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Prevalence and risk factors of anaemia among pregnant women attending antenatal care at Kapchorwa general hospital in Kapchorwa district, eastern Uganda: A cross-sectional study.

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Abstract

Background:
In Uganda, the prevalence of anemia among pregnant women has shown regional variability and persistent challenges. The study aims to examine the Prevalence of anaemia and risk factors among pregnant women attending antenatal care at Kapchorwa General Hospital in Kapchorwa district, eastern Uganda.

Methodology:
The study employed a cross-sectional descriptive study to determine the prevalence and explore factors associated with anaemia among pregnant women. This study was conducted at Kapchorwa General Hospital; the study population consisted of pregnant women with anaemia attending Kapchorwa General Hospital. The study population was selected from the antenatal care clinic. The sample size was determined using the Kish and Leslie formula. A simple random sampling technique was employed in the study.

Results:
The prevalence of anemia was 29/286 (10.1%). The majority of our study participants had attained tertiary education (50.7%), lived in an urban setting (66.4%), were employed (68.9%), and earned an average monthly income greater than one hundred thousand Uganda shillings(66.4%). The majority of the study participants found to be anemic were in the age bracket of 20-24(5.2%) with those with 15-19 having least percentage of 1.0% but overall those below the age of 25 had greater number of anemic participants 18(6.2%) while those above 25 had fewer number of anemic participants 11(3.85%).

Conclusion:
Employment was also associated with anemia, likely because busy work schedules limit time for antenatal care and proper meal preparation.

Recommendations:
Pregnant women should attend ANC early and consistently to monitor their blood levels.

Keywords: *Anemia, Pregnant women, Kapchorwa General Hospital, Kapchorwa District, Eastern Uganda*
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Background
Anemia in pregnancy is a common and serious public health concern, characterized by a reduction in hemoglobin concentration below the normal threshold required to meet physiological needs, particularly during gestation (World Health Organization, 2021). The condition can result from various causes, with iron deficiency anemia (IDA) being the most prevalent form during pregnancy. Other etiologies include folate deficiency, vitamin B_{12} deficiency, and anemia of chronic disease, which may be exacerbated by pregnancy-related physiological changes (Lahiri *et al.,* 2023). Pregnancy triggers increased iron requirements, primarily due to the expanding blood volume and fetal iron demands. Consequently, women with pre-existing iron deficiency or inadequate dietary intake are particularly vulnerable (Carter *et al.,* 2021). Iron deficiency anemia is particularly common in low-resource settings, where inadequate nutrition and limited access to prenatal care are prevalent (Ishikawa *et al.,* 2022). The consequences of anemia in pregnancy are severe, leading to an increased risk of preterm birth, low birth weight, maternal fatigue, and postpartum hemorrhage (Brown *et al.,* 2024). Additionally, it may impair cognitive development in the offspring and increase the risk of maternal mortality in extreme cases (Hibbs *et al.,* 2022).

Anemia in pregnancy remains a pervasive global health challenge. According to the World Health Organization (WHO), the global prevalence of anemia among pregnant women was estimated at 36.5% in 2019, affecting over 32 million women worldwide (WHO, 2021). The condition is more common in low- and middle-income countries due to factors such as undernutrition, parasitic infections, and inadequate antenatal care services (Stevens *et al.,* 2022). Recent studies have revealed the highest burden of anemia

in pregnancy in Africa. For instance, in 2019, the African region reported a prevalence of 46.3% among pregnant women (WHO, 2021). High fertility rates, poor dietary iron intake, and widespread infectious diseases such as malaria contribute to the elevated rates of anemia in this region (Oketch *et al.,* 2023). In Sub-Saharan Africa (SSA), anemia affects up to 57.1% of pregnant women, making it one of the regions with the highest prevalence globally (Gebreweld *et al.,* 2022). National-level data vary significantly: for instance, Nigeria reported prevalence rates as high as 72.6% (Ameh *et al.,* 2023), Ghana at 50.8%, and Ethiopia at 26.4% (Tekeste *et al.,* 2022). This variation is often linked to differences in public health policy implementation, food security, and malaria control efforts. In East Africa, anemia in pregnancy remains a critical concern. A multicounty analysis revealed prevalence rates of 18.0% in Tanzania, 26.2% in Kenya, and 31.7% in Rwanda (Mwangi *et al.,* 2023). In Uganda, the prevalence of anemia among pregnant women has shown regional variability and persistent challenges. A recent study conducted in northern Uganda reported an anemia prevalence of 24.7% among pregnant women, with iron deficiency accounting for nearly half of the cases (Auma *et al.,* 2022). The Uganda National Institute of Public Health (UNIPH) highlighted challenges in preventive services, including suboptimal coverage of iron and folic acid supplementation (UNIPH, 2024). According to UNIPH data, intermittent preventive treatment in pregnancy (IPTp) coverage has declined in several districts, and stock-outs of essential supplements remain a major issue in public health facilities (Kiggundu *et al.,* 2024). The study aims to examine the Prevalence of anaemia and risk factors among pregnant women attending antenatal care at Kapchorwa General Hospital in Kapchorwa district, eastern Uganda.

METHODOLOGY

Study design

The study employed a cross-sectional descriptive study to determine the prevalence and explore factors associated with anaemia among pregnant women. This study design was chosen because data were collected at one point in time due to time constraints and cost-effectiveness.

Study area

This study was conducted at Kapchorwa General Hospital, located in Eastern Uganda, serving districts such as Kapchorwa, Kween, Bulambuli, Bukwo, and parts of Amudat. It was established in 1962 with a bed capacity of 150; the hospital has been catering to an increasingly large catchment population over the years. The hospital serves as the main hospital for Kapchorwa District, serving as a referral centre for surrounding health units and providing antenatal care for pregnant women and other infectious diseases. Due to its role in providing antenatal care among pregnant women, it's an ideal setting for this study.

Study population

The study population consisted of pregnant women with anaemia attending Kapchorwa General Hospital. The study population was selected from the antenatal care clinic. This clinic provided prenatal care to pregnant women, including screening and management of anaemia.

Inclusion criteria

Pregnant women attending antenatal care (ANC) services at Kapchorwa General Hospital.

Willingness to participate and provide informed consent.

Resident in the catchment area of Kapchorwa General Hospital.

Exclusion criteria

Pregnant women with known haemoglobinopathies, e.g., Sickle cell disease.

Women with severe medical conditions unrelated to pregnancy e.g., chronic kidney disease, cancer).

Pregnant women who have received blood transfusions in the current pregnancy.

Pregnant women with cognitive impairments or unable to provide informed consent.

Non-resident or transient populations.

Pregnant women with multiple pregnancies with complications.

Women in labour or with imminent delivery.

Sample size determination

The sample size was determined using the Kish and Leslie formula (2000) as stated below.

Kish and Leslie's formula is $n = Z \cdot \frac{2pq}{d2}$

Where, n=Sample size to be determined,

z= Confidence interval, p= prevalence of anaemia among pregnant women in Northern Uganda, (24.7%) (Auma et al., 2022) hence p (0.247) q= (1-p) d= Margin of error (0.05) z=1.96, p= 0.247, d= 0.05, q= (1-0.247) Therefore, n= $\frac{(1.96)2\times 0.247\times (1-0.247)}{0.05\times 0.05}$

n= 285.801

Therefore, n ~ 286

The minimum sample size required = 286

Therefore, 286 participants will be selected to be included in the study.

Sampling technique

A simple random sampling technique was employed in the study. The simple random sampling technique ensures that each element in the population has an equal chance of being selected, and the sample is a representative of the population from which it was selected.

Sampling procedure

The researcher used a simple random sampling technique to carry out the study. The researcher wrote all the names of the clients on small pieces of paper, put them in a box, shook the box well, randomly picked the papers with the names, and the names of the clients picked will be chosen to participate in the study. OR words were written on paper

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indicating YES or NO. Each participant picks a paper from the enclosed box, and the respondents who pick the papers with the word YES are requested to participate in the study. This continued until the required number of participants was achieved.

Dependent variable

Prevalence of anaemia among pregnant women.

Independent Variable

The independent factors associated with anaemia are age, clinical presentation, and haemoglobin levels.

Data Collection Tools

The primary data collection tool was a structured questionnaire designed for participating pregnant women. The questionnaire collected data on demographic details, clinical presentation, and laboratory findings.

Secondary data was obtained by extracting information from available records at ANC regarding Hb levels of pregnancy.

Quality control

The questionnaires were pre-tested before administration to ensure that they were clear and concise. Laboratory results were verified for accuracy. The researcher ensured that the data collection tools were properly calibrated and functioning correctly.

The research assistants were provided with comprehensive training on the research protocol, including the research instruments, data collection procedures, and ethical considerations.

Data collection procedure

The researcher introduced themselves to the pregnant women and explained the study objectives. Informed consent was obtained from the study participants. The questionnaire was administered in an interview format to ensure clarity and accuracy.

Samples were picked from the participants, and Hb tests were performed on them, and the results were recorded.

piloting the study

A pilot study was conducted at Kapchorwa General Hospital to test the feasibility and validity of the study tools and procedures among a small sample of pregnant women attending ANC, allowing for necessary revisions to be made to the tools and data collection process before the main study was conducted.

Data analysis and presentation

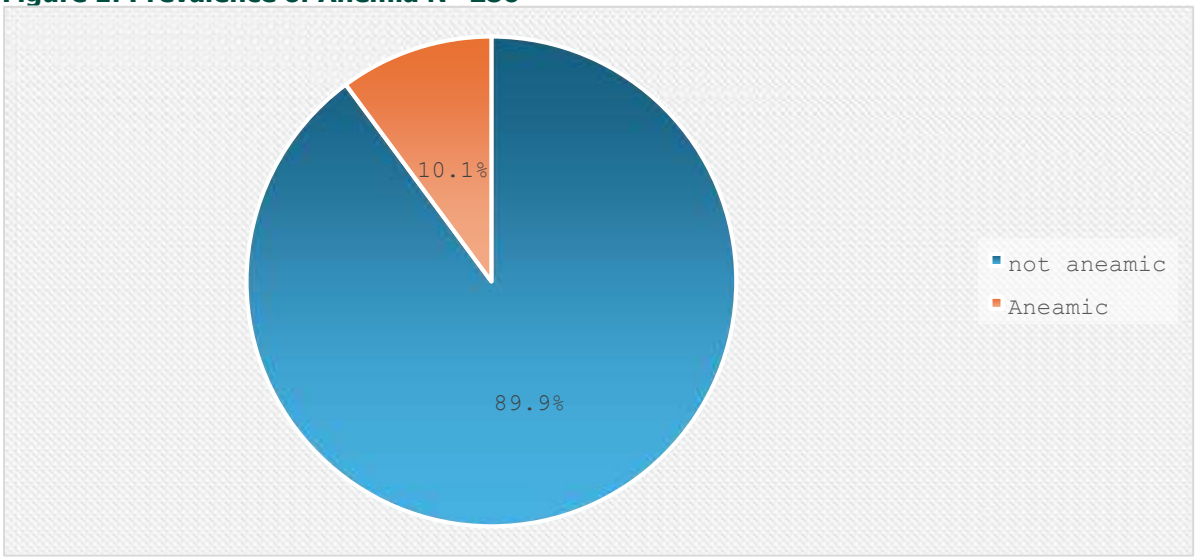
Data collected was checked and manually organized into a data entry form, sorted, and manually computed using simple hand calculators and then The raw data was subjected to manual analysis and verification ensuring the precision of all descriptive data which were then presented in tables and a pie chart then discussed, printed and the final copies were be disseminated to relevant bodies by the principal investigator.

