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Socio-demographic factors influencing Iron Deficiency Anaemia among children below five years at Bujubuli Health Centre IV, Kyegegwa District. A cross-sectional study.

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ABSTRACT

Background:

The study aims to find out socio-demographic factors influencing Iron Deficiency Anaemia among children below five years at Bujubuli Health Centre IV, Kyegegwa district.

Method:

A hospital-based cross-sectional study was conducted in July 2025 at Bujubuli Health Centre IV, Kyegegwa District. Data was collected using structured questionnaires, and a systematic random sampling technique was employed to select the 96 study participants. Data was analysed using Microsoft Excel and SPSS version 22.

Results:

Most of the respondents 62(64.6%) had jobless while 34(35.4%) were employed. Iron Deficiency Anaemia was more prevalent in children of higher birth order (4+), and least among those of birth order (1), that is 46.7% and 31.8% respectively. Families with three or more children under five reported the highest Iron Deficiency Anemia prevalence (56.5%). IDA prevalence was highest in children whose caretakers had never gone to school (83.3%). The prevalence of iron deficiency anaemia was higher in children whose caretakers were Catholics (50.0%) than in those who were following Seventh day Adventist church (0.0%). The prevalence of iron deficiency anaemia was found to be highest in children between 16 and 24 months of age, 53.3%. The prevalence of iron deficiency anaemia was highest in children whose caretakers were never employed (87.1%) and lower in children whose caretakers had jobs (41.2%).

Conclusion:

This study established that Iron deficiency Anaemia is still a national health threat, especially amongst the poor population, with a moderate prevalence of childhood anaemia, according to this study, being 38.5%.

Recommendations:

Health practitioners, most especially nutritionists, should ensure that anaemic children who are admitted are fed well on complementary foods while receiving required treatments to eradicate the severe grades of IDA.

Keywords: *Socio-demographic factors, Higher birth order, Iron deficiency anaemia, Children below five years*
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Background

Several studies have explored the association between a child's sex and the prevalence of IDA. While some research indicates a higher prevalence among female children, others find no significant difference. For instance, a study in sub-Saharan Africa found that female children had slightly lower odds of higher levels of anaemia compared to males. However, the differences are often marginal, suggesting that sex alone may not be a strong determinant of IDA. (Seifu & Tesema, 2022). A similar study in Ghana found no significant difference in anaemia prevalence between sexes (p=0.167) (Zheng et al., 2021). Age is a significant factor in IDA prevalence. Dickson et al., 2023). Children aged 6–23 months are particularly vulnerable due to rapid growth and inadequate dietary iron intake. Research in Liberia found a high prevalence of anaemia among children aged 6–59 months. (Adugna et al., 2023).

Residence plays a role in IDA prevalence, often reflecting disparities in access to healthcare and nutrition. Children in rural areas are generally at higher risk due to limited resources. A study in Ethiopia highlighted that rural residency was associated with higher anaemia prevalence

among children under five. (Gemechu et al., 2024). Conversely, other studies reported a protective effect for rural residence. (Obasohan et al., 2020). Younger maternal age is associated with a higher risk of IDA in children. Studies have shown that as maternal age increases, the likelihood of children developing anaemia decreases. (Obasohan et al., 2020). However, some studies did not find statistically significant associations between maternal age and child anaemia. Maternal education is consistently linked to child health outcomes. Higher maternal education levels are associated with lower IDA prevalence in children. For example, a study in Cambodia found that children whose mothers had no formal education had higher anaemia rates. (Um et al., 2023).

The relationship between maternal employment and child IDA is complex. In Pakistan, children of employed mothers had slightly higher, but not statistically significant, odds of IDA compared to those whose mothers were housewives (OR = 1.04, p = 0.617). Factors such as time constraints and caregiving practices may influence this relationship. (Habib et al., 2023). Households with multiple children under five may experience resource constraints, affecting each child's nutritional intake. A study in Kut City found that a higher number of children under five in a household was associated with increased severity of anaemia. (Al Kaabi et al., 2023). Similar studies in Sub-Saharan Africa have identified household size and the number of under-five children as contributing factors to anaemia. (Obasohan et al., 2020). Economic status is a critical determinant of IDA. (Habib et al., 2023b). Children from poorer households are at higher risk due to limited access to nutritious food and healthcare. (Shimanda et al., 2020). Research in sub-Saharan Africa demonstrated that children from the poorest households had higher anaemia rates compared to those from wealthier families. In Ghana, children from low-income households had a higher prevalence of anaemia (85.6%) compared to those from high-income households (66.3%) (Ewusie et al., 2014). Similarly, in rural China, higher family income was associated with a lower risk of childhood anaemia. (Li et al., 2020). A study in India found that children with higher birth order had a greater risk of anaemia, potentially due to resource dilution in larger families. (Goswami & Das, 2015). The study aims to find out socio-demographic factors influencing Iron Deficiency Anaemia among children below five years at Bujubuli Health Centre IV, Kyegegwa district.

METHODOLOGY

Study design

The study was a descriptive cross-sectional study design involving mainly a quantitative method of data collection. This design allowed for the estimation of the prevalence of IDA and the identification of socio-demographic and cultural factors influencing it at a specific point in time.

Study area

The study was carried out in a government health facility, that is Bujubuli Health Centre IV in Kyegegwa district, the southwestern region. Bujubuli Health Centre IV is located in Kyaka II refugee settlement and was established in 2005. The settlement covers 81.5 square kilometres in three sub-counties of Kyegegwa district, in the west of the country. Over 80% of the refugees in Kyaka II are from the Democratic Republic of Congo (DRC), while others are from Burundi, Ethiopia, Kenya, Malawi, and Rwanda.

Study population

The study only focused on children aged below five years of age attending Bujubuli Health Centre IV for inpatient and immunisation services and their mothers or primary caregivers for relevant socio-demographic and feeding history data within the period of data collection.

Sample size determination

The sample size was determined using Kish Leslie formula (1965) for a single population. This is because the formula ensures that the sample reflects the true characteristics of the target population and also reduces the sampling error. The expression is as follows:

$$n = \frac{Z^2 \quad PQ}{d^2}$$

Where n is the sample size

Z is the score corresponding to 95% confidence interval (1.96).

P is the estimated prevalence (53%) of anaemia in Uganda (UBOS & ICF, 2016).

d is the acceptable error of estimation at 95% confidence interval of 0.1.

Q is (1-P).

Substituting the value: $n = \frac{(1.96)^2 \times 0.53x\ (1-0.53)}{(0.1)^2}$

$$n = 95.694$$

Therefore, the sample size consisted of 96 respondents.

Sampling technique

The researcher employed a Systematic random sampling that selected every k^{th} child attending Bujubuli health centre IV until the sample size was reached. The sample represents the target population and eliminates sampling bias.

Sampling procedure

Respondents of this study were obtained by using systematic random sampling, whereby the study units that happened to be available at the time of data collection were selected for the study.

Study variables

Dependent variables

Iron Deficiency Anaemia among children below five years.

Independent variables

Socio-demographic factors

Data collection method

Data was collected by means of an interview method with the aid of a questionnaire that was administered by the researcher. The information on the socio-demographic and cultural factors influencing IDA among children below five years was obtained through the interview method.

An automated haemoglobin machine (Hemocue) was used to determine the haemoglobin level. A strict aseptic technique and a separate lancet for each child were used. The haemoglobin level of the under-fives was measured using capillary blood, and one drop of capillary blood was carefully collected from the middle finger of the under-five by finger prick. The first and second blood drops were discarded in order to remove excess fluid created by squeezing the finger. The level of anaemia was categorised according to WHO as follows: Mild anaemia when the Hb level is between 10-10.9g/dl, moderate anaemia when the Hb level is between 7-9.9g/dl, and less than 7.0g/dl for severe anaemia.

