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Prevalence and Associated Factors of Anemia among Children Admitted to a Pediatric Ward: A Cross-Sectional Study in Hoima Regional Referral Hospital, Uganda

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ABSTRACT

Anemia remains a significant public health concern among children under five years of age worldwide, particularly in low-resource settings. This study aimed to investigate the prevalence and associated factors of anemia among children admitted to the pediatric ward of Hoima Regional Referral Hospital in Western Uganda. A cross-sectional study was conducted, involving demographic data collection, clinical history, and hematological parameters analysis. The prevalence of anemia was determined based on World Health Organization criteria for hemoglobin levels, with factors such as nutritional status, socioeconomic status, and comorbidities explored through statistical analysis. Results revealed a concerning prevalence of anemia among pediatric ward children, with 70% found to be anemic. Factors such as malnutrition, low socioeconomic status, and presence of comorbidities were significantly associated with an increased risk of anemia. These findings underscore the importance of comprehensive strategies targeting the prevention and management of anemia in pediatric populations, particularly among those hospitalized.

Keywords: Anemia, children, pediatric, malnutrition

INTRODUCTION

Defined broadly as a condition associated with lower-than-normal hemoglobin concentration, anemia impairs the circulation of oxygen in the blood, which in turn has detrimental effects on suboptimal child growth, impaired learning, and reduced work productivity and income earning during adulthood [1]. For children between 6 and 59 months (generally referred to as under-fives), the threshold Hb level for being nonanemic is 11.0 grams per deciliter. Anemia diagnosis is classified as mild (Hb=10.0-10, moderate (Hb=7.0-9.9 g/dl), severe (Hb<7.0g/dl), and normal (Hb≥11.0 g/dl) Hb level concentration for children aged 6 to 59 months [1, 2]. Approximately 50%of anemia cases are due to iron deficiency, though the proportion varies among population groups and in different areas, according to the prevailing local conditions [3]. Globally, it is estimated that above two billion people are affected by anemia. In Latin America, the proportion of the population suffering from anemia by the end of the past decade was estimated to reach more than 100 million (nearly 20% of the total) and this included 22 million children less than 5 years, [4, 5]. In China in 2012, 28.2 and 20.5% of children 6–12 and 13–24months of age, respectively, had anemia [6]. Iron deficiency affects a significant part, and often a majority, of the population in nearly every country in the world [7]. In 2012, the World Health Assembly Resolution 65.6 endorsed Comprehensive implementation plan on maternal, infant and young child nutrition, which specified six global nutrition targets for 2025 [8].

More than 100 million African children are thought to be anemic and community-based estimates of anemia prevalence in children in settings where malaria is endemic range between 49% and 76%. Anemia is one of the largest killers of children admitted to hospital in sub- Saharan Africa [9, 10]. The consequences, in terms of years of life lost, of such a high level of aneamia are hard to quantify, although the burden of malaria related anaemia is estimated at 000–974 000 deaths per year in children under 5 years of age [9, 11]. In Ghana, the prevalence for anemia among children aged 6 to 59 months in the year 2014, according to Ghana Demographic and Health Survey [GDHS], (2014) report, was 66%, with the Volta Region's rate superseding the national prevalence rate (69.9%). In East Africa, anemia continues to be a serious public health problem, especially among children under 5 years of age and recent estimates from countries such as Tanzania and Kenya range from 20% - 56% in rural and urban areas [9, 12]. According to the Tanzania Demographic and Health Survey 2015 (TDHS), 58% of children under the age of 5 years in Tanzania were anemic. A recent study in Mwanza, Tanzania reported a prevalence rate of anemia at 77.2% (with mild, moderate, and severe anemia being reported in 16.5%, 33%, and 27.7%, respectively) [13].

