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Prevalence of Anemia among Pregnant Females of Reproductive Age Attending Remera Health Center in Gasabo District, Rwanda

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Abstract: **Anemia in pregnancy remains a major public health challenge globally, especially in low- and middle-income countries such as Rwanda, where maternal nutritional deficiencies and limited healthcare access persist. This study aimed to determine the prevalence of anemia among pregnant females of reproductive age attending Remera Health Center in Gasabo District, Rwanda. A descriptive cross-sectional design was employed, targeting 224 pregnant women selected through systematic random sampling. Data were collected using structured questionnaires and complemented by a review of medical records. Quantitative data were analysed using SPSS version 30. The findings revealed that 25.89% of the respondents were anemic, with microcytic hypochromic anemia identified as the predominant type. The highest prevalence was observed among women aged 30–34 years (24%), while the lowest occurred among those aged 40–44 years (14%). Married women represented 53% of the anemic cases, suggesting that socio-economic and household factors may play a key role in influencing nutritional outcomes during pregnancy. The study concludes that anemia continues to pose a significant public health concern among pregnant women in the study area. It recommends strengthening antenatal care services, enhancing screening and nutritional counseling, and promoting adherence to iron and folic acid supplementation as effective strategies to reduce anemia prevalence and improve maternal health outcomes.**

Keywords: **Anemia, Pregnancy, Prevalence, Iron Deficiency, Public Health, Remera Health Center, Rwanda.**

I. INTRODUCTION

Anemia in pregnancy is one of the most common nutritional disorders globally, with significant implications for both maternal and fetal health. According to the World Health Organization (WHO), approximately 41.8% of pregnant females worldwide are affected by anemia, with the highest prevalence in low- and middle-income countries (WHO, 2021). Anemia during pregnancy is primarily attributed to iron deficiency, though other factors such as inadequate nutritional intake, infections (especially malaria and intestinal worms), and poor access to healthcare contribute to the high burden (Rasmussen, 2001).

The burden of anemia is disproportionately high in Africa, particularly in Sub-Saharan Africa (SSA), which accounts for a significant share of the global anemia burden. Studies show that nearly 57% of pregnant female in Africa suffer from anemia (Kassebaum et al., 2014). This region's high prevalence of anemia can be attributed to a combination of poor dietary diversity, infections (like malaria), limited access to quality healthcare, and poverty (Gebremedhin et al., 2021).

In Sub-Saharan Africa, anemia is a leading cause of maternal morbidity and mortality. The prevalence varies across countries; it often exceeds 60% in some regions (Kassebaum et al., 2014). Malaria, a widespread infectious disease in SSA, is a major contributing factor to anemia, as it causes both blood loss and destruction of red blood cells, exacerbating the iron deficiency in pregnant females (Nandy et al., 2016).

In Rwanda, anemia among pregnant females remains a significant public health issue, with national prevalence rates consistently reported to be high. According to the most recent Rwanda Demographic and Health Survey (RDHS) of 2020,

approximately 49% of pregnant women are affected by anemia (NISR, 2020). This figure is in line with the regional patterns observed in Sub-Saharan Africa, where anemia is a common issue among pregnant women. Several factors contribute to this high prevalence, including insufficient dietary intake of iron-rich foods, inadequate access to prenatal care in rural areas, and the high burden of malaria and parasitic infections.

Anemia prevalence varies between rural and urban areas in Rwanda, with rural females facing significantly higher rates of anemia. In rural areas, pregnant females often experience delayed or inadequate antenatal care (ANC) due to geographical barriers, lower health literacy, and limited access to healthcare facilities. In contrast, urban areas, including the capital city Kigali, have better access to healthcare services, and females are more likely to receive timely ANC and nutritional interventions. However, even in urban centers, anemia remains a concern due to factors such as poor nutrition, socio-economic challenges, and the persistence of infectious diseases like malaria (Ministry of Health, Rwanda, 2018

II. REVIEW OF RELATED LITERATURE

Anemia in pregnancy remains a major global health concern. According to the World Health Organization (WHO), approximately 36.5% of pregnant women worldwide are anemic (WHO, 2021). Iron deficiency is the leading cause, accounting for nearly 50% of all cases (WHO, 2021). New cases continue to emerge annually due to factors such as inadequate dietary intake, high fertility rates, and infections.

Recovery is achievable through iron and folic acid supplementation, improved maternal nutrition, and access to quality antenatal care (UNICEF, 2022). However, anemia contributes to around 20% of global maternal deaths, often due to hemorrhage, sepsis, or complications during childbirth (WHO, 2021). In Africa, the burden of anemia among pregnant women is higher than the global average. Approximately 46.3% of pregnant women on the continent are anemic (WHO, 2021). The high incidence is linked to nutritional deficiencies, malaria, hookworm infestation, and HIV/AIDS (Kassebaum et al., 2014). Recovery rates are lower in many regions due to limited access to iron supplements and health services. Anemia remains a major indirect cause of maternal mortality in Africa, especially when combined with conditions such as malaria and postpartum hemorrhage (UNICEF, 2022). Sub-Saharan Africa bears one of the highest burdens, with an estimated 57% of pregnant women suffering from anemia (WHO, 2021). Iron-deficiency anemia is predominant, often worsened by co-infections such as malaria and HIV. The region sees a high incidence of new cases due to food insecurity and poor healthcare access, particularly in rural areas. Recovery is hindered by delayed antenatal visits, while anemia continues to be a major contributor to maternal morbidity and mortality (Kassebaum et al., 2014). In Rwanda, the Rwanda Demographic and Health Survey (RDHS) 2019–2020 reports that 23% of pregnant women aged 15–49 are anemic, showing a slight decline from previous years (NISR et al., 2021). This prevalence reflects both old and newly diagnosed cases.