Data collection tool(s)

Data was collected using a semi-structured questionnaire coded in kobo-collect tool, comprising open and closed-ended questions and administered in the language they understood better. A hemocue device for rapid haemoglobin testing.

Data collection procedure

An introductory letter from Nkumba University was taken to the administration of Bujubuli Health Centre IV seeking permission to allow the researcher carry out data collection at the health facility among children below five years. In addition, Informed consent was obtained, eligible children underwent clinical assessment, caregivers were interviewed using the questionnaire, and blood samples were collected from children below five years of age via finger prick for haemoglobin testing.

Validity and reliability

A pilot study was carried out at Kakabara Health Centre III, and this involved pretesting of the data collection tools, where a sample of respondents was interviewed and checked to establish the effectiveness, errors/gaps in the data collection tools to be used in the final study.

Pre-testing of the research tool(s)

The questionnaire was pre-tested on 15% of the sample size at another health center, that is to say, Kakabara HC III, Kyegegwa district. Feedback was used to guide adjustments for clarity and consistency.

Piloting of the study

The questionnaire was pretested at Kakabara HC III in Kyegegwa before being used at Bujubuli Health Centre IV. This was to assess feasibility and identify logistical or methodological issues before the full rollout.

Quality control

The following activities were done by the researcher before conducting the actual study;

Pre-testing of the research tools to be used in the study for data collection.

Training of the research assistants on how to assess the prevalence, socio-demographic, and cultural factors associated with IDA among children below five years.

Piloting of the study, which was done at Kakabara HC III in Kyegegwa district.

A clear selection criterion was followed to attain accurate results.

Inclusion criteria

The study involved all caretakers and mothers of children below five years of age who attended health services at Bujubuli Health Centre IV during the period of data collection and after consent.

Exclusive criteria

Caretakers or mothers with children above five years were not involved in the study. Additionally, critically ill children unable to undergo blood testing, those with diagnosed genetic anaemia such as thalassemia, sickle cell, and caregivers who declined consent.

Data management, analysis, and presentation

Data was stored on flash disks, questionnaires, and a record book, which is only accessible to the researcher and supervisor. It was then processed and analysed by Microsoft Excel and SPSS and presented inform of tables, graphs, and charts.

Ethical considerations

The proposal was approved by the management of MIHS and Nkumba University. An introductory letter from MIHS seeking permission from the Kyegegwa District Health Office and Bujubuli HC IV administration to carry out data collection. Written informed consent from caregivers and