Similarly, in Uganda, it is estimated that up to (53%) of children under 5 years of age are anemic [14, 15]. Furthermore, in Uganda, four out of 10 children below 5 years of age or (23%) suffer from underweight and (6%) suffer from acute malnutrition [16]. Further still, micronutrient malnutrition also remains widely prevalent, specifically deficiencies in

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iodine and Iron-Deficiency Anemia (IDA), and IDA affects (73%) of preschool children [17]. Given the significantly high levels of anemic under-five children in Uganda, there is strong need for action. In order to design and deliver effective interventions, it is important to know the strong risk factors for predicting anemia among under-five children. The intent of this study was to first affirm the baseline prevalence rates of anemia in under-five children in a hospital setting to implementation of an intervention to address anemia among the under-five children.

The global epidemiologic burden of anemia has been widely recognized, as one-third of the global population remain anemic [18]. Anemia is one of the most common health problems affecting children. Anemia affects populations in both rich and poor countries. It is an indicator of both poor nutrition and poor health [19]. Aneamia among children under 5 years of age is a public health problem in most countries, especially those in Africa, and Uganda is not an exception [20]. Anemia has adverse effects on children, especially in the first two years of life, such as behavioral delay, reduced cognitive development (impaired learning and decreased school achievement), low immunity and growth weight, fatigue, difficulty with concentration, lethargy, increased mortality, and susceptibility to infection. In Uganda, anemia is a recognized public health problem and its prevalence in some parts of the country is as high as 100% [21]. Anaemia develops through three main mechanisms: ineffective erythropoiesis (when the body makes too few red blood cells), haemolysis (when red blood cells are destroyed) and blood loss. Nutritional deficiencies, diseases and genetic haemoglobin disorders are the most common contributors to anaemia. The most common causes of anaemia include nutritional deficiencies, particularly iron deficiency, though deficiencies in folate, vitamins B12 and A are also important causes [2]. Undernutrition is a common problem in Hoima in Hoima district. A study conducted in Kahoora division reported that stunting, underweight, wasting, and overweight was observed among 19.4%, 10.4%, 6.7%, and 3.3% of study participants respectively [22]. However, the prevalence and factors associated with anemia among children admitted at Hoima regional referral hospital is not known. Therefore, this study seeks to feel the gap buy describing the prevalence and factors associated with anemia among children admitted at Hoima regional referral hospital. Determining the prevalence of anemia and associated factors among children under five years of age in peadiatric ward in Hoima Regional Referral Hospital, in Uganda was the aim of this study.

METHODOLOGY

Study Design

A quantitative cross section study approach was conducted in order to determine the prevalence of anemia and associated factors among children under five years of age in peadiatric ward in Hoima Regional Referral Hospital, in Uganda.

Area of Study

The study was conducted at Hoima Regional Referral Hospital. The hospital is approximately 110 kilometres (68 mi), by road, north-west of Mubende Regional Referral Hospital. This is approximately 198 kilometres (123 mi), by road, north-west of Mulago National Referral Hospital, in Kampala, Uganda's capital city. The coordinates of Hoima Regional Referral Hospital are 01°25'41.0"N, 31°21'16.0"E (Latitude:1.428051; Longitude:31.354451). Hoima Hospital is a public hospital, funded by the Uganda Ministry of Health, and general care in the hospital is free. It is one of the thirteen Regional Referral Hospitals in Uganda. The hospital is one of the fifteen internship hospitals in Uganda where graduates of Ugandan medical schools can serve one year of internship under the supervision of qualified specialists and consultants. The bed capacity of Hoima Hospital was reported to be 280 in 2013. Of the 337 gazetted staff positions, only 251 were filled as of March 2011, leaving 85 vacant positions. Established in 1935, the facility initially functioned as a district hospital. In 1994, it was upgraded to Regional Referral status for the Bunyoro sub-region. It also serves patients from nearby Eastern Democratic Republic of the Congo. In 2019, the Ugandan Ministry of Health estimated the hospital's catchment population to number approximately 3 million people.

Study Population

The study was conducted among caretakers of children under five years of age in peadiatric ward in Hoima Regional Referral Hospital, in Uganda.

Inclusion Criteria

It will include all caretakers of children under five years of age in peadiatric ward in Hoima Regional Referral Hospital that were available at the time of collecting data and willing to participate in the study.

Exclusion Criteria

Children with a recent history of blood transfusion (< 3 months) and those receiving iron supplementation will be excluded from this study.

