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THE PREVALENCE OF ANAEMIA AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE SERVICES AT KIYUMBA HEALTH CENTRE IV IN MASAKA DISTRICT. A CROSS-SECTIONAL STUDY.

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ABSTRACT

Background

The study was to improve the health being of pregnant women and reduce conditions associated with anemia, maternal transfusion, premature delivery, and high mortality rate among others.

Methodology

A cross-sectional study design was used and this is because it was cheap and the study was to take relatively a short period. It was conducted among 186 respondents at Kiyumba Health Centre IV between June and July 2023. A simple random sampling technique was used to select the participants and the selected participants signed consent forms and thereafter questionnaires to fill those who were unable to read and write and were interviewed.

Results

The results showed that out of the 186 respondents, 35 pregnant women were found to be anemic 32(91.43%) had mild anemia, (5.71%) had severe anemia, and only (2.86%) had moderate anemia. During the study, malaria and area of residence were found to be the risk factors and determinants of anemia among pregnant women where the majority,(17.20%) had suffered from malaria and as regards to the area of residence, (91.4%) were urban dwellers and (8.60%) were rural dwellers. Finally, the participants had suffered from different signs and symptoms during the pregnancy for example headache, dizziness, fatigue, and depression.

Conclusion

The study found that the magnitude and severity of anemia among pregnant women are high in the third and second trimesters respectively. The study found that marital status, area of residence, and infections like malaria are the main risk factors and determinants of anemia among pregnant women..

Recommendations

Health workers to make sure all pregnant mothers are tested for hemoglobin levels at every antenatal visit to determine their anemic states.

Keywords; *Anemia, Pregnant, Antenatal Care, Kiyumba Health Centre IV, Masaka District.*

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Background of the Study

Anemia is a condition in which the number of red blood cells or hemoglobin concentration within them is lower than normal. This causes a decreased capacity of blood to carry oxygen to body tissues resulting in patients suffering from, fatigue, weakness, dizziness, and shortness of breath among others. (WHO, 2022) .

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According to (Karami et al., 2022a) Anemia is one of the most critical health conditions affecting people worldwide. The disease is silent, with a slow progression and a few physical symptoms (Karami et al., 2022b). Anemia during pregnancy carries the risk of premature birth, low birth weight, and fetus malformations and can impose additional costs on society and families where the overall prevalence of anemia in pregnant women was 36.8%(95% confidence interval: 31.5–42.4%). According to (Karami et al., 2022c) The highest prevalence of anemia was mild at 70.8 (95% CI 58.1–81) and highest in the third trimester of pregnancy with a prevalence of 48.8 (95% CI 38.7–58.9), while the highest prevalence of anemia in pregnant women was in Africa with the prevalence of 41.7 (95% CI 32.3–49.4) (Mohammadmahdi Karami et al, 2022)

Anemia is a global public problem affecting approximately 40% of pregnant women which gives a total of around 32.4 million. (WHO, 2021).

In Ethiopia, the burden of anemia among pregnant women remains high in different regions of the country with the Somali region reported with the highest prevalence of 56.80% (Getachew *et al*, 2017).

In East Africa, the overall prevalence was 41.82% with a large difference in Rwanda which had 23.36%, and Tanzania with 57.10% (Liyew *et al*, 2021).

According to (Mkama, 2021)In Ifakara Tanzania, the prevalence of anemia among pregnant women attending the antenatal clinic at SFRH was revealed to be 52.6%. In this study, mild anemia was 34.5%, moderate anemia 13.8%, and severe anemia 4.3%.

In Uganda a cross-sectional study that employed laboratory analysis of blood samples to determine hemoglobin concentration, there were 89 participants whose Hb levels were indicative of anemia, giving anemia prevalence of 25.8%(95% confidence interval: 21.6–29.8). According to (Krishnamoorthy et al., 2018) Of these, 25 (28.1%) had mild anemia, 46 (51.7%) had moderate anemia, while 18 (20.2%) had severe anemia. Thin blood film examination showed normocytic-hypochromic (75.3%), then microcytic-hypochromic (21.6%), and macrocytic-hypochromic red blood cells (3.4%) (Ceasor Oyet et al. 2020).