In Hakizimana's study indicates that in Rwanda, anemia remains a major health problem among pregnant females. A study by Hakizimana et al. (2020) reported that the prevalence of anemia among pregnant female in Rwanda ranged between 23% and 45%. Various factors, including inadequate dietary intake, high prevalence of infectious diseases such as malaria and intestinal parasites, and limited access to healthcare, contribute to these high prevalence rates. Identifying the current prevalence of anemia at Remera Health Center is crucial for developing targeted interventions.

New cases arise due to factors such as poor dietary diversity, infections, and limited supplementation, especially in rural areas. Recovery has improved due to Rwanda's emphasis on community health worker programs and widespread distribution of iron and folic acid tablets during antenatal care. While anemia-related deaths are not specifically recorded in the RDHS, anemia is a known risk factor for maternal complications, especially among women who deliver at home or delay care-seeking.

The most common types of anemia in Rwanda include:

Iron-deficiency anemia: Most prevalent, especially during pregnancy due to increased iron demand.

Folate-deficiency anemia: Due to poor intake of folate-rich foods.

Vitamin B12-deficiency anemia: Less common but significant in cases of strict vegetarian diets or malabsorption.

III. METHODOLOGY

1. Introduction

The study adopted a descriptive cross-sectional design conducted at Remera Health Center in Gasabo District, Kigali City. The target population comprised pregnant females aged 15–49 years attending antenatal care (ANC) services during the study period. A total of 224 respondents were selected through purposive sampling from the women attending the health center.

Data collection involved the use of structured questionnaires and medical record reviews to obtain information on hemoglobin levels, socio-demographic characteristics, and ANC attendance. Quantitative data were analyzed using SPSS version 30, generating descriptive statistics such as frequencies, percentages, and cross-tabulations. The prevalence of anemia was calculated as the proportion of participants with hemoglobin levels below 11 g/dL. Ethical clearance was obtained from Mount Kigali University and the Ministry of Health through Gasabo District.

2. Study Area

The study was conducted at Remera Health Center, located in Gasabo District, Kigali, Rwanda. Gasabo District is one of the three districts of Kigali City, with a population of approximately 530,907 (National Institute of Statistics of Rwanda [NISR], 2022). Remera Health Center provides maternal healthcare services, including antenatal care, and serves as a key facility for pregnant female seeking medical attention. Educational attainment varies, with a significant portion of the population having completed primary education. Gasabo's population is predominantly young, with about 54.2% under the age of 25. Educational attainment varies, with a significant portion of the population having completed primary education. While specific religious affiliations in Gasabo are not detailed in the available data, Rwanda is predominantly Christian, with Catholicism and Protestantism being the major denominations.

3. Target Population

The target population for this study comprised pregnant females of reproductive age (15-49 years) attending antenatal care at Remera Health Center. According to Rwanda's Ministry of Health (MOH, 2021), approximately 4,500 pregnant women visit the health center annually. The inclusion criteria were pregnant females diagnosed with anemia and those willing to participate in the study, while the exclusion criteria included females with no anemia.

4. Sample Size Determination

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{e^2}$$

The sample size for the study was determined using Fisher's formula (1998)

Where:

- ✓ n= Sample size
- ✓ z= Standard normal deviation (1.96 for 95% confidence level)
- ✓ p= Estimated prevalence of anemia among pregnant female (37.6% from RDHS, 2020)
- ✓ e= Margin of error (5%)

Substituting the values:

$$n = \frac{(1.96)^2(0.376)(1-0.376)}{(0.05)^2} \approx 358$$

Adjustment of the sample size, was done, using Finite population correction formula (Fisher's,1998) because estimated sample size from the facilities is below 10,000 respondents.

Hence, corrected sample size:

$$nf = \frac{358}{1+\left(\frac{358}{600}\right)} = 224$$

Where,

nf= desired sample size of respondents was less than 10,000.

n= desired sample size of respondents was more than 10,000

N = total estimated study/target population size (600)

The desired sample size of respondents were 224 females of reproductive age visiting Remera Health Center.