Sample Size Determination

The sample size will be determined using the Kish Leslie's formula [23]. n = Estimated minimum sample size required p = Proportion of a characteristic in a sample e = the acceptable Margin of error set a 5%. z = 1.96 (for 95% confidence interval).

Sampling Method

Simple random sampling technique was used to choose respondents to participate in the study, from whom data was collected.

Data Collection Method

Data was collected using an interviewer-administered questionnaire. The researcher met with the targeted respondents

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that took part in the study, after obtaining permission for data collection from respondents. Each participant was required to give an informed consent before enrolling in the study. The researcher assisted the respondents in filling the questionnaires by explaining to the respondents for clarifications. The properly filled questionnaires were then collected and then data was taken for analysis.

Data Analysis

The qualitative data collected was statistically analyzed and documented using Microsoft Excel and Word version 2019 which will then be analyzed using Microsoft Excel version 2019. The analyzed data was then presented in form of tables and graphs which formed a basis for discussion and conclusion among others.

Ethical Considerations

Participants was given information regarding the research to seek consent. Each participant's choice to participate or not was respected and data collected from participants was kept confidential. The participants' names will not be included while filling out the questionnaire to maintain privacy. It was clearly communicated that information obtained from the participants would be kept under lock and key to only be used for research purposes.

RESULTS

Table 1: Demographic Characteristics of Study Respondents

Characteristics		**Frequencies**	**Percent (%)**
Child sex	Male	40	42
	Female	56	58
Child age	6–11 months	27	28
	12–23 months	26	28
	24–35 months	19	20
	36–47 months	12	12
	48–59 months	11	12
Residence	Urban	26	28
	Rural	70	73
Mothers age	18–27 years	50	52
	28–38 years	44	46
	39–40 years	2	2
Mother's education	Non-formal	57	60
	Primary	26	27

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	Secondary	13	13
Mother's occupation	Housewife	73	76
	Small-scale business	4	4
	Government employee	1	1
	Farmer	19	20
Family's monthly income	Below 200,000	35	36
	200,001–500,000	56	58
	>500,001	6	6
Birth order	1st	74	77
	2nd	13	13
	3rd	6	6
	4th and above	3	3
Number of children aged <5 years	0	3	4
	1	72	75
	2	21	22

The study included 96 children under the age of five. More than half of the children (56%) were under the age of two, and 58% were female. Almost three-quarters (73%) of the children were from rural areas. The majority (52%) of child caregivers/mothers were between the ages of 18 and 27, 60% had no formal education, and 76% worked as housewives. The majority of mothers (75%) had one child under the age of five, and 78% of the children studied were born first. The majority (58%) earned between UGX200,000 and UGX500,000 per month. In terms of nutritional status, more than half of the children (52%) were underweight, 36.1% wasted, and 53% stunted. Only 30 (7.4%) of the children had started complementary foods before 6 months of their age as showed in table 1 above.

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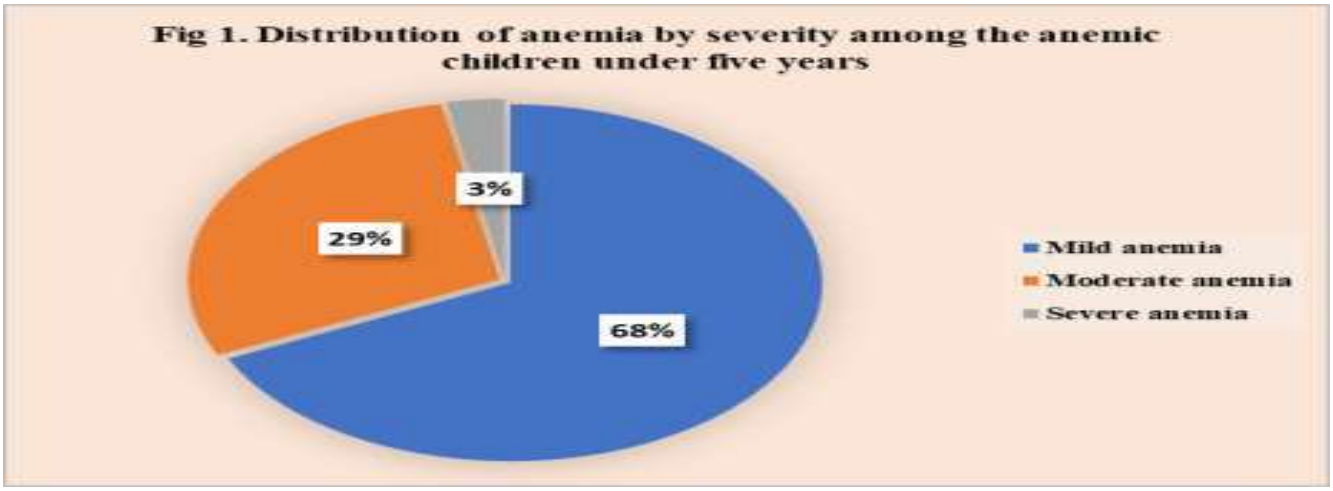