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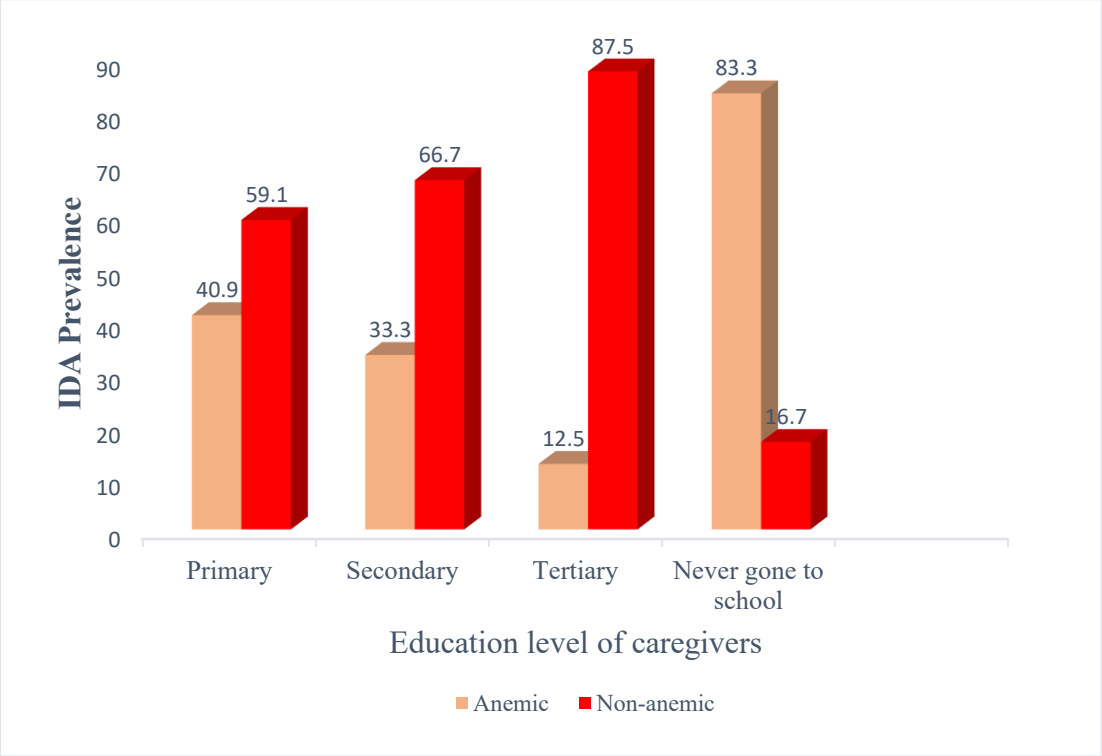
privacy, confidentiality, and the right to withdraw were all respected.

RESULTS.

The majority of respondents were between 26 and 30 years of age (31; 32.3%), and the fewest were between 16 and 20 years. Most of the respondents 62(64.6%) had jobless while 34(35.4%) were employed. The tribe that dominated the study was Congolese 68(70.8%), with the minority being the Banyankole tribe with 04(4.2%) in the study.

Education level of caregivers

Figure 1: Showing the education level of caregivers



Almost half of the respondents attained a primary level of education, and only 6.3% of the respondents attained a tertiary level of education. IDA prevalence was highest in children whose caretakers had never gone to school (83.3%) and lowest in children whose caretakers had attained a tertiary level of education (12.5%).

