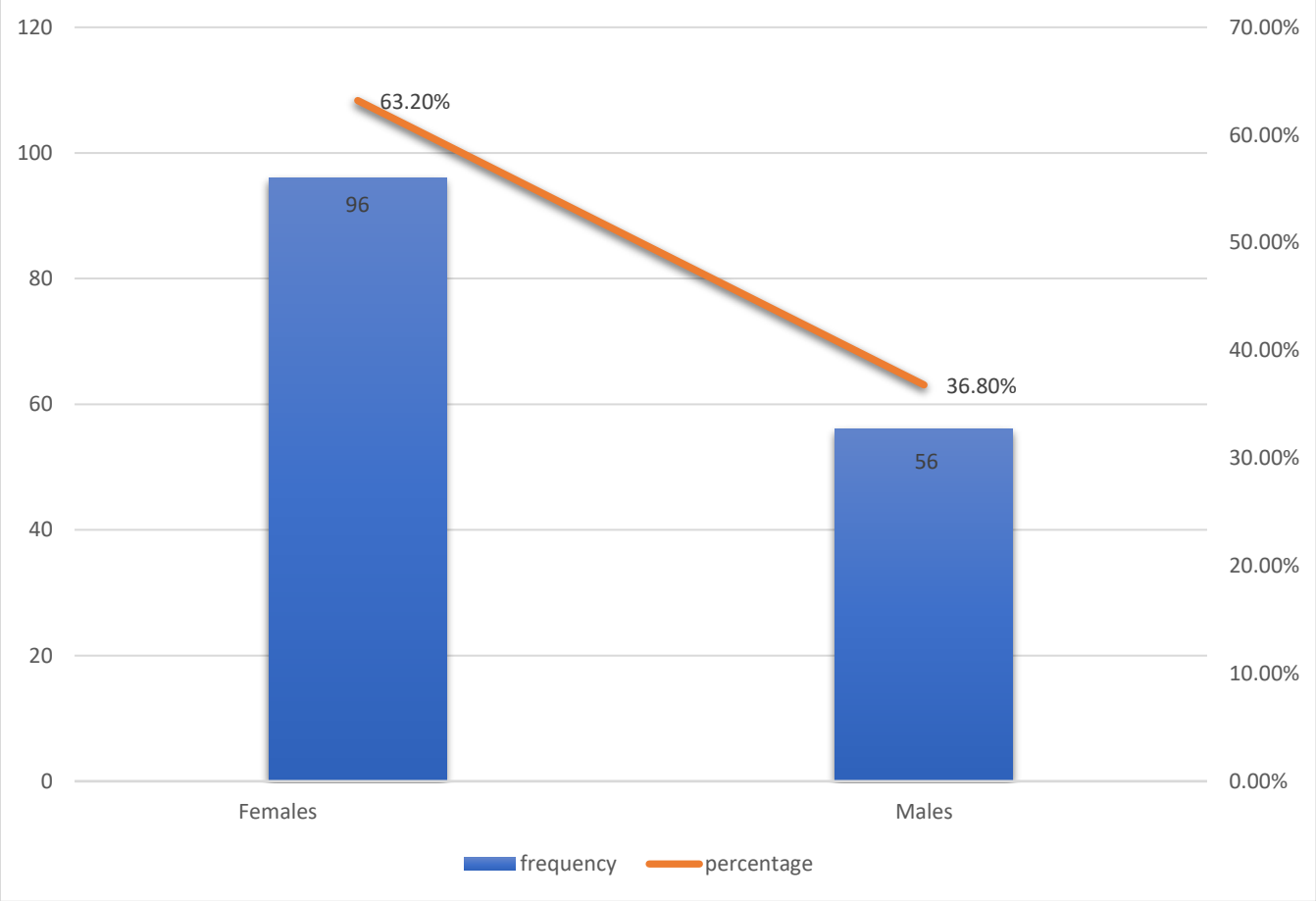

Figure 2: Prevalence of anemia in malaria positive children below 5 years according to gender

The figure above shows the prevalence of anemia in malaria positive children below 5 years according to gender where females had the highest frequency of 96(63.2%) then males with the low frequency of 56(36.8%).