Ethical consideration

An introductory letter was obtained from the research and ethics committee of Mildmay Institute of Health Sciences –School of Medical Laboratory Technology, and was presented to Kapchorwa General Hospital, so that the researcher was permitted to carry out research in the study area. All participants were selected on the basis of informed consent. The study was voluntary, and the information obtained was kept private and confidential. The researcher explained the purpose of the study to the participants.

RESULTS

Figure 1: Prevalence of Anemia N=286



The prevalence of anemia was 29/286 (10.1%).

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Table 1: Sociodemographic characteristics of study participants N=286

Characteristic	Frequency	Percentage
Education Level		
No education		
Primary	46	16.1
Secondary	95	33.2
Tertiary	145	50.7
Residence		
Rural	96	33.6
Urban	190	66.4
Employment status		
Unemployed	89	31.1
Employment	197	68.9
Household income		
Below 100000ugx	96	33.6
Above 100000ugx	190	66.4

The majority of our study participants had attained tertiary education (50.7%), lived in an urban setting (66.4%), were employed (68.9%), and earned an average monthly income greater than one hundred thousand Uganda shillings (66.4

Table 2: Proportion of participants for different age categories, n=286

Age category	participant frequency	Anemia frequency	Percentage
15-19 years	36	03	1.0
20-24 years	119	15	5.2
25-34 years	90	6	2.1
35 above	41	5	1.75

The majority of the study participants found to be anemic were in the age bracket of 20-24(5.2%) with those with 15-19 having least percentage of 1.0% but overall those below the age of 25 had greater number of anemic participants 18(6.2%) while those above 25 had fewer number of anemic participants 11(3.85%).

Table 3: Obstetric characteristics of the study participants N=286

Variable	Participant frequency	Anemic frequency	Percentage
Parity			
One	69	1	0.35
More	217	3	1.05
Number of ANC visits			
Below 4	150	2	0.7
Above 4	136	1	0.35
Supplements(iron and folic acid)			
Yes	190	1	0.35
No	96	3	1.05
Birth interval			
Below 2 yrs	186	8	2.8
Above 2yrs	100	2	0.7
Trimester			
First	30	1	0.35
Second	60	2	0.7
Third	196	5	1.75

Based on obstetric history, those with a short birth interval of less than two years, more than one pregnancy (high parity), those in the third trimester, not taking folic and iron supplements, and those who had ANC visits less than 4 had a higher number of participants who were anemic, as indicated in Table 3.

DISCUSSION

Prevalence of anemia among pregnant women and assessment of factors associated with anemia among pregnant women

The current study findings gave a prevalence of 10.1% which is closely similar to a study that was done in Ethiopia that gave a prevalence of 11.6(Gebreweld, A,$ Tsegaye, a,2018) this could be attributed to the fact that the two studies had closely similar sample sizes with our current study having 286 and the study done in Ethiopia having 284. The current study gave a lower prevalence than another study carried out in Mbeya Tanzania, that gave a prevalence of 25.5%(Abdalla, et al 2022), and another than in Hargeisa group hospital that gave a prevalence of 50.6%(Abdilahi, M. M. et al 2024) this could be due to their relatively larger sample sizes of 420 and 360 respectively.

A study done is Adigrat general Hospital, Tigral northern Ethiopia (Berhe, B., et al 2018) gave a lower prevalence of 7.9% compared to our current study that gave 10.1% this could be attributed to the fact that out of their sample size of 304,235(77.3%) which is more than half of their study population were housewives and therefore they could be having sufficient time at home to prepare nutritious meals that could help them boost their blood levels as compared to our current study were most of our study participants were employed and lived in urban setting so it's also possible that they were busy at work and had less time at home to prepare healthy food to help boost their blood levels.

Factors associated with anemia among pregnant women and assess factors associated with anemia among pregnant women

In our current study most of our study participants who were anemic were under the age of 25 this could be because their bodies are still growing and their bodies are competing for iron and other nutrient demands and also inadequate prenatal care or lower social economic status associated with teenage pregnancies which is similar to the findings from other studies done in Bangladesh (khanam et al.,2023) were most anemic participants were aged 21-30 years, Saudi arabia (ahmed et al 2022) anemic participants were below participants 25 years, Northern Uganda (ssewankambo et al.,2022) (fite et al 2021) mostly adolescent girls were anemic.