In Uganda, about 14400 pregnant women revealed a prevalence of 30% in a systematic and meta-analysis study carried out by Kawempe National Referral Hospital. (Bongomin *et al*, 2021).

According to (Oburu, I et al, 2022) findings showed that the prevalence of anemia among pregnant women in their second and third trimesters was 14%(37/265). The prevalence of anemia was high among pregnant women in the second trimester compared to the third trimester. A total of 158 (59.6%) pregnant women were in the second trimester out of which 24 (15.2%) pregnant women were anaemic. According to (Ivan Oburu et al, 2022). There were 107 (40.4%) pregnant women in the third trimester of pregnancy and 13 (12.1%) were diagnosed with anemia In the study area, there was no clear documentation about the prevalence of anemia among pregnant women; hence, the study aimed at determining the prevalence of anemia among the pregnant women attending Antenatal Care services from Kiyumba Health Centre IV.

METHODOLOGY

Study Design

The study design used was a cross-section study design. This is because the study was going to take a short period, cross-sectional study design is relatively cheap and it is a good, quick method of the prevalence of exposure and prevalence outcomes.

Study Area

The study was conducted from Kiyumba Health Centre IV located along Masaka Bukakata Road Kasaka village, Wampewo parish in Masaka City, Central Uganda. This research was carried out from June to August 2023

Study Population

The study was conducted among pregnant women attending ANC services from Kiyumba Health Centre IV because anemia is so common in pregnant women.

Sample Size Determination

The sample size was determined using the formula by Kish and Leisliel (1995) which states:

$N= (Z^2pq) \div d^2$ where;

N= Desired sample size

Z= Value at 95% confidence level, which is 1.96
P= Proportion of pregnant women estimated to be anemic
q= 1-p (proportion of pregnant women estimated not to be anemic)
d=margin of error accepted set at 0.05
Based on the previous cross-sectional study from Kawempe National Referral Hospital, they found a prevalence of 14.1% (95%CI 10.4-18.8) (Bongomin *et al*, 2021), therefore the estimated value of p=14.1÷100
P=0.141
q=1-0.141
q=0.859
Substitute in the formula
$N=\{(1.96)^2\times0.141\times0.859\} \div (0.05)^2$
N=186
Therefore sample size is approximately 186

Sampling Technique

The sampling technique used was probability random sampling where specifically simple random probability sampling was employed. This gives an equal chance for every pregnant woman to be chosen to participate in the study. The technique is non-biased.

Sampling Procedures

A laboratory identification number was used to select participants. All the bio-data was first captured from the patients and a laboratory number was given. The laboratory number of each patient was drafted on a separate piece of paper and folded. Thereafter they were mixed in a container. Each paper was picked one at a time from a container randomly until the desired number was reached. Since I preferred to attend to 10 patients per day, I picked 10 pieces of paper from the container to represent the rest of that day.

Data Collection Method

Hemoglobin estimation using venous blood collected in an EDTA tube by CBC machine was used, information in the registration book, correctly filled the laboratory request forms and the laboratory results. Made a list of printed questions to answer some independent variable-related questions and illiterate patients were aided by the interviewer who translated for them

Data Collection Tools

A Complete Blood Count (CBC) machine was used for measuring Hemoglobin levels. The specimen/sample used was venous blood (5mls) collected using EDTA tubes. Pens, marker pens, register book (stationary) for data entry, lab request forms, interviews, and questionnaires, and the laboratory results.

Data Collection Procedures

The rapport was first created by greeting the patients and introducing myself, the study, and purposes, the consent form was provided to be signed by the participants. Laboratory request forms were filled by interviewing the patients. A questionnaire was also provided to the patient to answer some questions appropriately. Those that are unable to interpret were guided as they filled.

Study Variables

These were divided into two that is; dependent and independent variables.

Dependent Variables

The dependent variable was the prevalence of anemia among pregnant women.

Independent Variables

These were causes or risk factors associated with anemia among pregnant women and these included age, nutritional status, economic status, level of education, family size, gestational age (trimester), and others

Quality Control.

Quality of the research was assured through pretesting of the research tools, training the research assistants, giving ample time for data collection, piloting the study, having clear inclusion and exclusion criteria, and ensuring that instruments used for Hb estimation were properly cleaned and well-calibrated. All pregnant women irrespective of

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age and gestational age that is; all trimesters were included in the study.