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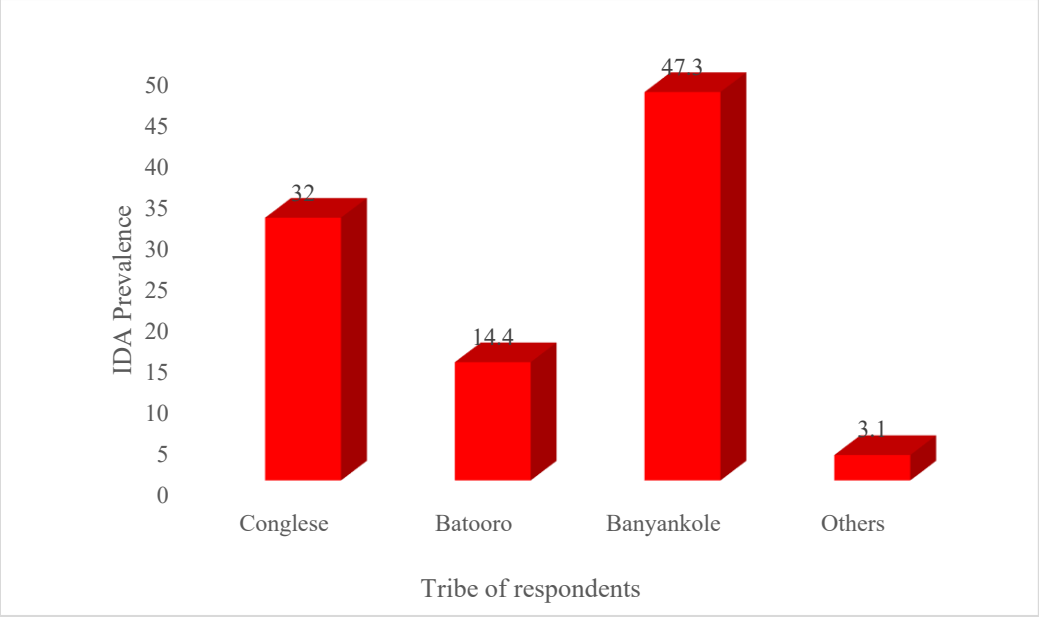
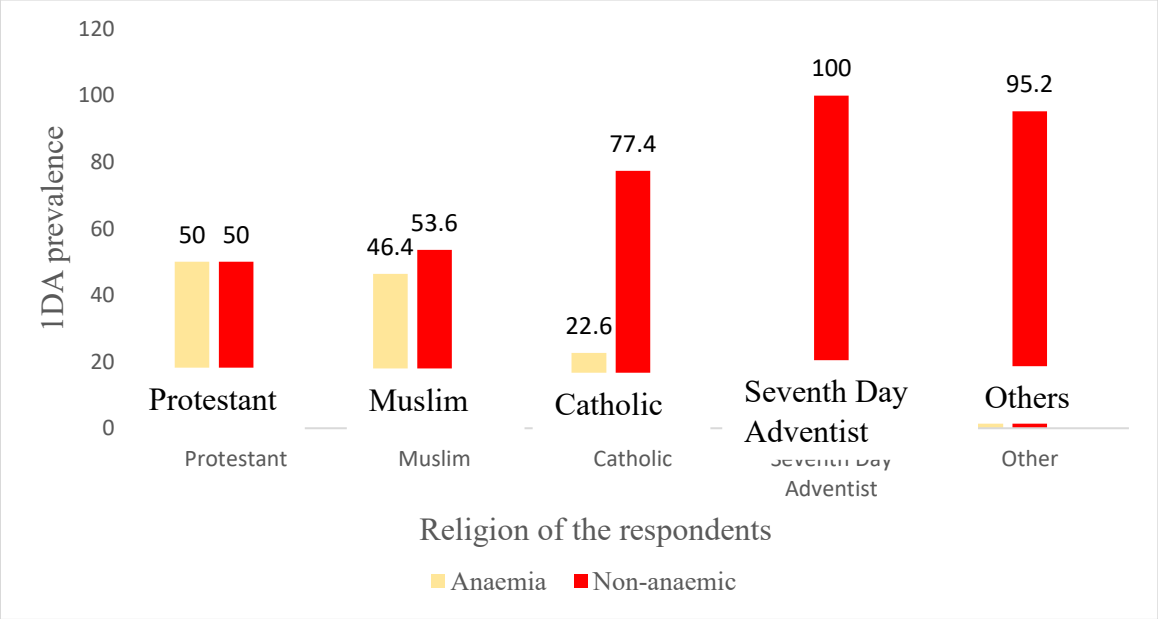
Figure 2: Showing the tribes of respondents.



The tribe that dominated the study was Congolese 68(70.8%), with the minority being the Banyankole tribe with 04(4.2%) in the study. However, the highest prevalence of Iron deficiency anaemia was found in Banyankole (50.0%), whereas the least IDA prevalence was among respondents from other tribes, such as Kenyans (3.1%).

Figure 3: Showing the religion of respondents.



Almost 50% the respondents were Catholics by religion, 31(32.3%), with the least represented religion being registered by the respondents was Seventh-day Adventist, 2(2.1%). The prevalence of iron deficiency anaemia was higher in children whose caretakers were Catholics (50.0%) than those who were following Seventh day Adventist church (0.0%).