The figure shows the risk factors to anemia in malaria positive children below five years attending Ishaka Adventist hospital Bushenyi District**.**

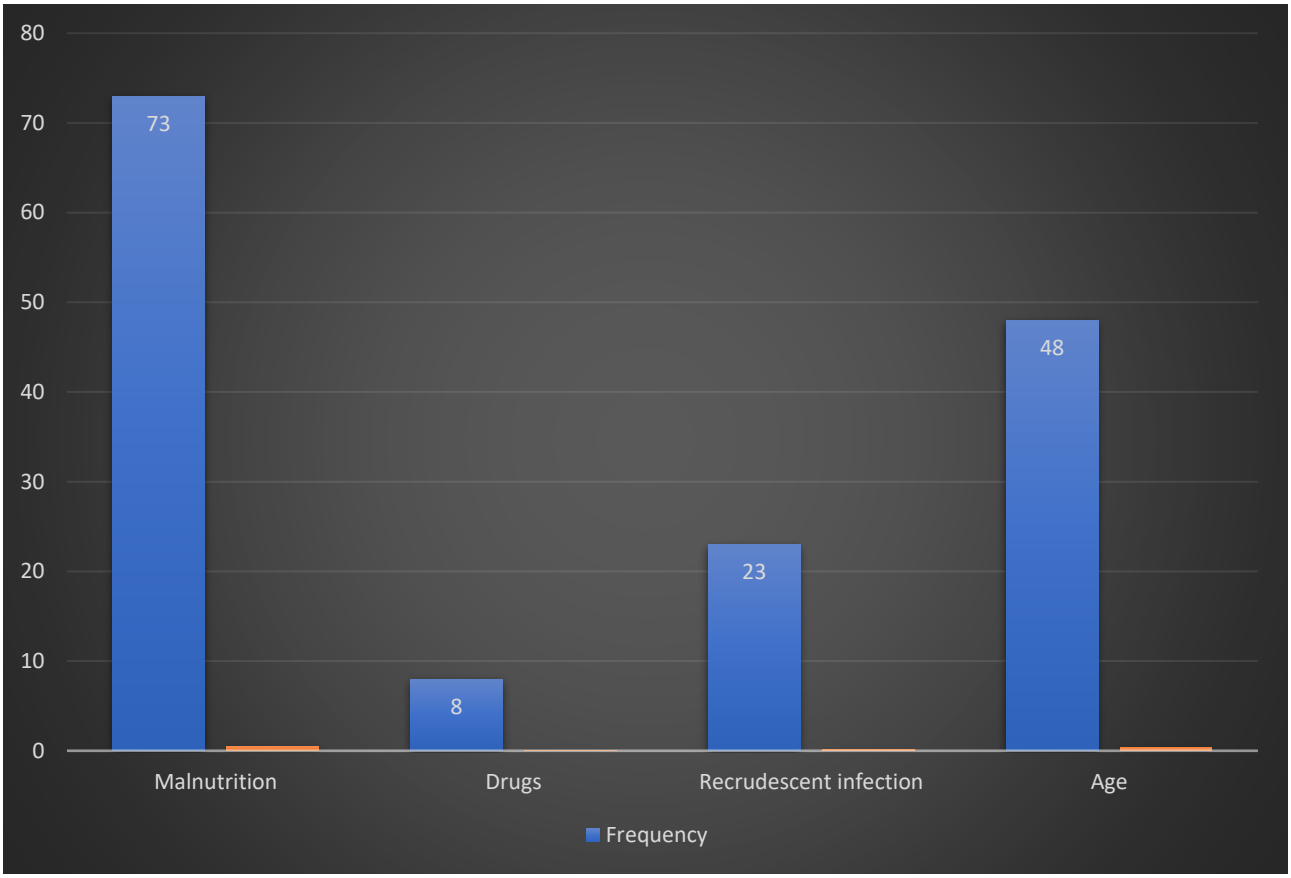

Figure 3: Risk factors to anemia in malaria positive children below 5 years

The figure above shows the risk factors to anemia in malaria positive children and they included Malnutrition, Drugs, Recrudescent infection and Age, Where Malnutrition had frequency of 73(48%), Drugs had a frequency of 8(5.3%), Recrudescent infection had 23(15.20%) and age with a frequency of 48(31.6).