Data Analysis and Presentation

Data was analyzed during data collection and after collection to avoid unnecessary data. This was done by checking for completeness of the data and performing quality control checks. Descriptive statistics were used after the completion of data collection. Tables were also used in the presentation of some data. The prevalence of anemia was calculated using the formula;

Prevalence = Positive Cases (anemic pregnant women) X 100%

Total number of participants

Ethical Consideration

Ethical guidelines as per the Uganda National Council for Science and Technology Guidelines were put into action, the anonymity and confidentiality of patients were observed, the risk of harm, informed consent and avoided deceptive practices, maximized benefits and minimize harm to safeguard rights and welfare of participants, the respondent's choices were treated with self-respect for self-determination and no harm was inflicted on to the research participants besides that, justice was observed.

RESULTS

Demographic data of respondents.

Table 1: Showing characteristics of respondents by demographic data Kiyumba Health Center IV (n=186)

Factors		Frequency (%)	Anemic		severity		
Age			Yes F (%)	No F (%)	Mild (%)	Moderate (%)	Severe (%)
	≤19	8(4.30)	3(8.6)	5(3.3)	03(33.3)	06(28.6)	01(20)
	20-29	124(66.7)	26(74.3)	98(63.9)	02(22.2)	09(42.8)	03(60)
	30-39	52(27.9)	6(17.1)	46(30.5)	04(44.4)	06(28.6)	01(20)
	= ≥40	2(1.08)	0(0.00)	2(1.32)	0(0.00)	00	00(0.0)
		186(100)	=35(100)	=151(100)	=09(100)	=21(100)	=5(100)
Marital status	Married	181(97.3)	35(19.3)	146(96.7)	08 (100)	20(100)	07(100)
	Unmarried	5(2.7)	0(0.00)	5(3.3)	00	00(0.0)	00(0.0)
	Total	186(100)	=35(100)	=151(100)	=8(100)	=20(100)	Level
Llevel of Education	Never	9(4.8)	5(14.3)	4(2.6)	6(60.0)	9(50.0)	4(57.1)
	Primary	36(19.4)	6(17.1)	30(19.8)	2(20.0)	5(27.8)	2(28.6)
	Secondary	108(58.1)	18(51.4)	90(59.6)	1(10.0)	3(16.7)	1(28.6)
	Tertiary	33(17.7)	6(17.1)	27(17.9)	1(10.0)	1(5.6)	0(0.0)
	Total	186(100)	35(100)	151(100)	=10(100)	=18(100)	=7(100)
Occupation	Housewife	72(38.7)	22(62.8)	50(33.1)	9(47.4)	4(36.4)	3(60.0)
	Businesswomen	66(35.5)	10(28.6)	56(37.1)	6(31.6)	2(18.2)	0(0.0)
	Others	48(25.8)	3(8.6)	45(29.8)	4(21.1)	5(45.4)	2(40.0)
	Total	186(100)	35(100)	=151(100)	=19(100)	=11(100)	=5(100)
Area of residence	Urban dwellers	170(91.4)	30(85.7)	140(92.7)	9(64.3)	14((70.0)	1(100)
	Rural	16(8.6)	5(14.3)	11(7.3)	5(35.7)	6(30.0)	0(0.0)
	dwellers						

The majority

The majority, 124(66.7%), of the respondents were aged between 20-29 years with a total of 26(74.3%) being anemic whereas the minority 2(1.1%), aged >40 years of which none had anemia.

