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Prevalence and Risk Factors of Anemia among Women in Uganda: A Comprehensive Review

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ABSTRACT

Anemia is a prevalent public health issue among women in Uganda, with significant implications for their health and socio-economic well-being. This comprehensive review examines the prevalence and risk factors of anemia among women, especially those of reproductive age, and identifies the multifaceted contributors to this condition. Nutritional deficiencies, particularly iron deficiency, are primary causes, exacerbated by limited access to iron-rich foods and food insecurity. Infectious diseases, such as malaria, hookworm, and HIV/AIDS, also contribute substantially to anemia by inducing red blood cell loss or impairing their production. Socioeconomic determinants, including education level, income, and access to healthcare, significantly impact anemia prevalence, as do reproductive factors like early pregnancies and high parity. This review synthesizes research on anemia among Ugandan women to highlight the urgent need for targeted interventions, including improved nutritional programs, enhanced malaria and deworming campaigns, and policy measures addressing socioeconomic barriers. By addressing the underlying determinants of anemia in Uganda, stakeholders can work toward mitigating its impact on women's health, productivity, and community participation.

Keywords: Anemia, prevalence, risk factors, Uganda, women's health, iron deficiency, reproductive health.

INTRODUCTION

Anemia is a condition characterized by a decrease in the number of red blood cells (RBCs) or a reduction in hemoglobin concentration within these cells, leading to a compromised oxygen-carrying capacity. Hemoglobin, the iron-containing protein in red blood cells, is essential for transporting oxygen from the lungs to tissues throughout the body [1]. Low hemoglobin levels impair the body's oxygen supply, causing fatigue, weakness, and a host of related symptoms. In more severe cases, anemia can lead to organ damage and even increase the risk of mortality. For women of reproductive age, anemia is particularly detrimental. This demographic is already at a heightened risk due to menstrual blood loss, higher iron requirements, and increased nutritional demands associated with pregnancy and lactation. During pregnancy, anemia can pose serious health risks for both the mother and the developing fetus [2]. The reduced oxygen supply can lead to complications like preterm delivery, low birth weight, and, in severe cases, maternal mortality. The impact of anemia in this group extends beyond immediate health outcomes; it affects their productivity, quality of life, and ability to contribute to their communities [3]. In Uganda, the prevalence of anemia among women is a critical public health issue, with significant disparities across age groups, geographical locations, and socioeconomic status. Anemia among Ugandan women is often multifactorial, involving a complex interplay of nutritional deficiencies, infectious diseases, and socioeconomic determinants. Poor dietary intake of iron and other essential nutrients is common, particularly in rural areas where food insecurity is prevalent. Iron deficiency, the most common nutritional cause of anemia, often results from inadequate consumption of iron-rich foods, such as meat, fish, and legumes [4]. Other micronutrients, including vitamin B12, folate, and vitamin A, also play critical roles in red blood cell production, and deficiencies in these can contribute to anemia. Infectious diseases such as malaria, hookworm, and HIV/AIDS are also major contributors to anemia in Uganda. Malaria, which remains highly endemic in many regions, can cause hemolysis, the breakdown of red blood cells, resulting in severe anemia [5]. Parasitic infections like hookworm cause chronic blood loss through intestinal bleeding, further compounding iron deficiency.

Additionally, HIV-positive women are at higher risk of anemia due to both the infection itself and the side effects of antiretroviral treatments, which can suppress bone marrow function.

Socioeconomic factors further exacerbate anemia risk. Women from lower-income households often have limited access to quality healthcare and adequate nutrition, heightening their vulnerability to anemia [6]. Education also plays a key role, as women with higher educational attainment are more likely to have better knowledge of health and nutrition, which can help mitigate anemia risk. In Uganda, anemia's high prevalence has led to numerous public health interventions, including nutritional supplementation, malaria prevention programs, and deworming initiatives. However, challenges in funding, coverage, and sustained implementation remain.

This review synthesizes existing research on anemia prevalence and risk factors among Ugandan women, aiming to identify effective strategies for prevention and treatment [7]. By understanding the key determinants of anemia in this context, healthcare providers and policymakers can better address gaps in care and develop policies to improve women's health and reduce the public health burden of anemia in Uganda.

This review synthesizes a broad spectrum of sources to present a comprehensive overview of the prevalence and risk factors of anemia among women in Uganda. The methodology employed involves an extensive literature search and selection process to ensure the inclusion of relevant, high-quality studies and reports [8]. The primary sources for data collection include demographic and health surveys, reports from international organizations like the World Health Organization (WHO), and peer-reviewed journal articles. By incorporating these varied sources, the review captures both statistical prevalence data and qualitative insights into the risk factors associated with anemia in this population. The literature search focused on studies conducted within the last 20 years to reflect current trends and factors influencing anemia in Uganda. This timeframe ensures that recent findings and updated healthcare practices are included while allowing for a historical perspective on changes in anemia prevalence and related health interventions over time [9]. The review is organized around studies published between 2003 and 2023, thus capturing significant periods of public health changes, including nutritional programs, malaria control efforts, and socioeconomic shifts in Uganda. To conduct the literature search, multiple databases were employed to maximize the range and reliability of findings. PubMed, Google Scholar, and JSTOR were selected for their extensive coverage of medical, public health, and sociological literature. These databases were accessed using specific keywords and search strings relevant to the research focus, such as "anemia in Uganda," "prevalence of anemia in women Uganda," "anemia risk factors," and "malnutrition and anemia Uganda." Combining these keywords helped in identifying articles and reports directly related to anemia among Ugandan women, while also capturing studies that examine contributing factors such as nutritional deficiencies, infectious diseases, and socioeconomic status [10].

Inclusion criteria were defined to ensure that only studies relevant to the prevalence and risk factors of anemia among women in Uganda were considered. Studies that provided statistical data on anemia prevalence, explored potential risk factors, or evaluated the effectiveness of interventions in Uganda were prioritized [11]. This criterion-based selection process helped to focus the review on empirical findings rather than theoretical discussions, allowing for a thorough examination of the specific drivers of anemia in the Ugandan context. Studies without explicit data on prevalence or risk factors were generally excluded to maintain a clear focus on the determinants and public health impact of anemia.

The review also integrates findings from national health surveys, particularly the Uganda Demographic and Health Survey (UDHS), which provides high-quality, nationally representative data on health indicators, including anemia prevalence. WHO reports were additionally consulted to cross-reference global anemia trends and confirm the accuracy of regional statistics. These reports provide valuable context on how Uganda's anemia rates compare to those of other countries in East Africa, highlighting specific areas where Uganda might need targeted interventions [12].

By utilizing these methods, the review is positioned to offer an accurate and comprehensive analysis of anemia among Ugandan women, identifying critical gaps in knowledge and areas where public health interventions can be further strengthened. This methodological approach, grounded in data-driven research, provides a reliable foundation for exploring the multifaceted risk factors contributing to anemia, enabling informed policy recommendations and intervention strategies.

Prevalence of Anemia Among Women in Uganda

Anemia among women in Uganda is a significant public health issue, particularly affecting women of reproductive age (15–49 years), with prevalence rates showing substantial variability across regions, age demographics, and socioeconomic factors. According to the Uganda Demographic and Health Survey (UDHS) of 2016, approximately 32% of Ugandan women in this age range are anemic. This statistic indicates that nearly one-third of women of reproductive age face compromised health and productivity due to anemia, with the rates rising to 40% in pregnant women, whose increased physiological demands make them particularly vulnerable [13]. The prevalence of anemia is notably higher in rural areas than in urban centers. Women in rural Uganda often experience more

barriers to accessing adequate nutrition, healthcare, and sanitation, which directly influences anemia rates. Limited healthcare infrastructure in rural regions reduces the availability of essential health services, including routine screening for anemia, iron and folic acid supplementation during pregnancy, and access to malaria prevention measures. Nutritional deficiencies are also more common in rural areas, where diets may lack adequate iron and other micronutrients essential for red blood cell production. Regional disparities further underscore the complexity of anemia prevalence in Uganda. The northern and eastern regions tend to report higher anemia rates compared to the central and western regions [14]. This regional variation can be attributed to several socio-historical factors. Northern Uganda, for instance, has a long history of conflict and displacement, which has impacted the socioeconomic stability of communities and disrupted healthcare services. Even in the post-conflict period, poverty and limited healthcare resources remain prevalent in the north, creating barriers to proper nutrition, disease prevention, and general healthcare access. In the eastern regions, poverty and limited agricultural diversity often contribute to food insecurity and poor dietary quality, resulting in a higher prevalence of iron and micronutrient deficiencies. These deficiencies are further exacerbated by high rates of infectious diseases, particularly malaria and helminth infections, which are endemic to many parts of the country and directly contribute to anemia through blood loss and chronic inflammation. Malaria prevention and treatment efforts, while ongoing, still face challenges in regions with high transmission rates, and women in these areas remain vulnerable to anemia linked to recurrent malaria infections. Socioeconomic factors also play a critical role in determining anemia prevalence among Ugandan women [9]. Women with lower socioeconomic status often have less access to quality healthcare, fewer opportunities for education, and a limited capacity to afford nutrient-rich foods. Education levels are particularly influential, as women with higher educational attainment generally have greater awareness of nutritional needs and are more likely to seek healthcare services. This awareness extends to antenatal care, where educated women are more likely to receive iron supplements and other preventive measures during pregnancy. Anemia prevalence among pregnant women is particularly concerning, given the elevated health risks it poses to both mother and child. Anemia in pregnancy is associated with adverse maternal outcomes, including increased risk of maternal mortality, preterm birth, and low birth weight, which further highlights the urgency of addressing this issue. Despite ongoing public health efforts to reduce anemia through nutritional and health interventions, gaps in coverage and resource allocation persist, especially in regions where healthcare infrastructure is limited. Overall, the high prevalence of anemia among Ugandan women underscores a need for targeted interventions that address both the immediate and underlying causes [2]. These efforts should prioritize improving nutritional access, enhancing healthcare delivery in rural and underserved areas, and promoting education and awareness on anemia prevention. Addressing the regional disparities and understanding the specific socio-cultural and economic challenges that affect anemia prevalence in various parts of Uganda will be essential to reducing the burden of anemia among women in the country.