IV. RESULTS

The results show that 25.89% of pregnant women were diagnosed with anemia**,** indicating that approximately one in four participants were affected. The majority (74.11%) were non-anemic at the time of data collection. These findings reflect a moderate public health burden and are consistent with national statistics reporting a prevalence of 23–25% among pregnant women in Rwanda

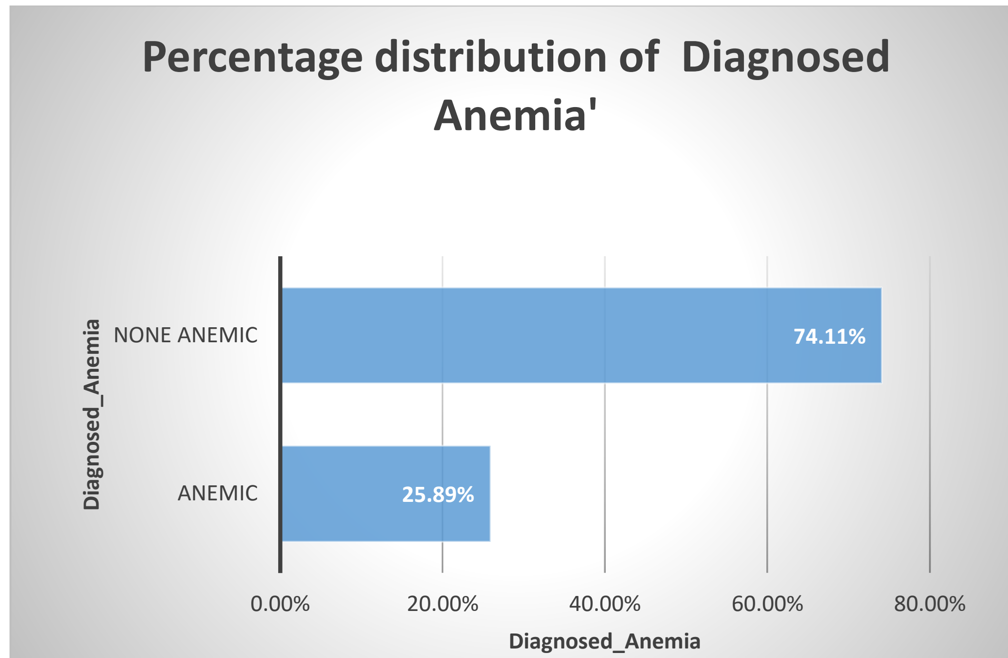

Figure 1: The prevalence of anemia among pregnant females

As is shown in the percentage distribution table bellow, this study assessed the prevalence of Anemia among pregnant women attending Remera Health Center. Out of the total participants, 25.89% were diagnosed with anemia, while 74.11% were found to be non-anaemic. This means that more than one in four pregnant women in the study population were affected by anemia.

This finding is consistent with national and international estimates, where the prevalence of anemia among pregnant women in Rwanda ranges between 23–25% (Rwanda DHS 2020; WHO 2019). The result underscores the importance of sustained interventions focusing on iron and folic acid supplementation, improved dietary diversity, and routine screening during antenatal care to prevent adverse maternal and fetal outcomes.

Marital status also appeared to influence the prevalence of anemia. Married women accounted for 53% of anemia cases, while single women represented 10%. Occupation was another determinant: 29% of affected women were self-employed, whereas 22% were unemployed.

V. DISCUSSION

The prevalence of anemia (26%) observed in this study aligns with previous findings from Rwanda's RDHS 2019–2020, which reported anemia prevalence between 23% and 25%. This indicates that anemia remains a moderate public health concern despite ongoing maternal health interventions. Similar results have been observed in neighboring countries such as Kenya (27.4%) and Ethiopia (29%), suggesting a regional trend in Sub-Saharan Africa.

The higher prevalence among women aged 30–34 years may be attributed to increased parity and physiological demands associated with repeated pregnancies. Comparable findings were reported by Abriha et al. (2014) in Ethiopia, where women with multiple pregnancies showed higher anemia rates. Marital status and occupation further influence access to nutrition and health services. Married women often face increased household responsibilities and may prioritize family needs over personal health, leading to nutritional deficiencies.

The predominance of microcytic hypochromic anemia underscores iron deficiency as the primary cause, consistent with WHO (2021) findings. This suggests gaps in dietary intake or supplement adherence despite health center efforts to distribute iron and folic acid tablets during ANC visits.

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VI. CONCLUSION

The study established that the prevalence of anemia among pregnant women attending Remera Health Center is 25.89%, signifying a moderate but persistent public health concern that continues to affect maternal health outcomes. The findings further revealed that the highest burden of anemia occurs among women aged 30–34 years, indicating that even women in their prime reproductive years remain vulnerable to nutritional deficiencies. Microcytic hypochromic anemia was identified as the most prevalent type, suggesting that iron deficiency remains a leading underlying cause. Moreover, the study demonstrated that socio-economic factors, particularly marital status and occupation, play a significant role in influencing anemia occurrence, highlighting the complex interaction between social conditions and health outcomes. These findings underscore the need for strengthening nutritional education programs targeting women of reproductive age, particularly during pregnancy, to promote dietary diversification and adequate iron intake. In addition, enhancing awareness and ensuring consistent utilization of iron and folic acid supplements are crucial strategies for reducing the burden of anemia in this population. Ultimately, sustained community-based health interventions and continued support from health workers are vital to improving maternal nutrition and safeguarding the well-being of mothers and their unborn children.

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