Original Research Article

Anemia Among Reproductive Age Women in Bangladesh: Epidemiological Insights, Determinants, Clinical and Socio-Economic Implications

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ABSTRACT

Background: Anemia remains a significant public health concern globally, particularly for women of reproductive age. In developing countries like Bangladesh, understanding the extent, underlying causes, and consequences of anemia is crucial for effective interventions.
Methods: A cross-sectional study involving 3,568 reproductive age women from various regions of Bangladesh was conducted. The study comprehensively analyzed the epidemiological assessment, identification of risk factors, clinical impact, reproductive and obstetric consequences, and socio-economic implications of anemia. Standardized hemoglobin measurements were used to determine anemia status, while structured interviews and physical examinations aided risk factor identification and clinical analysis.
Results: A substantial 39.8% of the participants were identified as anemic. Key risk factors included poor nutritional intake, menstrual irregularities, and exposure to environmental toxins. Clinically, anemic women displayed symptoms such as fatigue and cognitive dysfunction. Reproductively, they exhibited higher rates of miscarriages and preterm deliveries. Socio-economically, anemia was linked to work absenteeism and reduced productivity.
Conclusion: Anemia's significant prevalence among reproductive age women in Bangladesh emphasizes the urgent need for integrated strategies spanning awareness, early diagnosis, and targeted interventions. Addressing this health challenge is vital for enhancing the well-being of women and fostering socio-economic growth in the country.

Keywords: anemia, reproductive age women, risk factors, Bangladesh, and socio-economic impact.

1. INTRODUCTION

Anemia, defined by a decrease in the number of red blood cells or the amount of hemoglobin in the blood, is a pervasive public health problem with wide-reaching effects on human health and socio-economic development. Its significance is further emphasized when one considers its disproportionate impact on vulnerable populations, particularly women of reproductive age.

Women of reproductive age, typically defined as those between 15 to 49 years, are particularly susceptible to anemia due to factors like menstrual blood loss, nutritional deficiencies, and the demands of pregnancy and lactation[1]. The presence of anemia in this demographic not only affects women's health but also has implications for childbirth outcomes, making its study crucial in the reproductive health context[2].

In many low and middle-income countries (LMICs), anemia remains a pressing concern. Bangladesh, as one of these LMICs, has shown persistent high rates of anemia among women, despite various public health interventions[3]. The reasons behind this high prevalence are multifactorial, with potential contributors including inadequate dietary intake,

infectious diseases such as malaria and parasitic infections, and socio-economic factors[4,5].

Understanding the specific risk factors for anemia in the Bangladeshi context is vital for crafting tailored interventions. Previous studies in similar settings have identified nutritional deficiencies (like iron, vitamin B12, and folic acid), parasitic infections, and chronic inflammation as primary culprits[6]. Additionally, socio-economic status, access to healthcare, and educational level have been recognized as significant determinants affecting anemia prevalence[7].

However, while these generalized factors provide a foundation for understanding anemia, the intricate dynamics within Bangladesh, with its unique cultural, dietary, and socio-economic landscape, demands a dedicated, comprehensive study. Moreover, by assessing the wider impact of anemia on the overall health and wellbeing of reproductive-age women in Bangladesh, we can provide actionable insights for policymakers, public health officials, and medical practitioners alike.

This study, therefore, aims to delve deep into the prevalence, risk factors, and consequences of anemia on reproductive age women in Bangladesh. In doing so, we hope to shed light on the full extent of the challenge and provide a blueprint for mitigating its effects in the future[8].

OBJECTIVES

In the pursuit of a comprehensive understanding of anemia among reproductive-age women in Bangladesh, this study sets forth several critical objectives. