

Prevalence of Anemia among Pregnant Teenagers in the Third Trimester Attending Antenatal Care Clinic at Hoima Regional Referral Hospital, Western Uganda

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**ABSTRACT**

Globally, anemia is public health problem leading to increased maternal and perinatal morbidity and mortality. An estimated 41.8% of pregnant women are diagnosed with anemia at some point in their gestation with special groups such as teenagers noted to be most affected. This was a cross-sectional study done from August 2021 to October 2021. A total of 288 pregnant teenagers aged between 13 and 19 years attending ANC at HRRH were consecutively enrolled. Interviewer-administered questionnaires and laboratory report forms were used to obtain data. Descriptive statistics followed by binary logistic regression were conducted. All data analyses were conducted using IBM SPSS statistics version 23. We enrolled 288 participants, (The prevalence of anemia was 26%; with 53% having mild anemia, 40% moderate anemia, and 7% severe anemia. The majority 40 (53.3%) had microcytic anemia, followed by normocytic anemia 25(33.3%) while 10(13.3%) had macrocytic anemia. This study found that anemia prevalence among pregnant teenagers at HRRH was higher than the estimated national anemia prevalence in the reproductive age group. There is a great need to strengthen ANC attendance for all pregnant teenagers by the health care authorities at all levels at the hospital, local area, district, and the MOH to reduce the risk of anemia among pregnant teenagers.

**Keywords:** prevalence, anemia, pregnate teenagers, trimester, antenatal care

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**INTRODUCTION**

Anemia is defined as a condition when the hemoglobin concentration in red blood cells or red cell mass is less than normal [1,2,3,4]. Several factors determine the optimal hemoglobin concentration required to meet physiologic needs including age, the elevation of residence, smoking habits, and pregnancy status. In pregnancy, anemia is defined as a hemoglobin concentration of less than 11 g/dL (hematocrit of less than 33%) in the first and the third trimester or a hemoglobin concentration of less than 10.5 g/dL (hematocrit less than 32%) in the second trimester [1,5,6,7].

Globally, anemia is public health problem since ancient years as results of the analysis of a sample of skeletons from the 4,000 years old site of Khok Phanom Di on the coast of central Thailand identified some individuals with skeletal evidence suggestive of severe anemia [2; 3]. People have been treating anemia for thousands of years, too. Perhaps most notably, Hippocrates

(c.460BC to c.370BC), the Father of Western Medicine, is said to have regularly used supplemental iron to cure the diseases [4,8,9,10].

During pregnancy, the World Health Organization suggests that eradication of anemia is a key component of safe motherhood as its attributable to 6.37%, 7.26%, and 3.0% deaths for Africa, Asia, and Latin America, respectively [5,11,12,13]. Geographically, those living in Asia and Africa are at the greatest risk. Nevertheless, there is a large variation in the incidence of pregnancy anemia due to changes in socio-economic conditions, lifestyles, and health-seeking behaviors of various individuals across different countries and cultures and obstetrics and gynecological related situation of pregnant mothers [6,14,15,16,17]. In general, anemia has been a serious problem affecting mostly African and Asian populations including pregnant women with a wide range of causes which can be can microcytic, normocytic, and

macrocytic anemia and its incidence varies largely during pregnancy [18]. The study was done to determine the prevalence of anemia among pregnant

teenagers in the third trimester attending antenatal care clinic at Hoima Regional Referral Hospital.

## METHODOLOGY

### Study design

This was a hospital-based cross-sectional study conducted to determine the prevalence, classification of anemia according to Mean Corpuscular Volume, and factors associated with anemia among pregnant teenagers in the third trimester attending antenatal care clinic at Hoima Regional Referral Hospital.

### Study site and setting

The study was conducted at the antenatal care clinic of Hoima regional referral hospital. HRRH, a public hospital located in Hoima city.

### Target population

All pregnant teenagers in the catchment area.

### Study population

All pregnant teenagers aged 13 years to 19 years in the third trimester who attended the ANC clinic at HRRH during the study period and met the eligibility criteria for the study.

### Eligibility criteria

#### Inclusion criteria

All pregnant teenagers in the third trimester who attended the ANC clinic at HRRH during the period of study.

#### Exclusion criteria

Pregnant teenagers with emergency obstetric conditions for example antepartum hemorrhage and/or those suspected to have COVID-19.

#### Sample size

A sample size of 288 human research participants was considered.

#### Sampling technique

Participants were enrolled consecutively until the required sample size was achieved.

#### Data collection

Data were collected by the principal investigator and trained research assistant using a structured investigator-administered questionnaire.

#### Data collection instruments

Each participant was given a questionnaire to obtain information on socio-demographic and factors associated with anemia such as obstetric factors and gynecologic factors. To achieve objectives one and two, about 3

ml to 4ml of venous blood was drawn using a sterile needle and labeled.

### Study procedure

Eligible pregnant teenagers were recruited in the study after consenting in writing, following sensitization, education, and counseling about the study. A structured questionnaire was administered to capture data on sociodemographic, and obstetric participant characteristics. A blood sample for Complete blood count was then collected using the procedure below.

The phlebotomy site selected was either the antecubital fossa or forearm, where a vein of good size, visible, straight, and clear was located. A tourniquet was applied about 4-5 finger-widths above the venipuncture site and the vein was re-examined [7]. While wearing clean gloves, the chosen site was swabbed with alcohol (70%) and allowed to dry completely. The vein was anchored by holding the patient's arm and placing a thumb below the venepuncture site, phlebotomy was performed at approximately 30-degree angle and 4 ml of blood was collected and put in well-labeled vacutainers which contained ethylenediaminetetraacetic acid [7]. The pressure was applied to the site until bleeding completely stopped. The sample was then taken to the laboratory for complete blood count analysis [7].

The laboratory technician used an automated analyzer (Celltac, Automated Haematology Analyzer, MEK-6400. NIHON KOHDEN). The manufacturer-supplied controls were run every morning to ensure that the analyzer was operating within 2.0 standard deviations. The closed model of blood sampling was used; the analyzer automatically sampled blood, processed, analyzed, and printed out the hemoglobin concentration levels. Pregnant teenagers with a hemoglobin concentration of less than 11.0 g/dl were categorized as anemic. Anemia was considered severe when the hemoglobin concentration was less than 7.0 g/dL, moderate when

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hemoglobin was between 7.0 and 9.9 g/dL, and mild from 10 to 10.9 g/dL. Depending on Mean Corpuscular Volume, anemia was classified as microcytic when the Mean Corpuscular Volume was less than 82 fL, normocytic when the Mean Corpuscular Volume was between 82 fL and 98 fL, and macrocytic when the MCV was more than 98 fL.

#### **Data management and analysis**

Collected data was checked for completeness before the participant left the interview room. Data were coded and entered in Excel version 2010 and later exported to IBM SPSS version 23. The analysis was done per objectives.

#### **Ethical consideration**

Ethical approval was sought from the Department of Obstetrics and Gynaecology KIU-TH, and the Research and Ethics Committee (REC) of Kampala International University. Permission from the hospital director of HRRH was also sought before conducting the study.

#### **Justice in selection and recruitment of participants**

Voluntary recruitment was done, and informed consent was signed. The participant was free to withdraw from the study any time she wished without coercion or compromise of care that she was entitled to. Participants were not forced to enrol in the study if they did not want to. Minors (emancipated minors

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or those under the age of 18 years) did not require the presence of their guardians to consent. Participants were consecutively selected so that they have equal opportunities to participate in the study. Priority was not given in terms of tribe, interest group, race, or religion.

#### **Criteria for selection of the study participants**

Using English and the local language, every pregnant teenager in the third trimester attending antenatal care clinic at HRRH during the period of study was fully explained and given the details of the study, sensitized, counseled, and then allowed to consent. The participant was requested to allow history taking and physical examination as part of our data collection procedure as well as a blood sample which was immediately taken for hematological analysis.

#### **Confidentiality**

Identification of participants was done using numerical codes. Details of respondents were kept under lock and key for privacy and confidentiality purposes throughout the research. Respect for the respondents' rights and fair treatment was strictly adhered to thus minimizing harm and discomfort to them. There was no disclosure of participants' information to the public without their consent.

RESULTS

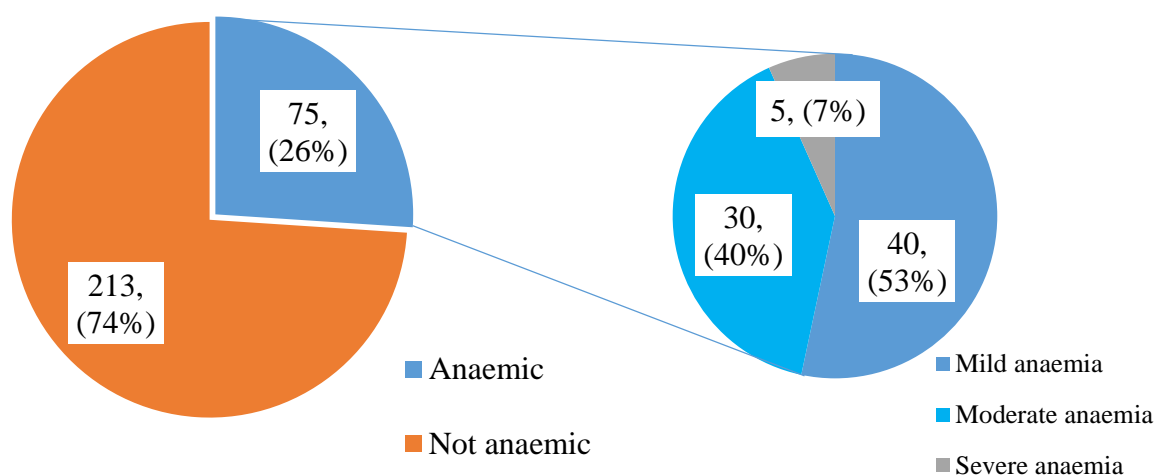
**Table 1: Socio-demographic characteristics of the study participants**

Variable	Category	Frequency	Percentage
Age	<18 years	20	6.9
	≥18 years	268	93.1
Level of education	Primary and below	128	44.4
	Secondary and above	160	55.6
Residence	Urban	84	29.2
	Rural	204	70.8
Religion	Catholic	140	48.6
	Anglican	74	25.7
	Moslem	25	8.7
Average monthly income (Ugx)	Born again	49	17.0
	≤100,000	129	44.8
	>100,000	159	55.2
Marital status	Single	93	32.3
	Married	195	67.7
No. family members	<5	185	64.2
	≥5	103	35.8
Cultural dietary restrictions	Yes	69	24.0
	No	219	76.0

*Ugx=Uganda shillings*

Of the 288 pregnant teenagers recruited in the study, the majority were aged eighteen years and above 268(93.1%), had attained at least secondary education 160 (55.6%), and resided in the rural setting 204(70.8%). Most of them were Catholics 140 (48.6%) and married 195(67.7%), with an average monthly

income of more than 100,000 Uganda shillings 159(55.2%). The majority of the respondents had family members less than five 185(64.2%), and many of the respondents had no dietary restriction 219(76.0%). This is all shown in table 1 above.



**Figure 1: Prevalence and severity of anemia among pregnant teenagers in the third trimester attending ANC at HRRH.**

Figure 1 shows that 75 out of the 288 pregnant teenagers who attended the ANC clinic at HRRH had anemia giving a prevalence of 26%. The majority had mild

anemia 40 (53%), followed by moderate anemia 30 (40%). A few of them however had severe anemia 5 (7%).

#### DISCUSSION

This prevalence of anemia among pregnant teenagers in the third trimester attending antenatal care clinic at Hoima Regional Referral Hospital was 26%. This finding is comparable to findings in a study done by [8] that enrolled 345 pregnant women attending Kisugu Health Centre IV, Makindye Division, Kampala, in Uganda which found the prevalence of anemia among pregnant teenagers to be 25.8%. The participants in the two studies likely had the same characteristics since they were both done in Uganda.

higher prevalence could be geographic, cultural, and altitude differences, plus dietary factors.

This prevalence, however, was lower than that found in a study done by [11] on pregnant teenagers in northwestern Malaysia where the prevalence was 53.1% and in one done in Kenya by Sowayi and Kagwiria, where it was 61% [12].

In comparison with a cross-sectional study conducted in Ethiopia where the prevalence of anemia was 11.1% among 443 pregnant teenagers [9] and a study done in Northern Tanzania where the prevalence of anemia was 18.0% among pregnant teenagers [10], our study found a higher prevalence of anemia among pregnant teenagers. The reason for

Regarding severity, this study found that mild anemia was the most common rated at (53%), followed by moderate anemia rated at 40%, and lastly, severe anemia rated at 7%. This was consistent with the findings in a study done in Kenya by Sowayi & Kagwiria, which showed that the majority (48.3%) had mild anemia, 31.2% had moderate anemia and 20.5% had severe anemia [12]. Therefore, regardless of the environmental, population, and methodological differences, the severity of anemia may vary from study to study.

#### CONCLUSION

The anemia prevalence among pregnant teenagers is high. Microcytic anemia remains the most common

morphological type affecting pregnant teenagers at HRRH.

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