Risk Factors for Anemia Among Women in Uganda

Nutritional Deficiencies: Iron deficiency is the leading cause of anemia globally and in Uganda. Due to limited access to iron-rich foods and poor dietary diversity, many Ugandan women, especially in rural settings, suffer from iron deficiency. Deficiencies in other micronutrients such as vitamin B12, folic acid, and vitamin A are also contributors, exacerbated by food insecurity and the high cost of fortified foods.

Infectious Diseases: In Uganda, infectious diseases such as malaria, hookworm infection, and HIV/AIDS significantly contribute to anemia. Malaria, highly endemic in Uganda, leads to hemolysis, where red blood cells are destroyed, lowering hemoglobin levels [11]. Intestinal parasites, particularly hookworms, cause chronic blood loss, contributing to anemia. Additionally, HIV-infected women often face anemia as a comorbidity, with both the disease and its treatments contributing to reduced red blood cell production.

Socioeconomic Factors: Socioeconomic determinants, including poverty, education level, and employment status, impact anemia prevalence. Women from lower-income families often face food insecurity and limited healthcare access, resulting in poor nutrition and untreated infections. Education also plays a role; studies have shown that women with higher education levels are more likely to have access to information on nutrition and healthcare, which helps mitigate anemia risk.

Reproductive Health and Maternal Status: Reproductive factors such as early pregnancies, high parity, and short intervals between births increase anemia risk due to cumulative nutrient depletion. In Uganda, a significant percentage of young women experience early pregnancies and closely spaced births, which contribute to their higher anemia risk [3]. Additionally, menstrual blood loss without adequate dietary compensation leads to iron deficiency among non-pregnant women.

Public Health Implications: The high prevalence of anemia among women in Uganda presents a significant public health challenge, with both immediate and long-term implications. Anemia in women, particularly during pregnancy, has been linked to increased risks of maternal mortality, impaired physical and cognitive function, and

adverse birth outcomes. Anemic mothers are more likely to deliver babies with low birth weight or developmental delays, perpetuating a cycle of poor health and socioeconomic disadvantages.

Current Interventions and Strategies

Efforts to address anemia in Uganda include nutritional supplementation, malaria control programs, deworming initiatives, and public health campaigns. The Ugandan Ministry of Health and various international organizations have launched programs to promote iron and folic acid supplementation, particularly among pregnant women. National campaigns for malaria prevention, including bed net distribution, and periodic deworming are also part of the public health strategy [12]. However, these efforts face challenges in terms of coverage, funding, and sustained implementation.

Recommendations for Future Interventions

Enhancing Nutritional Programs: Developing more comprehensive nutritional programs, including the promotion of locally available iron-rich foods and biofortified crops, can improve dietary intake for women in rural and low-income areas. Community-based initiatives and educational campaigns on nutrition can also enhance awareness and dietary practices.

Strengthening Infectious Disease Control: Enhanced malaria control efforts and regular deworming programs are essential. Providing bed nets and scaling up rapid diagnostic and treatment facilities for malaria in endemic regions will reduce malaria-induced anemia. Additionally, integrating anemia screening into routine health services for women at risk can facilitate early diagnosis and treatment.

Addressing Socioeconomic Barriers: To tackle anemia effectively, policies need to address socioeconomic barriers. Providing subsidized healthcare services, improving access to maternal care, and enhancing women's education on health and nutrition are critical. Expanding programs that empower women economically can also help mitigate anemia by reducing food insecurity and promoting healthcare access.

CONCLUSION

In conclusion, addressing anemia among women in Uganda requires a multifaceted approach that combines nutrition, healthcare, infectious disease management, and socioeconomic support. This review underscores the complex interplay of factors driving the high prevalence of anemia, including nutritional deficiencies, infectious diseases, and socioeconomic challenges, all of which contribute to the vulnerability of Ugandan women, particularly those in rural and low-income areas. Current interventions, such as iron and folic acid supplementation, malaria prevention, and deworming programs, are essential yet insufficient to achieve a significant reduction in anemia prevalence due to limitations in funding, coverage, and accessibility.

To make meaningful progress, future strategies should focus on expanding access to high-quality healthcare and enhancing nutritional programs that incorporate local and biofortified food sources. Integrating anemia screening into routine health services for at-risk women and strengthening malaria and parasite control efforts are also critical. Furthermore, addressing socioeconomic barriers through policies that support women's education, economic empowerment, and access to affordable healthcare will contribute to reducing anemia's impact on individuals, families, and communities. By implementing these targeted interventions and focusing on the specific regional and demographic needs, Uganda can take significant steps toward improving women's health outcomes and alleviating the public health burden of anemia.

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