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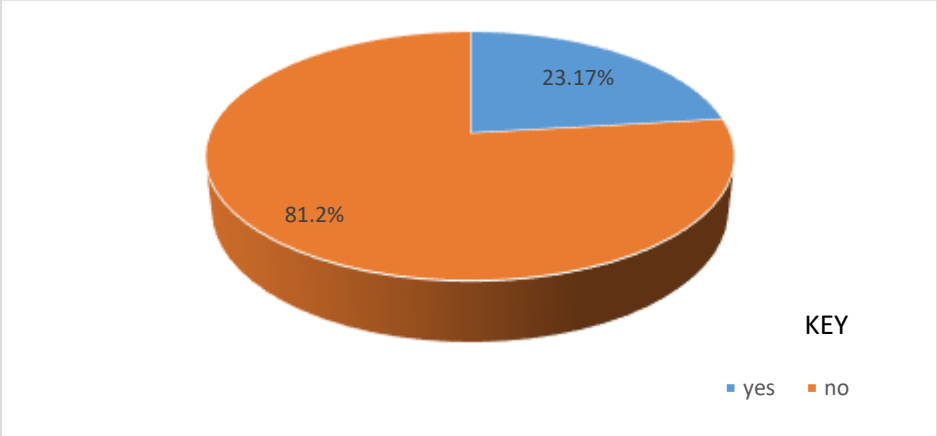
Furthermore, the majority, 108(58.1%), of the respondents had attended secondary school with a total of 51.4% being anemic and the minanemic9(4.84%), had never attended school and a total of 5(14.3%) were anaemic.

Also, majorianemic38.7%), of women, were housed by wives with a total of 22(62.8%), and the minority, 48(25.8%), were from other groups, (48(25.8%), for example, tailors teachers making a total of 3(8.6%) being anemic.

Finally the majority of women,170(91.4%) were urban dwellers with a total of 30(85.7%) being anemic, and the minority, 16(8.6%) were rural dwellers making a total of 5(14.3%) were anemic.

Magnitude and Severity of Anemia among Pregnant Women

Figure 1: A pie chart showing the distribution of respondents by prevalence of anemia. n= (186)



Out of the 186 participants in the study, 35(23.17) % were anaemic and 151(81.2) % were not anaemic.

Table 2: Distribution of respondents by the degree of anemia among pregnant women attending antenatal care services from Kiyumba Health Centre IV.(n=186)

Degree of anaemia	Frequency (f)	Percentage (%)
Mild anaemia	32	91.4
Moderate anaemia	1	2.8
Severe anemia	2	5.7
TOTAL	35	100

From a total of 35 mothers who were anemic, 32(91.4) % had mild anaemia, 1(2.8)% had moderate anemia and 2(5.7)% had severe anemia.

Risk factors and determinants associated with anemia among pregnant women

Under this, responses on the risk factors and determinants of anemia among pregnant women are to be showed

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Table 3: Distribution of anemia by the risk factors and determinants among pregnant women. (n=186)

Variable	Category	Frequency (f) (%)	Anaemia		severity		
			Yes F (%)	No F (%)	Mild (%)	Moderate (%)	Severe (%)
Ever suffered from malaria	Yes	32(17.20)	26(74.3)	6(3.9)	13(68.4)	8(72.7)	2(66.7)
	No	154(82.8)	9(25.7)	145(96.0)	6(31.6)	3(27.3)	1(33.3)
Total		186(100)	35(100)	151(100)	19(100)	11(100)	3(100)
Gestational age	1st Trimester	13(6.9)	2(5.71)	11(7.5)	7(38.9)	5(38.5)	1(20)
	2nd Trimester	61(32.8)	5(14.3)	56(37.1)	9(50)	5(38.5)	2(40)
	3rd Trimester	112(60.2)	28(80)	84(55.6)	3(23.1)	3(23.1)	1(20)
Total		186(100)	35(100)	151(100)	19(100)	13(100)	4(100)
Do you have meals containing iron supplements	Yes	10(5.4)	10(28.6)	0(0.00)	6(27.3)	2(22.2)	2(50)
	No	176(94.6)	25(71.4)	151(100)	16(72.7)	7(77.8)	2(50)
Total		186(100)	35(100)	151(100)	22(100)	9(100)	4(100)
How many times do you eat per day	<2 times	42(22.6)	8(22.8)	34(22.5)	11(47.8)	6(66.8)	2(66.7)
	>3 times	144(77.4)	27(77.1)	117(77.5)	12(52.2)	3(33.3)	1(33.3)
Total		186(100)	35(100)	151(100)	23(100)	9(100)	3(100)

Majority, 74.3%The maThe majoritya was among those women who had ever suffered from malaria whereas the minority, 25.7% had no anemia. Also majority, 60.2%, of the respondents were in the third trimester with a total of 80% who were anemic while the minority, 13(6.9%) were in the first trimester with a total of 5.7% of those who were anemic.