The Overall Prevalence of Anemia in this study was 41% (96/234). Sixty-eight percent of the anemic under-five children had mild anemia, 29% had moderate anemia, and only 3% had severe anemia (Fig 1). There was little difference in prevalence between males and females (40% And 42%). The highest prevalence was recorded in the age group of 6-11 months (57%) and gradually decreased as the children's ages increased. Anemia was also found more in children who Lived in cities (50%), Children whose mothers were over the age of 39 (57%), and children whose mothers had no formal education (48%). Furthermore, a high prevalence of anemia was found in children with a family monthly income of less than 200,000 (48%), early (<6 Months) introduction of complementary foods (73%), low MAUC (48%), and underweight (50%).

Table 2: Prevalence of anemia among children under five years

Characteristics		Anemia	
		Yes (%)	No (%)
Child sex	Male	40	60
	Female	42	58
Child age	6–11 months	57	43
	12–23 months	49	51
	24–35 months	35	65
	36–47 months	16	84
	48–59 months	21	79

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Residence	Urban	49	51
	Rural	38	62
Mothers age	18–27 years	50	50
	28–38 years	30	70
	39–40 years	57	43
Mothers' education	Non-formal	48	52
	Primary	37	63
	Secondary	18	82
Mothers' occupation	Housewife	43	57
	Small-scale business	37	63
	Gov employee	0	100
	Farmer	35	65
Family's monthly income	Below 200,000	48	52
	200,001–500,000	40	60
	>500,001	13	87
Birth order	1st	43	57
	2nd	35	65
	3rd	32	68
	4th and above	33	67
Number of children aged <5 years	0	71	29
	1	39	61
	2	42	58
Introduction of complementary foods	< 6 months	73	27
	> 6 months	38	62
Underweight	No	31	69
	Yes	50	50
Wasted	No	38	62
	Yes	46	54
Stunted	No	42	58
	Yes	41	59

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Low MUAC	Yes	48	52
	No	21	79
Intestinal parasite	No	40	60
	Yes	59	41

DISCUSSION

This study examined the prevalence of anemia and associated factors in children under the age of five at Hoima Regional Referral Hospital's pediatric ward. This study discovered that 96 children under the age of five had hemoglobin levels less than 11.0 g/dL, indicating a 41% prevalence of anemia. This is slightly lower than the global prevalence of 47.7% [24], 47.4% in Ethiopia [4, 25, 26], and 58.8% in the Ugandan district of Namutumba [27]. While the causes of this significantly higher variance are multifactorial, it is most likely attributed to a number of factors. First, our study population included children who were sick and sought formal health care, which may imply that they had already developed anemia given our communities' poor health care seeking behaviors. Second, this population has low living standards, which may warrant high parasitic infection burdens, which are known risk factors for anemia. Several studies have found a higher prevalence, including 84% in Tanzania [28], 51.8% in Cape Verde [29], and 58.8% in Uganda's Namutumba District [27]. The disparity in prevalence could be attributed to differences in study design, sampling techniques, and sample size. The difference could also be attributed to differences in the geographical location of the study participants, as well as differences in the socio-demographic characteristics or socioeconomic status of parents in the areas. According to WHO, determining the severity of anemia could aid in reducing morbidity and mortality. Regarding the levels of anemic status, in this study, the majority of the anemic children had mild anemia followed by moderate anemia and very few had severe anemia [30-40]. This finding agrees with studies conducted in Ethiopia [18], Tanzania [28] and Cape Verde ([29]. Similar to previous research from Ethiopia [30] and Ghana's Volta Regional Hospital [31], the current study discovered that sex difference had no association with anemia. Other research, however, revealed a higher prevalence of anemia in boys than in girls [26], as well as in girls than in boys [32]. This contradiction may be explained by social norms in differences in iron-rich food intake between women; nevertheless, more research is needed to properly understand this complicated topic. The current study discovered a link between maternal education levels and anemia, which is consistent with previous research [32]. Children of low-education mothers were more likely to be anemic than children of secondary and higher-education mothers. This may be explained by the fact that education improves the mother's information required for their children's health and an appropriate feeding practice, both of which contribute to their children's nutritional status. This finding, however, contradicts the findings of a study conducted in Northwest Ethiopia[30]. The current study also discovered that children from low-income families were more likely to be anemic than those from high-income families. This finding was consistent with earlier studies conducted in different sections of the country and countries, which found that children from low- income families were more likely to suffer from anemia than their counterparts [30]. One probable explanation for the high frequency of anemia is that low-income families are less likely to purchase nutrient- rich foods (such as iron, vitamins, and so on), secure food availability, and afford health care for their children when they are ill [31-40]. The higher prevalence of anemia among children from lower- income families and with less educated moms suggests that anemia is a marker of socioeconomic disadvantage [32]. The greater prevalence of anemia found in children with early (<6 months) introduction of supplemental foods was consistent with prior research [30]. Complementing breast milk before 6 months of age reduces iron bioavailability by up to 80%; early introductions of complementary foods such as cow's milk interfere with iron absorption in breast milk because cow's milk contains excess protein and minerals, particularly calcium, and most digestive enzymes are insufficient at this age [32].

CONCLUSION

Anemia was found to be 41% prevalent in this study. Anemia was common in children under the age of five, and it is a serious public health issue in the studied region. Anemia was substantially linked with age, residence, family income, maternal education, the introduction of supplemental meals, and nutritional status. As a result, governments should devise a strategy to prevent anemia by reducing poverty and increasing women's awareness of breastfeeding, nutrition, and other related variables.