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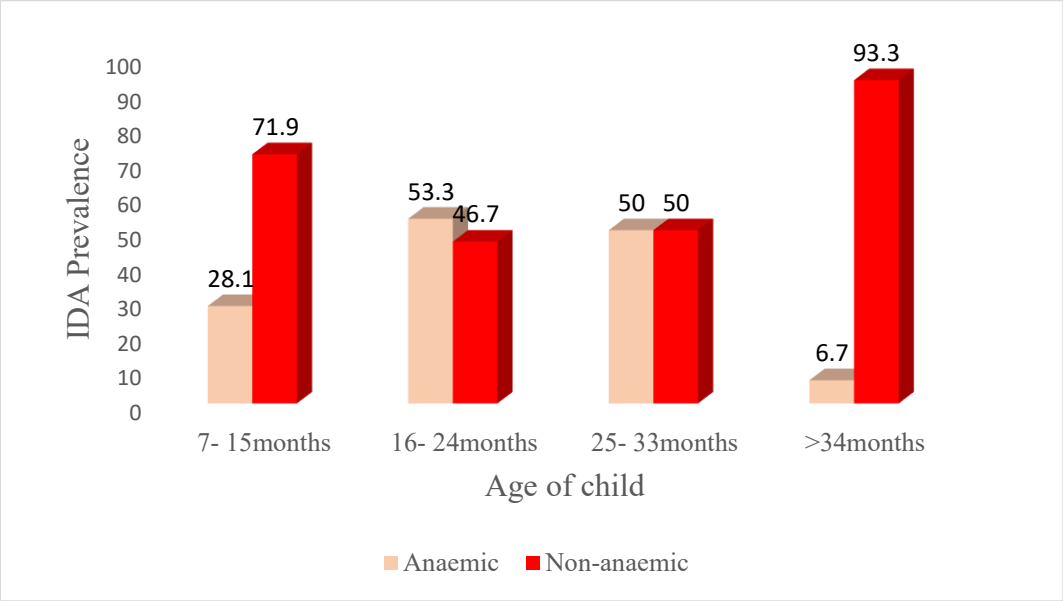
Figure 4: Showing the age of the child.



Most of the children in the study were between 7 and 15 months 64, 66.7%), and 2 (2.1%) were ranging from 25 to 33 months of age. However, the prevalence of iron deficiency anaemia was found to be highest in children between 16 and 24 months of age 53.3% and the lowest prevalence was found in children greater than 34 months of age 01(6.7%).

Table 1: Showing occupation of respondents.

Occupation of respondents	Frequency (%)	Anaemia status of the child	Frequency (%)
Yes	34 (35.4)	Anaemic	14 (41.2)
		Non- anaemic	20 (58.8)
No	62 (64.6)	Anaemic	54 (87.1)
		Non- anaemic	8 (12.9)

Most of the respondents 62(64.6%) had jobless while 34(35.4%) were employed. The prevalence of iron deficiency anaemia was highest in children whose caretakers were never employed (87.1%) and lower in children whose caretakers had jobs (41.2%).

Table 2: Showing birth order of children

Birth Order	Total (n)	IDA Cases (n)	IDA Prevalence (%)
1st	22	7	31.8
2nd	26	9	34.6
3rd	18	7	38.9
4+	30	14	46.7

Most of the respondents had a birth order of (4+) 31%. Iron Deficiency Anaemia was more prevalent in children of higher birth order (4+), and least among those of birth order (1), that is 46.7% and 31.8% respectively.

Table 3: Showing the number of under-fives in households

Number of Under-5s in Household	Total (n)	IDA Cases (n)	IDA Prevalence (%)
1	41	11	26.8
2	32	13	40.6
3+	23	13	56.5

Almost 50% of the respondents had at least one child below five years old in their households. However, families with three or more children under five reported the highest Iron Deficiency Anemia prevalence (56.5%).