Finally majority, 94.6% did not eat food containing iron supplements with a total of 71.4% who were anemic while the minority, 5.3% ate food containing iron supplements with a total of 28.6% of those who had anemia.

Signs and symptoms of Anaemia among pregnant women

Table 4: Distribution of respondents by signs and symptoms of anemia.(n=186)

Signs and symptoms	Frequency	Percentage
Headache	22	11.8%
Fainting	0	0.0%
Dizziness and fatigue	16	8.6%
Depression	4	2.2%
All signs and symptoms	2	1.1%
None	142	76.3%
Total	186	100%

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The majority, 22(11.8%) of the respondents presented with a headache while the least 2(1.1) % presented with all signs and symptoms.

Discussion

Association between Demographic characteristics with the prevalence of anemia.

The study findings showed that the majority of the age group was 20-29 years with a total of 124(66.7%). Of which 26(74.3%) were anemic, this is because women in this age group do not usually feed well, and many most likely eat junk foods for example chips which are non-nutritious.

The study findings revealed that the majority 181(97.31%) of the pregnant women were married and only 5 (2.69%) pregnant women were unmarried where unmarried women were at a higher risk of acquiring anemia than married women and this is probably due to lack of support and money for feeding and paying hospitals bills, this is in line with the study conducted in the northern region of Ghana by Fondjo and others in 2020 which showed that unmarried pregnant women were at a higher risk of acquiring anemia with prevalence of 60.87% compared to married women with prevalence of 38.53% and this was because husbands take up responsibility of ensuring that wives attend antenantal and conform directives to their physicians and nurses thus ensuring overall wellbeing of wives.

Secondly, the study found out that many of the respondents 108(58.06%) had attained a secondary level at which 16.6 % had anemia, this is because people on this level have not yet gotten enough knowledge about anemia, its causes, signs, and its symptoms. This is in line with the study conducted in Iraq by Rusha and Hamdia in 2020 where they stated that illiterate pregnant women were reported to have a higher risk of anemia with a prevalence of 48%. This was because most of the illiterates did not mind visiting healthcare providers.

The study also found out that many of the respondents 170(91.4%) resided in urban areas of which 30(85.71%) were anemic. This is because however, these women are near hospitals, and most of them eat junk foods that do not contain all the values, especially iron. This is in line with a study conducted in Walayita town, southern Ethiopia by Lin and others in 2015 which stated that rural dwellers had a higher risk of 50.92% than urban dwellers with a prevalence of 31%, this was because the access to health centers was difficult.

Magnitude and severity of anemia

The study showed that the majority, 81.2% of participants were not anemic followed by 23.2% being anemic. This is not in line with the previous study carried out by Bongomin et.al, 2021 which revealed that the meta-analysis pooled data from 17 published studies about anemia in Uganda which had a total of 14,410 pregnant women. A prevalence of 30% (95% CI 23-37) prevalence of anemia was 30%. This may be probably due to low levels of awareness and poor nutrition among pregnant women.

The study showed that the majority of the respondents 32(91.4) % had mild anemia, 1(2.8)% had moderate anemia and 2(5.7)% had severe anemia which correlates with a study carried out by (Lin et al, 2018) which revealed that from a total of 43,403 pregnant women was found, out of whom 10,199 (23.5%) were anemic. In the first trimester, 2.7% were anemic of whom 77.5% had mild anemia, 22.5% had moderate anemia, and no severe case was reported in the first trimester. In the second trimester, 14.7% were anemic of whom 82.9% had mild anemia, 17.0% had moderate and 0.1% had severe anemia. In the third trimester, 6.1% were anemic of whom 73% had mild anemia, 26.1% had moderate anemia and 0.2% had severe anemia. this may be due to different levels of education among pregnant women.

Risk factors and determinants associated with anemia among pregnant women

According to this study, the majority of the respondents 74.3% had anemia among those women who had ever suffered from malaria whereas the minority, 25.7% had never suffered from malaria which correlates with a study conducted in Ghana by (Fondjo *et al*, 2020) which revealed that the history of malaria plasmodium

falciparum infection increases the risk of anemia in pregnancy Malaria induces destruction of parasitized and non-parasitized RBCs, impaired erythropoiesis and delayed reticulocyte response due to suppression of erythropoietin hormone during periods of tissue hypoxia. (Addai *et al*, 2019). This may be due to reduced immunity in a pregnant mother.