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REFERENCES

1. Adugna, D.G., Kibret, A.A., Aragie, H., Enyew, E.F., Dessie, G., Melese, M., Simegn, W., Abebe, E.C., Admasu, F.T., Dejenie, T.A.: Prevalence and determinants of anemia among children aged from 6 to 59 months in Liberia: a multilevel analysis of the 2019/20 Liberia demographic and health survey data. Front. Pediatr. 11, 1152083 (2023). https://doi.org/10.3389/fped.2023.1152083
2. Chaparro, C.M., Suchdev, P.S.: Anemia epidemiology, pathophysiology, and etiology in low- and middle-income countries. Ann. N. Y. Acad. Sci. 1450, 15–31 (2019). https://doi.org/10.1111/nyas.14092
3. Alum, E. U., Ugwu, O. P. C., Aja, P. M., Obeagu, E. I., Inya, J. E., Onyeije, P. E., Agu, E. and Awuchi, C. G. Restorative effects of ethanolic leaf extract of *Datura stramonium* against methotrexate-induced hematological impairments, Cogent Food & Agriculture, 2023; 9:1, DOI: 10.1080/23311932.2023.2258774. https://doi.org/10.1080/23311932.2023.2258774
4. Kebede, D., Getaneh, F., Endalamaw, K., Belay, T., Fenta, A.: Prevalence of anemia and its associated factors among under-five age children in Shanan gibe hospital, Southwest Ethiopia. BMC Pediatr. 21, 542 (2021). https://doi.org/10.1186/s12887-021-03011-5
5. Mwaiswelo, R.O., Mmbando, B.P., Chacky, F., Molteni, F., Mohamed, A., Lazaro, S., Mkalla, S.F., Samuel, B., Ngasala, B.: Malaria infection and anemia status in under-five children from Southern Tanzania where seasonal malaria chemoprevention is being implemented. PLOS ONE. 16, e0260785 (2021). https://doi.org/10.1371/journal.pone.0260785
6. Huang, Z., Jiang, F., Li, J., Jiang, D., Xiao, T., Zeng, J.: Prevalence and risk factors of anemia among children aged 6–23 months in Huaihua, Hunan Province. BMC Public Health. 18, 1267 (2018). https://doi.org/10.1186/s12889-018-6207-x
7. Obeagu, E. I., Bot, Y. S., Obeagu, G. U., Alum, E. U. and Ugwu, O. P. C. Anaemia and risk factors in lactating mothers: a concern in Africa. *International Journal of Innovative and Applied Research.* 2023; **11**(02): 15-17. Article DOI: 10.58538/IJIAR/2012 DOI URL: http://dx.doi.org/10.58538/IJIAR/2012.
8. Global nutrition targets 2025: policy brief series, https://www.who.int/publications-detail-redirect/WHO-NMH-NHD-14.2
9. Khalaf, W., Al-Rubaie, H.A., Shihab, S.: Studying anemia of chronic disease and iron deficiency in patients with rheumatoid arthritis by iron status and circulating hepcidin. Hematol. Rep. 11, 7708 (2019). https://doi.org/10.4081/hr.2019.7708
10. Obeagu, E., Obeagu, G., Alum, E., Paul-Chima, O., P.C., U., Extension, K.P.: Anemia as a Prognostic Marker for Disease Progression in HIV Infection. 11, 33–44 (2023)
11. Tesema, G.A., Worku, M.G., Tessema, Z.T., Teshale, A.B., Alem, A.Z., Yeshaw, Y., Alamneh, T.S., Liyew, A.M.: Prevalence and determinants of severity levels of anemia among children aged 6–59 months in sub-Saharan Africa: A multilevel ordinal logistic regression analysis. PLoS ONE. 16, e0249978 (2021). https://doi.org/10.1371/journal.pone.0249978
12. Menon, M.P., Yoon, S.S.: Prevalence and Factors Associated with Anemia among Children under 5 Years of Age—Uganda, 2009. Am. J. Trop. Med. Hyg. 93, 521–526 (2015). https://doi.org/10.4269/ajtmh.15-0102
13. Shenton, L.M., Jones, A.D., Wilson, M.L.: Factors Associated with Anemia Status Among Children Aged 6–59 months in Ghana, 2003–2014. Matern. Child Health J. 24, 483–502 (2020). https://doi.org/10.1007/s10995-019-02865-7
14. Wasswa, R., Kananura, R.M., Muhanguzi, H., Waiswa, P.: Spatial variation and attributable risk factors of anaemia among young children in Uganda: Evidence from a nationally representative survey. PLOS Glob. Public Health. 3, e0001899 (2023). https://doi.org/10.1371/journal.pgph.0001899
15. Baluku, J.B., Anguzu, G., Nassozi, S., Babirye, F., Namiiro, S., Buyungo, R., Sempiira, M., Wasswa, A., Mulwana, R., Ntambi, S., Worodria, W., Andia-Biraro, I.: Prevalence of HIV infection and bacteriologically confirmed tuberculosis among individuals found at bars in Kampala slums, Uganda. Sci. Rep. 10, 13438 (2020). https://doi.org/10.1038/s41598-020-70472-6
16. Legason, I.D., Atiku, A., Ssenyonga, R., Olupot-Olupot, P., Barugahare, J.B.: Prevalence of Anaemia and Associated Risk Factors among Children in North-western Uganda: A Cross Sectional Study. BMC Hematol. 17, 10 (2017). https://doi.org/10.1186/s12878-017-0081-0
17. Haq, I. ul, Mehmood, Z., Mujahid, A.M., Ahmed, B., Shah, J., Khan, N., Haq, I.U., Shahzad, M., Khan, E.A., Khan, A., Zeb, U., Xu, J., Xue, Y., Chen, X.: Prevalence of Micronutrient Deficiencies among Preschool and School-Going Children in Flood-Hit Areas of Pakistan. Am. J. Trop. Med. Hyg. 105, 1638–1644 (2021). https://doi.org/10.4269/ajtmh.21-0705