Discussion

Age of the child

Child's age was a crucial and significant factor in this study as follows: Prevalence of IDA was found to be highest in children between 7 and 15 months of age and least among children greater than 34 months of age. The probable reason for this is that children older than 34 months of age feed on a variety of foods, including those that are rich in iron, for example, meat. Iron deficiency Anaemia was highest in children between 7 and 15 months of age, and this is probably because most of these children are fed on fixed diets, so they are deprived of various essential foods rich in iron. A review conducted in of 44 studies conducted in 19 European countries showed that the prevalence of IDA among children 12-36 months varied between 3% and 48% (Mantadakis, 2020). Conversely, another meta-analysis review revealed high IDA prevalence among adolescents, and it was attributed to menstrual bleeding, inadequate diets, and rapid growth. (Department of Pediatric Haematology, Hacettepe University, Ankara, Turkey et al., 2023).

Sex of child

Sex of the child was a significant factor contributing to IDA prevalence in the study, whereby the highest prevalence was found in males (36.4%) and the lowest in females (19.5%). The high IDA prevalence in males could be that they are considered to be strong in terms of health, even when they are still too young. Furthermore, testosterone, which begins to rise in early childhood, has been linked with erythropoiesis and iron metabolism, potentially influencing iron turnover more dynamically in boys than girls. In a study by Dickson et al. (2023) Involving 364 infants aged 6–23 months in Southwestern Uganda, the overall prevalence of IDA was 41.5%, with male children disproportionately affected. Similarly, a study conducted at Tsitsika Health Centre, Wag-Himra Zone, Northeast Ethiopia, among children aged 6–59 months found a higher IDA burden among males, with the magnitude of 55.4% (Woldie et al., 2015). However, not all studies support this finding; A community-based study by Zheng et al. (2021) In Baiyun district, China, there was no association between a child's sex and the prevalence of IDA.

Education level of the caregiver

Caretaker's level of education was a significant variable in this study. The prevalence of IDA was highest in children whose caretakers had never gone to school (83.3%) and lowest in children whose caretakers had attained a tertiary level of education (12.5%). This is probably because caretakers who had never gone to school had little knowledge about proper feeding and health care of children below five years, hence becoming more susceptible to IDA. Similarly, the highest prevalence of iron deficiency anaemia was observed in children whose families had no education (48.1%), as opposed to the lowest percentage of anaemia, which was recorded for children whose families attained secondary education and above (28%) (Kawo et al., 2018). It indicated that children of more educated families were less exposed to anaemia compared to children of uneducated families. This totally agrees with another study done at Bugando Medical Centre, Tanzania, by Simbauranga et al. (2015), which reported that the relationship between education and anaemia may be due to the capacity of caregivers to grasp the knowledge needed for adequate health care and nutrition for children. A study carried out by Chowdhury et al. (2015) in India, however, reported a minimal association between caregiver education and IDA when controlling for household income and access to healthcare.

Place of residence

The residence of the caretaker was also a vital variable in the study. The prevalence of IDA was found to be highest in children who reside in the urban areas 58.3% and found lowest in children residing in rural areas 23.8% while urban residence is traditionally associated with better health outcomes. This could be attributed to increased reliance on highly processed, iron-poor diets, poor sanitation practices, and reduced access to traditional iron-rich foods. This is supported by data from Pakistan's National Nutrition Survey. Habib et al., 2023), which found that rural residence was protective against anaemia with an AOR of 0.77 (95% CI: 0.65–0.90), implying a higher burden in urban areas. The analysis was conducted using multivariate logistic regression models on nationally representative survey data, and the overall prevalence of IDA among children under

five in Pakistan was reported at 33.2%. Another study on burden and determinants of anaemia among children under five in Africa revealed that children from rural settings were 20% less likely to be affected by anaemia as compared to children from urban settings. This may be because mothers in the rural setting will breastfeed their children exclusively till six months of age and continue breastfeeding till 24 months or more. (Tadesse et al., 2022). In contrast, in rural Liberia, rural children had significantly higher anaemia prevalence, linking it to poverty, poor sanitation, and reduced access to healthcare.

