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Prevalence and Demographic Characteristics of Anaemia among Children under five Years at Hoima Regional Referral Hospital, Hoima City

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ABSTRACT

Globally, anemia was estimated to affect about one-quarter of the entire population. Children below 5 years of age have the highest estimated prevalence of anemia, with reports of 42% – 47% being affected in Africa. Despite various interventions by the Ugandan Ministry of Health, anemia prevalence still ranges from 38 to 46% to as high as 72 percent in some regions of Uganda**.** This study sought to assess the prevalence and demographic characteristics of anemia among children under five years old at Hoima Regional Referral Hospital, Hoima City (HRRH)**.** The study used a descriptive cross-sectional hospital-based survey at Hoima Regional Referral Hospital in which 385 caregivers were recruited into the study by convenient sampling technique. The study found that malaria was a significant factor in the occurrence of anemia in under five children. The study also found that post-primary education level 21(56.3%) and age of less than 30 at 192(57%) were protective factors against anemia. There was a high anemia prevalence in under-five children in which child malaria and malnutrition were contributing factors while a good caregiver education and being below 30 years were protective factors. There is a need for mass media sensitization of masses on child anemia, its risk factors, and how it can be prevented, Post-natal mothers and other caregivers should be advised on the nutritional requirements of children at different ages to prevent such anemia complications.

Keywords: Anemia, Children below 5 years of age, Caregivers, Malaria, Malnutrition, Postnatal care.

INTRODUCTION

Anemia is a prevalent public health problem affecting all countries, but the greatest burden is in developing countries, most notably in the sub-Saharan Africa region. It is a condition in which the number of red blood cells or their ability to carry oxygen is not enough to meet the physiological needs of a person [1, 2]. Diagnosis of anemia is through blood examination for the hemoglobin or hematocrit concentration of a standard threshold by age and sex and thus a hemoglobin concentration below 11 g/dl is defined as anemia [3]. All over the world, children who are not up to five years old are exposed to health problems like malaria and this increases the incidence of anemia [4, 5]**.** Childhood anemia is the manifestation of multiple underlying diseases that increase under-five mortality and morbidity in low and middle-income countries. Iron deficiency is the leading causative factor of anemia, accounting for nearly half of the anemia prevalence globally [6,7]. Globally, anemia is estimated to affect about one-quarter of the entire population. Children below 5 years of age have the highest estimated prevalence of anemia, with reports of 42% – 47% being affected in Africa. Overall, high prevalence rates are reported in the sub-Saharan Africa region, with some countries reporting a prevalence above 70% in the general population [8]. In Uganda, some hospital-based data on anemia is available with a few of the studies, anemia prevalence ranges from 38 to 46% [9]. Anemia is a major nutritional problem in the world and it affects 1.62 billion people**.** The anemia burden is the third top-ranked childhood cause of death, which accounts for 8.1% of the total mortalities [9]. Furthermore, the effects of anemia in a population are both short and long term**,** such as a wide range of health problems like heart failure, poor cognitive performance, and macro- and micronutrient deficiencies [10]. Nutritional deficiencies (such as iron, folate, vitamins B_{12} and A); hemoglobinopathies, and infectious diseases such as malaria, tuberculosis, HIV, and hookworm)

are the most common causes of anemia in children [11]. These are influenced by several biological, aetiological, sociodemographic, and genetic factors mainly including child sex, age, birth weight, parasites, history of recent infection, diarrhea episode, diet, parental education, nutrition, parity, household size, wealth index, and residence [12]. Many countries have sought support to combat this preventable public health concern. In 2014, a comprehensive plan on maternal, infant, and young child nutrition was approved by the World Health Assembly, with anemia being one of the global targets for reduction (by 50%) by 2025 and subsequent alleviation [13]. However, the commonest and most cost-effective approaches for anemia prevention include: i) iron supplementation by tablets, ii) dietary supplementation, and iii) food fortification. In severe cases, blood can be transfused to resolve anemia [14].

Childhood anemia is a public health interest due to its irreversible impact posed on children's physical health and cognitive development [15]. However despite the adverse effects of anemia on child development, it is preventable and curable upon diagnosis [16]. Despite the appreciable global progress in the socio-economic and health status of the community, sub-Saharan African countries are still faced with a huge number of under-five mortality with about 67.6% of under-five children in Africa are suffering from anemia and is responsible for 5–18% of under-five mortality [17]. In Uganda the Ministry of Health has put in place deliberate interventions to improve maternal and child health outcomes through the Reproductive, Maternal, Neonatal and Child Health Sharpened Plan [18]. Despite having all these interventions in place, anemia prevalence still ranges from 38 to 46% [9] and as high as 72.00 percent in some regions of Uganda [19]. Meanwhile, there is limited study on the prevalence and associated factor of anemia among under-five age children in our study area. Therefore, this study aims to determine the prevalence of anemia and its associated factors among under-five children in Hoima Regional Referral Hospital in western Uganda.

METHODOLOGY

Study design

The study used a descriptive cross-sectional hospital-based survey. The cross-sectional study design entails collection of information on the individual study parameters at a single point in time from February 2022 to August 2022. It provided a basis of describing the status of phenomena at a fixed point in time and does not allow for inference of changes and trends of the same over time.

Area of Study

The study was carried out in Hoima Regional Referral Hospital which is found along Kampala-Hoima Road, in Hoima City western Uganda. Hoima Regional Referral Hospital, a public government hospital that runs the free treatment policy. The hospital's location lies approximately 200 kilometers, by road, west of Kampala, the largest city in the country. The coordinates of the hospital are: 01° 25' 40"N, 31° 21' 16"E. The hospital has a public wing with a total bed capacity of about 500. The 5 major disciplines present are Internal medicine, Obstetrics/Gynecology, Surgery, Psychiatry and Pediatrics. There is a total of 317 beds. On a daily basis, the hospital has over 100 in-patients and 150 out-patients. The hospital serves a population of about 3 million people. The scope is wide as many patients come from even the neighboring Democratic Republic of Congo. It has special clinics for example Mother child health, Mental Health Clinic (MHC), ophthalmology, dental, Ear, Nose and Throat (ENT), Radiology, and Dermatology, which work throughout the week.

Study population

All patients in the age group of 2 to 59 months at the pediatric ward of HRRH.

Inclusion criteria

Patients between the ages of 2 to 59 months.

Exclusion criteria

Patients above the age of 59 months.

Sample size determination

The sample size was calculated using the probability sampling formula by (Fischer et al, 1991) i.e.

$N = Z^2pq/d^2$

Where, n = sample size, when the population size is greater than 10,000.

z = Standard normal deviation, i.e. 1.96, set at 95% confidence level

p= prevalence of relapse among patients with mental illness.

q = 1- p= expected non-prevalence

d = Desired degree of accuracy

If the value of p = 38% (0.38) (Mghanga et al., [19])

$n = z^2 p (1- p) / d^2$

$= 1.96^2 \times 0.38(1- 0.38) / 0.05^2$

= 385 participants.

Sampling and recruitment procedures

A convenient sampling technique was used to sample the study participants. Where a patient coming in and meets the inclusion criteria were enrolled into the study.

Data collection methods and management

Primary data was obtained using a structured questionnaire containing demographic information, social, economic and cultural factors and feeding practices that was obtained from the caretaker. It was administered in English or Lunyoro languages. Whenever a participant/his or her caretaker agree to be interviewed he/she was asked to provide written consent by signing or fingerprinting. Laboratory results were seen against the patient into the study to compare. After obtaining informed consent from caretakers, they were interviewed using researcher administered a hard copy questionnaire. The researcher entered responses given by the participant by ticking the appropriate response and entering the same number in to the coding box immediately to reduce likelihood of data loss. A pre-piloted questionnaire was administered to the household caretaker/head of the selected children by trained research assistants. Up to 4 ml of venous blood was collected into EDTA vacutainer for complete blood count (CBC). Anemia was diagnosed if Hgb is less than 11 g/dl.The severity of anemia was categorized according to WHO cut-off value scheme as:

Hgb between 10.0g/dl- 10.9g/dl for mild anemia.

Hgb between 7.0–9.9g/dl for moderate anemia.

Hgb less than 7g/dl for severe anemia on under-five age children.

Stool analysis was also done possible cyst or trophozoites which could be a worm infestation. The process of data collection continued until every effort to contact every study participant/his or her caretaker in the sample was exhausted. Completed data collection forms were kept under lock and key to ensure safety.

Data collection tools

The study adopted a semi-structured questionnaire. The questionnaire was designed in a way that patients answer closed-ended questions. The questionnaire was written in simple language and easy to read in English and Lunyoro. It was administered to the participants' caretakers by the researcher. A checklist for laboratory results for the child was also used to confirm hemoglobin levels for anemia. A nutrition assessment z score chart was used, coupled with MUAC assessment for malnutrition.

Data analysis

Analyzed data was presented in tables and figures showing frequencies and proportions.

Univariate analysis was done for continuous variables to report measures of central tendency like mean, median and mode and measures of dispersion like the range, interquartile range and measures of variance like standard deviation for various independent variables. For categorical variables, data presentation was through well summarized "2 by 2" tables that show frequencies (percentages) and totals. Data was analysed using STATA version 11. Analysis was done per research objectives.

Quality control

To ensure quality work, the inclusion and exclusion criteria was strictly adhered to and data forms was double checked for completeness by the principle investigator. Completely filled data forms was kept under lock and key by the principal investigator to minimize data loss and also ensure confidentiality. Incompletely filled forms was discarded and not used during data analysis. The informed consent form and questionnaire was translated into Lunyoro to ensure full understanding of the information before one consent.

RESULTS

Table 1: Prevalence of anemia in children.

Table one showing anemia prevalence in under five children.

Anemia	Frequency	Percentage
Anemia	337	87.5
No anemia	48	12.5

From table one above, 337(87.5%) of the children had anemia while 48(13.5%) didn't have anemia.

Table 2: Demographic characteristics of children under five years with anemia

Anemia status	**Has anemia n_1=337**		**No anemia n_2=48**	
Factor considered	Freq.	Percent	Freq.	Percent
Education				
Post primary	173	51.3	21	43.7
Primary	164	48.7	27	56.3
Occupation				
Peasant	286	84.9	39	81.3
Formerly employed	52	15.1	09	18.7
Age				
30 years and below	145	43.0	20	41.7
More than 30 years	192	57.0	28	58.3
Marital status				
Married	39	11.6	32	66.7
Single parent	289	88.4	16	33.3
No. of children				
Four or less	129	38.3	25	52.1
More than four	208	61.7	23	47.9

The study showed that about 173 (51.3%) of children who had anemia have parents who have had post-primary education. About 286(84.9%) of children who had anemia, their parents were peasants, about 192(57.0%) of children have their parents aged more than 30 years, plus 289(88.4%) of children their parents are single, and about 208(61.7%) of children who had anemia live in a home of more than four children.

DISCUSSION

Anemia prevalence in children

The study showed that 337(87.5%) of the children had anemia while 48(12.5%) didn't have anemia, this could be due to various infections which lead to hemolysis of red blood cells, or poor nutritional intake leading to lack of essential nutrients essential for blood formation. When this study is compared with other studies, it shows a lower prevalence percentage, as compared to results from Legason *et al.* [9] in their study in Uganda, anemia prevalence ranged from 38 to 46% in different hospitals.

Child age and anemia

The study showed that 161(47.9%) of the children with anemia were aged 12-23 months, while only 65(18.8%) of the children had anemia. This could be because, at this age, children are introduced to family and they eat whatever they come across, this increases their risk of infections that can easily lead to anemia. When compared with other studies, the study shows a similarity from study results from Kebede *et al.* [20] who had cited that the commonest types of anemia include iron deficiency anemia, sickle cell anemia, Vitamin deficiency anemia, Aplastic anemia, hemolytic anemia and anemia of inflammation, and also that breasting children of 6-11 months were the least affected at 5%, while the most affected were those on complimentary feeding between 12 to 23 months at 45%.