18. Ocan, A., Oyet, C., Webbo, F., Mwambi, B., Taremwa, I.M.: Prevalence, morphological characterization, and associated factors of anemia among children below 5 years of age attending St. Mary’s Hospital Lacor, Gulu District, Northern Uganda. J. Blood Med. 9, 195–201 (2018). https://doi.org/10.2147/JBM.S184126
19. Obeagu, E. I., Nimo, O. M., Bunu, U. M., Ugwu, O. P.C. and Alum, E.U. Anaemia in children under five years: African perspectives. Int. J. Curr. Res. Biol. Med. 2023; (1): 1-7. DOI: http://dx.doi.org/10.22192/ijcrbm.2023.08.01.001.
20. Nogueira-de-Almeida, C.A., Ued, F. da V., Ciampo, L.A.D., Martinez, E.Z., Ferraz, I.S., Contini, A.A., Cruz, F.C.S. da, Silva, R.F.B., Nogueira-de-Almeida, M.E., Lamounier, J.A.: Prevalence of childhood anaemia in Brazil: still a serious health problem: a systematic review and meta-analysis. Public Health Nutr. 24, 6450–6465 (2021). https://doi.org/10.1017/S136898002100286X
21. Nankinga, O., Aguta, D.: Determinants of Anemia among women in Uganda: further analysis of the Uganda demographic and health surveys. BMC Public Health. 19, 1757 (2019). https://doi.org/10.1186/s12889-019-8114-1
22. Maniragaba, V.N., Atuhaire, L.K., Rutayisire, P.C.: Undernutrition among the children below five years of age in Uganda: a spatial analysis approach. BMC Public Health. 23, 390 (2023). https://doi.org/10.1186/s12889-023-15214-9
23. Wiegand, H.: Kish, L.: Survey Sampling. John Wiley & Sons, Inc., New York, London 1965, IX + 643 S., 31 Abb., 56 Tab., Preis 83 s. Biom. Z. 10, 88–89 (1968). https://doi.org/10.1002/bimj.19680100122
24. Anemia in women and children - PAHO/WHO | Pan American Health Organization, https://www.paho.org/en/enlace/anemia-women-and-children
25. Aliyo, A., Jibril, A.: Anemia and Associated Factors Among Under Five Year Old Children Who Attended Bule Hora General Hospital in West Guji zone, Southern Ethiopia. J. Blood Med. Volume 13, 395–406 (2022). https://doi.org/10.2147/JBM.S363876
26. Azmeraw, M., Kassaw, A., Habtegiorgis, S.D., Tigabu, A., Amare, A.T., Mekuria, K., Temesgen, D., Zemariam, A.B., Kerebeh, G., Bantie, B., Alemnew, D., Abate, B.B.: Prevalence of anemia and its associated factors among children aged 6–23 months, in Ethiopia: a systematic review and meta analysis. BMC Public Health. 23, 2398 (2023). https://doi.org/10.1186/s12889-023-17330-y
27. Kuziga, F., Adoke, Y., Wanyenze, R.K.: Prevalence and factors associated with anaemia among children aged 6 to 59 months in Namutumba district, Uganda: a cross- sectional study. BMC Pediatr. 17, 25 (2017). https://doi.org/10.1186/s12887-017-0782-3
28. Sunguya, B.F., Ge, Y., Mlunde, L., Mpembeni, R., Leyna, G., Huang, J.: High burden of anemia among pregnant women in Tanzania: a call to address its determinants. Nutr. J. 20, 65 (2021). https://doi.org/10.1186/s12937-021-00726-0
29. Semedo, R., Santos, M., Baião, M., Luiz, R., Veiga, G.: Prevalence of Anaemia and Associated Factors among Children below Five Years of Age in Cape Verde, West Africa. J. Health Popul. Nutr. 32, 646–57 (2014)
30. Enawgaw, B., Workineh, Y., Tadesse, S., Mekuria, E., Addisu, A., Genetu, M.: Prevalence of Anemia and Associated Factors Among Hospitalized Children Attending the University of Gondar Hospital, Northwest Ethiopia. EJIFCC. 30, 35–47 (2019)
31. Akowuah, J.A., Owusu-Addo, E., Opuni, A.A.: Predictors of Anaemia Prevalence Among Ghanaian Pregnant Women: A Cross-Sectional Study. Inq. J. Med. Care Organ. Provis. Financ. 59, 00469580221086919 (2022). https://doi.org/10.1177/00469580221086919
32. Gebreweld, A., Ali, N., Ali, R., Fisha, T.: Prevalence of anemia and its associated factors among children under five years of age attending at Guguftu health center, South Wollo, Northeast Ethiopia. PLoS ONE. 14, e0218961 (2019). https://doi.org/10.1371/journal.pone.0218961
33. Ezekwe, C. I., Uzomba, C. R., & Ugwu, O. P. C. (2013). The effect of methanol extract of Talinum triangulare (water leaf) on the hematology and some liver parameters of experimental rats. *Global Journal of Biotechnology and Biochemistry*, *8*(2), 51-60.
34. Nwaka, A. C., Ikechi-Agba, M. C., Okechukwu, P. U., Igwenyi, I. O., Agbafor, K. N., Orji, O. U., & Ezugwu, A. L. (2015). The effects of ethanol extracts of Jatropha curcas on some hematological parameters of chloroform intoxicated rats. *American-Eurasian Journal of Scientific Research*, *10*(1), 45-49.
35. Enechi, O. C., Okpe, C. C., Ibe, G. N., Omeje, K. O., & Ugwu Okechukwu, P. C. (2016). Effect of Buchholzia coriacea methanol extract on haematological indices and liver function parameters in Plasmodium berghei-infected mice. *Global Veterinaria*, *16*(1), 57-66.
36. Ezekwe, C. I., Okoro, I. J., Ugwu, P. C., & Ezea, S. C. (2013). The effect of methanol extract of Talinum