According to this study, the majority of the respondents 60.2%, of the respondents were in the third trimester with a total of 80% being anemic while the minority, (6.9%) were in the first trimester with a total of 5.7% of those who were anemic this is in line with a study conducted in Southern Ethiopia, (Laelem *et al*, 2015) which showed that there is gestation age which is divided into three, that is; first, second and third trimester where those in third trimester (62.75%) had highest risk of anemia followed by second (31.17%) and first (22.64%). This could be due to a reduction in maternal iron reserves with increasing gestational age as the result of demand by the fetus.

This research showed that the majority of respondents 94.6% did not eat food containing iron supplements with a total of 71.4% who were anemic while the minority, 5.3% ate food containing iron supplements with a total of 28.6% of those who had anemia, an iron deficiency which this correlates with a study carried out by (Rushna and Hamdia, 2020) which showed that food not rich in iron, vitamin B12, vegetables, and meat increased the risk of anemia among pregnant women. They also found out that age was a determinant where the highest risk was reported between 25-36 years. This may be due to the lack of enough iron, especially during late pregnancy was highly associated with anemia among pregnant women.

This study showed that the majority of the respondents (77.1%) eat three times a day while the least 22.8% eat less than two times a day this is in line with a study carried out by (Gautam *et al*, 2019) where most (77.4%) ate more than three times in a day and 27(77.1%) were anemic. This is because all these had an underlying pathology which was a warm infestation that could hinder the use of food that they were eating. the family size the pregnant women from families with more than five members were reported to have a higher risk of anemia than those with less than five members. It was assumed that catering for a small family in terms of food, and medication was much easier than large family.

Signs and symptoms of anemia among pregnant women

The study showed that (11.83%) of the pregnant women suffered from headache, (8.60%) had dizziness and fatigue, (2.15%) had depression,(and 1.08%) had all the above signs and symptoms and this is in line with the study done by Medhat and others in 2018 which stated that headache, fatigue weaknesses, irritability, the incidence of bleeding and a positive family history of blood diseases are found to be the clinical profile of anemia.

Furthermore, in the study conducted by Senthil and Geetha in 2021 where 76.34% did not have any of the above signs and symptoms indicating that anemia symptoms vary from mild to severe, patients with mild anemia may not experience any symptoms while those with intense anemia may experience some signs and symptoms.

Conclusion

In Uganda, recent research done by Kawempe National Referral Hospital found a prevalence of 14.1% of anemia among pregnant women with no severe cases (Bongomin *et al*, 2021). However, this study found out that the prevalence was 23.2% which is high. The prevalence was high in participants aged between 20-29 years, 30-39 years, <19 years, and > 40 years respectively, higher in married than unmarried, high in those who attained secondary education, primary, and tertiary, and those who had never gone to school respectively.

Also, it was high in participants who were housewives followed by business. In the same way, the prevalence was high in urban dwellers compared to village dwellers.

This study also found out that the signs and symptoms were, headache and fatigue, fainting, dizziness, and depression.

Recommendations

The present study has shown that the prevalence of anemia is still high. This calls for the government's intervention in health education about anemia.

Health workers should make sure all pregnant mothers are tested for hemoglobin levels at every antenatal visit to determine their anemic states.

The government should recruit more health workers because the number of mothers coming daily for antenatal is too high compared to the available workers and this can improve the patient and health worker interaction.

There is a need for continuous strengthening and interaction of risk factors and determinants influencing the prevalence of anemia for example malaria and education by the health workers to the pregnant women to increase awareness.

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ABBREVIATIONS AND ACRONYMS

ANC : Antenatal Care
g/dl: Grams per deciliter
Hb: Hemoglobin
RBCs: Red Blood Cells
UBOS: Uganda Bureau of Statistics
UDHS: Uganda Demographic and Health Survey
UTI: Urinary Tract Infection
WHO: World Health Organization

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Conflict of interest

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