Demographic among children with anemia

The study showed that education was a significant factor in occurrence of anemia, majority of the caregivers of the anemic children 173(56.3%) had only primary level of education or less. This could be because, educated care givers have had exposure to different information that can be used to control anemia, such as from schools, and from their exposure [20-34]. When compared with other studies, this study correlates with a study by Nankinga *et al.* [18], who stated that mothers who had a high level of education had children with normal hemoglobin levels than their

counterparts who had low level of education and further stated that educated mothers were more conscious of their children's health and thus introduced scientifically proved feeding practices which helped to improve their children's nutritional status. Caregiver Occupation was a significant factor in the occurrence of anemia in children. The majority of the caregivers for anemic 286(84.9%) and non-anemic 39(81.3%) said were peasant farmers and this affected the occurrence of anemia in their children. This could be because the hospital catchment is predominantly occupied by peasant farmers, so their increased number with number of anemic might have been of epidemiological importance in correlation to being etiology but rather because of their population numbers. When compared with other numbers, the study is the same from study results from [21-34] who indicated that children from families with parents who were employed with a good job were less susceptible to anemia than those whose parents were not employed or had low-income jobs. In regards to age, the study showed that majority of the caregivers with anemic children, 28(58.3%) were above 30 years, while majority of those 192(57%) whose children were non anemic were 30 years and below. The study showed that old age of caregivers of more than 30 years significantly correlated to the occurrence of anemia in children. This could be because caregivers above 30 years are assumed to by a lot of daily activity engagements for family and give little attention to the child's health and risk them being anemic. When this study was compared with other studies, it shows a difference from a study by Nankinga and Aguta [18] who had shown that children born to mothers aged less than 20 years have been found with higher odds of a higher level of anemia compared to children born to mothers aged 20 years and above. The study also showed that the caregivers marital status was a significant factor for anemia to occur, it showed that the majority of the caregivers both with anemic 289(88.4%) and non-anemic children 39(11.6%) were single, but this had associative impact on anemia occurrence. This could be because whether one is married or not, one's ability to protect a child from anemia will depend on how much he/she knows in doing intervention measures [20-34]. This means that marriage status will play a less part in making a child anemic. When compared with other studies, this study is similar to a study by Ncogo *et al.* [16], in which she found out that marital status of the couple as well as lack of support from the husband or partner to ensure inadequate nutrition of all children was a major factor that contributed to anemia among children under-five. From the study, it was showed that, majority of the caregivers 208(61.7%) whose children were anemic had more than 4 children, while majority 25(52.1%) of the non-anemic children, their caregivers had four or less children. The study showed that having more than four children was a contributing factor to anemia occurrence. This could be because the caretaker has to provide nutritional resources to different children which may be scarce and thus lead to nutritional deficiencies. Also, the health-seeking behavior of such caregivers may be poor due to limited resources and this could accelerate the infection state thus leading to anemia. When compared with other studies, this study correlates with a study by Ngoco *et al.* [16] who had cited that children from families with more than five family members in a home having anemia were 3.12 times more likely to be anemic compared to those children from family size less than five in home. Another study by Kebede *et al.* [20] noted that. This could be because an increase in the number of children might lead to a risk of communicable disease transmission, and competition for food, and consequently nutritional deficiencies.

CONCLUSION

The study concludes that there was a high anemia prevalence of 41%. The study concludes that the occupation and income of caregivers were significant factors for the occurrence of anemia in under five children. The study also concludes that post-primary education level and age of less than 30 were protective factors against anemia

RECOMMENDATION

i. There is a need for mass media sensitization of masses on child anemia, its risk factors, and how it can be prevented.
ii. Post-natal mothers and other caregivers should be advised on the nutritional requirement of children at different ages to prevent such anemia complications.
iii. Immunization and deworming should be emphasized for all children to prevent immunizable diseases that easily lead to anemia.

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