ONLINE ISSN: 2992-5797

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triangulareon some selected hematological and Kidney parameters of experimental rats. *World J Pharm Pharm Sci*, *2*(6), 4383-4396. Obioma, B. E., Okechukwu, P. U., Emmanuel, I. O., & Ifemeje, J. C. (2014). Antianaemic potential of aqueous leaf extract of Mucuna pruriens on wister albino rats. *Int. J. Curr. Microbiol. App. Sci*, *3*(1), 707-712.

37. Chukwuemeka, I., Utuk, G. S., Ugwu Okechukwu, P. C., Ibiam, U. A., Aja, P. M., & Offor, C. E. (2015). The effect of ethanol leaf extract of Jatropha curcas on some haematological parameters of cyclophosphomide induced anaemia in wister albino rats. *European Journal of Applied Sciences*, *7*(1), 17-20
38. Offor, S. C. E., Ukpabi, E. N., Ogbanshi, M. E., Okechukwu, P. U., & Nwali, B. U. (2014). The effects of ethanol leaf-extract of Anacardium occidentale on haemoglobin and packed cell volume of albino rats. *World Journal of Alternative Medicine*, *1*(1), 05-08.
39. Adonu, C. C., Ugwu, O. P., Bawa, A., Ossai, E. C., & Nwaka, A. C. (2013). Intrinsic blood coagulation studies in patients suffering from both diabetes and hypertension. *Int J Pharm Med Bio Sci*, *2*(2), 36-45.
40. Offor, C. E., Okaka, A. N. C., Ogbugo, S. O., Egwu, C. O., & Ugwu, P. C. Effects of ethanol leaf extract of Pterocarpus santalinoides on haemoglobin, packed cell volume and platelets. *IOSR-JNHS 2015; 4: 108, 112.*

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