The majority of our participants who were anemic were employed, which was in contrast to a study at Adgar General Hospital in Ethiopia were majority were housewives. This could be due to their busy schedule at work, which meant they didn't have time to attend to ANC, and also less time at home to have nutritious meals.

And most of our study participants were also in the third trimester and had short birth intervals. This also concurred with a study done in Ethiopia that gave those factors as associations to anemia (Teshome et al.,2022

The short birth intervals could be attributed to low uptake of family planning methods, and also our participants being that most were employed and educated, could be more knowledgeable about the existing family planning effects, hence hindering them from using them.

Conclusion

In relation to the prevalence of anemia among pregnant women, the study found an anemia prevalence of 10.1%, showing a relatively low burden compared to other regions. This prevalence was close to that reported in Ethiopia, likely because the studies had similar sample sizes. However, the prevalence was lower than that reported in Tanzania and Hargeisa, where larger samples were used. It was higher than the rate reported at Adigrat Hospital, possibly because most women in that study were housewives and had more time to prepare nutritious meals, unlike the majority of employed women in our study, who may have limited time for proper nutrition.

Concerning the factors associated with Anemia, the study revealed that younger pregnant women, especially those below 25, were more likely to be anemic. This may be due to their bodies still requiring more nutrients for growth and the increased challenges linked to early pregnancies. Employment was also associated with anemia, likely because busy work schedules limit time for antenatal care and proper meal preparation. In addition, women in their third trimester and those with short birth intervals were more affected.

Recommendations

To the Ministry of Health (MoH)

Strengthen health education on anemia prevention, focusing on nutrition, birth spacing, and early ANC attendance.

Support routine screening for anemia at all antenatal visits, especially for young and working pregnant women.

Increase community sensitization on the benefits and safety of family planning to reduce short birth intervals.

Ensure a continuous supply of iron and folic acid supplements in all health facilities.

To Hospital Management

Train healthcare workers to identify high-risk groups such as young mothers, employed women, and those in late pregnancy.

Improve counseling services on proper nutrition, family planning, and adherence to iron supplements.

Strengthen follow-up of pregnant women through reminder systems, especially those with busy work schedules.

Display simple posters and leaflets on anemia prevention in maternity and ANC clinics.

To Participants and the Community

Pregnant women should attend ANC early and consistently to monitor their blood levels.

Adopt balanced diets rich in iron, such as green vegetables, liver, beans, and fortified foods.

Embrace healthy birth spacing through safe and modern family planning methods.

Reduce stress and heavy workloads during pregnancy to support better nutritional and health outcomes.

To Future Researchers

Conduct larger studies to better understand how employment, urban living, and dietary practices influence anemia.

Explore cultural beliefs and attitudes that affect family planning uptake and nutrition among pregnant women.

Investigate seasonal and socioeconomic factors linked to anemia in different regions of Uganda.

Assess the effectiveness of existing anemia-prevention programs in antenatal care settings.

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List of Abbreviations

ANC Antenatal Care
Hb Haemoglobin
IDA Iron Deficiency Anaemia
IPTp Intermittent Preventive Treatment in Pregnancy
MoH Ministry of Health
SSA Sub-Saharan Africa
UNIPH Uganda National Institute of Public Health
WHO World Health Organization

Source of funding

The study was not funded.

Conflict of interest

The author did not declare any conflict of interest.

Author contributions

Ivan Kokoi Chewere was the principal investigator.
Robert Nwabine supervised the research.
Francisco Ssemuwemba supervised the research.
Anthony Sekitoleko supervised the research.
Jane Frank Nalubega supervised the research.

Data availability

The data is available upon request.

Author Biography

Ivan Kokoi Chewere is a student at Mildmay Institute of Health Sciences
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