Occupation of caretaker

Occupation of the caretakers was another contributing factor to iron deficiency anaemia among children below five years. Children whose caretakers had no jobs and low monthly income earners were more prevalent for IDA, that is, 71.4% and 60%, respectively. This could be attributed to financial constraints limiting access to nutritious foods, healthcare, and hygiene resources. The study findings were in total agreement with the study carried out by Kawo et al., (2018) indicated that the wealth index was found to have a significant association with anemia status among children aged between 6 and 59 months at 5% level of significance, and 49.5%, 40.9%, and 35.6% of children aged between 6 and 59 months from poor, middle, and rich households were anemic, respectively. It also indicated that children from rich families were less exposed to anaemia compared to children from poor families, demonstrating the protective role of economic stability. In contrast, a study conducted at Kampala International Teaching Hospital among children 6-59 months revealed that children whose caretakers were business operators had a higher likelihood of iron deficiency anaemia. (Faculty of Clinical Medicine and Dentistry, Kampala International University Western Campus, Uganda & Ruth, 2024).

Maternal Age

Age of the caregiver was also a significant variable during the hospital study. The study reported that children of mothers aged 21-25 years had the highest prevalence of IDA, 59.3%. This age group, though biologically optimal, often lacks economic and caregiving experience. A case-control study by Parbey et al. (2019) In Hohoe Municipality, Ghana, researchers confirmed this association, linking younger maternal age with poor nutritional knowledge and child care practices. However, a community-based cross-sectional study showed that having a caretaker aged 45 to 59 years increased the risk of anaemia among children aged 6–59 months. Caretakers in this age range may have numerous additional responsibilities beyond caring for the child, including, but not limited to, supervising other children in the home and elsewhere while engaging in income-generating activities and fulfilling other duties. (Komakech et al., 2025).

Conclusion

This study established that Iron deficiency Anaemia is still a national health threat, especially amongst the poor population, with a moderate prevalence of childhood anaemia, according to this study, being 38.5%.

Study Limitations

Being a cross-sectional study design, the limitation would be that it would not show a causal effect relationship. Scarcity of resources with limited time may limit the researcher from conducting the study effectively, non-responsiveness of the participants, who would request money to provide certain information, and a language barrier, since some participants are illiterate.

The study was carried out in only the hospital premises, leaving out mothers or caretakers in the community who could provide information that could contribute to the proposed study.

Recommendations

Health practitioners, most especially nutritionists, should ensure that anaemic children who are admitted are fed well on complementary foods while receiving required treatments to eradicate the severe grades of IDA.

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I thank the Almighty ALLAH for my life, life of my parents, relatives, and friends. If not for ALLAH, I would not have reached this level in life.

I thank my supervisor, Ms. Elizabeth Okello, for persistent supervision during the development of my research proposal and this report. I appreciate the time and effort you have rendered to me.

I appreciate the cooperation accorded to me by the staff and hospital administrators of Bujubuli Health Centre IV and the study participants who freely accepted to be part of the study.

List of abbreviations and acronyms

CI	:	Confidence interval
Hb	:	Haemoglobin
HC	:	Health Centre
ICF	:	International Coach Federation
IDA	:	Iron Deficiency Anaemia
IYCF	:	Infant and Young Child Feeding
MIHS	:	Mildmay Institute of Health Sciences
RDT	:	Rapid Diagnostic Test.
SPSS	:	Statistical Package for Social Sciences
UBOS	:	Uganda Bureau of Statistics
WHO	:	World Health Organisation

Source of funding

The study was not funded.

Conflict of interest
The author did not declare any conflict of interest.

Data availability
Data is available upon request.

Author contribution
Musa Kayima collected data and drafted the manuscript of the study
Elizabeth Okello supervised the study

Author biography
Musa Kayima is a student of a Bachelor of Science Degree in Human Nutrition and Clinical and Dietetics at Mildmay Institute of Health Sciences.
Elizabeth Okello is a supervisor at Mildmay Institute of Health Sciences and *Nkumba University.*

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