Table 2: The effect of Parasitaemia on Hb level in children below 5 years

Age (years)	Malaria positive cases	Percentage	Hb below 5g/dl.	Percentage
<1	08	5.2%	3	(6.4%)
1	12	8%	5	(10.6%)
2	19	12.5%	12	(25.5%)
3	41	27%	10	(21.2%)
4	34	22.3%	6	(12.7%)
≤5	38	25%	11	(23.4%)
Total	152	100%	47	100%

According to the effects of Parasitaemia on haemoglobin levels in children below 5 years were below 1 years they had 8(5.2%) positive malaria cases and 3(6.4) had a low HB level below 5 g/dl ,children at 1 years had 12(8%) as the malaria positive cases and 5 (10.6%) had low HB level below 5g/dl ,children at 2 years had malaria positive cases of 19(12.5%) had HB levels below 5 g/dl of 12(25.5%),At 3 years malaria positive cases of 41(27%) had low HB levels 7(14.8) At 4 had malaria positive cases 34(22.3) and low HB levels of 9(19.3)and lastly children who were at 5 years had malaria positive cases of 38(25) and low HB levels of 11(23.4) among children below 5 years attending Ishaka Adventist hospital Bushenyi District.

Discussion

From the study the results for the prevalence of anemia among malaria positive children below 5 years attending Ishaka Adventist hospital were 47(31%) were the children positive for malaria and had anemia after testing while 105 (69 %) had malaria but they had no anemia and therefore they were regarded negative for the anemia among malaria positive children below 5 years and This is comparable to 32.3% reported from Ibadan, Western Nigeria. Several studies in holoendemic regions have documented severe anemia as the predominant presentation of severe malaria including this study where it accounted for 45.7 in all malaria positive children.[20] This is similar to the WHO report of a multicentre study that attributed a 51.2% contribution of severe anemia to severe malaria burden in Ibadan.[21] However Schellenberg et al in Tanzania and Modiano *et al* in Burkina Faso reported 24 and 21% prevalence of severe anemia among severe malaria cases respectively. The huge burden of severe malaria and particularly severe malaria anemia in malaria endemic region may be underestimated as a result of limited access to hospitals in developing countries.

Citation: Ajugwo AO, Bot YS, Obeagu EI, Mugabiza M. Anaemia and Plasmodiasis among children below five years attending OPD at Ishaka Adventist Hospital, Bushenyi District. *Elite Journal of Haematology, 2024; 2(2):* 34-45

This prevalence was attributed to the social demographic factors like women who were coming from the villages had the highest number of children with malaria compared to urban settlement due to high risk of mosquito in the villages ,use of insect side treated mosquito net was low among the family that had malaria positive children with anemia cases to increase anemia in children demographic characteristics of the study respondents where according to age 1 -6 months 22 (14.70%)6-12month 34(22.30%) 1-3years 44 (29%) 3- 5 52 (34%) years and according to sex, Female had a frequency of 96 (63.20%) and value of 0.076 and Males had 56 (36.80%) and value of 0.056 than duration of illness <3 days had a frequency of 65 (42.70%) and > 3 days 87 (57.30%), on Residence where many children were from the villages with a percentage of 98(64.40%) and town with 54(35.60), According to signs and symptoms ,fever had 58(38),loss of consciousness had 33(21.70),difficulty in breathing had 43 (28.2) and lastly jaundice 18(11.80)and lastly the use of insect side treated nets 98(64.50) and Despite recent advances made in malaria prevention and control globally, malaria still remains a major health concern in Sub Saharan Africa with very high mortality rates being recorded among children.[22]

The prevalence of anemia in malaria positive children below 5 years according to gender where females had the highest frequency of 96(63.2%) and males with the low frequency of 56(36.8%). The risk factors to anemia in malaria positive children and they included: Environmental, Drugs, Recrudescent infection and Age, where malnutrition had frequency of 73(48%), Drugs had a frequency of 8(5.3%), Recrudescent infection had 23(15.20%) and age with a frequency of 48(31.6%). This report is in consistent with an earlier study done in GDA hospital Gwadar June 2017 to 2017 where the mean age was found to be 3 and the percentage of anemic children among the male gender was 62.9% while females was at 65.9% indicating that females were at a higher risk of being anemic.

Conclusion

The study revealed that the prevalence of anemia in malaria positive children attending Ishaka Adventist hospital was 31% which shows that there is a need for government to increase on analyzing heamoglobin levels in all malaria positive children to curb down the burden. This study suggests a multifactorial aetiology for anemia in malaria positive children where malaria parasite enters the blood after an infective mosquito bite and infects red blood cells causing red blood cell rapture hence lowering the amount of red blood cells leading to severe anemia and also confirming that majority of affected children are clinically stable without signs of decompensation.

References

1. Papaioannou I, Utzinger J, Vounatsou P. Malaria-anemia comorbidity prevalence as a measure of malaria-related deaths in sub-Saharan Africa. Scientific reports. 2019;9(1):11323.

Citation: Ajugwo AO, Bot YS, Obeagu EI, Mugabiza M. Anaemia and Plasmodiasis among children below five years attending OPD at Ishaka Adventist Hospital, Bushenyi District. *Elite Journal of Haematology, 2024; 2(2):* 34-45

2. Ehrhardt S, Burchard GD, Mantel C, Cramer JP, Kaiser S, Kubo M, Otchwemah RN, Bienzle U, Mockenhaupt FP. Malaria, anemia, and malnutrition in African children—defining intervention priorities. The Journal of infectious diseases. 2006 Jul 1;194(1):108-14.
3. Obonyo CO, Vulule J, Akhwale WS, Grobbee DE. In-hospital morbidity and mortality due to severe malarial anemia in western Kenya. InDefining and Defeating the Intolerable Burden of Malaria III: Progress and Perspectives: Supplement to Volume 77 (6) of American Journal of Tropical Medicine and Hygiene 2007. American Society of Tropical Medicine and Hygiene.
4. Hershey CL, Florey LS, Ali D, Bennett A, Luhanga M, Mathanga DP, Salgado SR, Nielsen CF, Troell P, Jenda G, Ye Y. Malaria control interventions contributed to declines in malaria parasitemia, severe anemia, and all-cause mortality in children less than 5 years of age in Malawi, 2000–2010. The American Journal of Tropical Medicine and Hygiene. 2017 Sep 9;97(3 Suppl):76.
5. World Health Organization. (2015). World malaria report 2014: summary (No. WHO/HTM/GMP/2015.2). World Health Organization.
6. Warren, J. L., Burgert, C. R., & Emch, M. E. (2016). Influence of demographic and health survey point displacements on raster-based analyses. Spatial demography, 4, 135-153
7. Obeagu EI, Nimo OM, Bunu UO, Ugwu OP, Alum EU. Anaemia in children under five years: African perspectives. Int. J. Curr. Res. Biol. Med. 2023; 1:1-7.
8. Obeagu EI, Obeagu GU, Egba SI, Emeka-Obi OR. Combatting anemia in pediatric malaria: Effective management strategies. Int. J. Curr. Res. Med. Sci. 2023;9(11):1-7.
9. Obeagu EI, Ogunnaya FU, Obeagu GU. Integrated Approaches for Improving Pediatric Health: Addressing Anemia in Malaria Cases. Journal home page: http://www. journalijiar. com.;12(01).
10. Obeagu EI, Obeagu GU. Overcoming Hurdles: Anemia Management in Malaria-Affected Childhood. Elite Journal of Laboratory Medicine. 2024;2(1):59-69.
11. Obeagu EI, Obeagu GU. Hematological Changes Following Blood Transfusion in Young Children with Severe Malaria and HIV: A Critical Review. Elite Journal of Laboratory Medicine. 2024;2(1):33-45.
12. ObeaguEI AA, Obeagu GU. Synergistic Effects of Blood Transfusion and HIV in Children Under 5 Years with Severe Malaria: A Review. Elite Journal of HIV. 2024;2(1):31-50.
13. Obeagu EI, Obeagu GU. Advances in Understanding the Impact of Blood Transfusion on Anemia Resolution in HIV-Positive Children with Severe Malaria: A Comprehensive Review. Elite Journal of Haematology. 2024;2(1):26-41.
14. Obeagu EI, Obeagu GU. Transfusion-Related Complications in Children Under 5 with Coexisting HIV and Severe Malaria: A Review. Int. J. Curr. Res. Chem. Pharm. Sci. 2024;11(2):9-19
15. Obeagu EI, Mohamod AH. An update on Iron deficiency anaemia among children with congenital heart disease. Int. J. Curr. Res. Chem. Pharm. Sci. 2023;10(4):45-8.

Citation: Ajugwo AO, Bot YS, Obeagu EI, Mugabiza M. Anaemia and Plasmodiasis among children below five years attending OPD at Ishaka Adventist Hospital, Bushenyi District. *Elite Journal of Haematology, 2024; 2(2):* 34-45

16. Opeyemi AA, Obeagu EI. Regulations of malaria in children with human immunodeficiency virus infection: A review. Medicine. 2023 Nov 17;102(46):e36166.
17. Ogbonna CO, Obeagu EI, Ufelle SA, Ogbonna LN. Evaluation of haematological alterations in children infected by Plasmodium falciparum Species in Enugu, Enugu State, Nigeria. Journal of Pharmaceutical Research International. 2021 Feb 13;33(1):38-45.
18. Obeagu EI, Opoku D, Obeagu GU. Burden of nutritional anaemia in Africa: A Review. Int. J. Adv. Res. Biol. Sci. 2023;10(2):160-3.
19. Offie DC, Ibekwe AM, Agu CC, Esimai BN, Okpala PU, Obeagu EI, Ufelle SA, Ogbonna LN. Fibrinogen and C-Reactive Protein Significance in Children Infected by Plasmodium falciparum Species in Enugu, Enugu State, Nigeria. Journal of Pharmaceutical Research International. 2021 Mar 22;33(15):1-8.
20. Enato IG, Sadoh AE, Ibadin OM, Odunvbun ME, Osaigbovo II. Distinct pattern and prevalence of Plasmodium falciparum dihydropteroate synthase gene mutations in children with sickle cell anaemia and haemoglobin AA in Benin City, Nigeria: the impact of HbAA. The Pan African Medical Journal. 2022;43.
21. WHO. Management of the child with a serious infection or severe malnutrition: guidelines for care at the first-referral level in developing countries. Geneva: WHO; 2009.
22. Brittany Noel Robles, Adelbert B James, Raffaele Macri, Mai Xiong, Sabeen Jafri, Alyssa Vitale, Victoria Beata, Sarah Faheem and Rhonda McIntyre-Francis. (2017). Prevalence of Anemia in Preschool Aged Children Living in Dominica,Vol. 3 No. 3: 12. DOI:

Citation: Ajugwo AO, Bot YS, Obeagu EI, Mugabiza M. Anaemia and Plasmodiasis among children below five years attending OPD at Ishaka Adventist Hospital, Bushenyi District. *Elite Journal of Haematology, 2024; 2(2):* 34-45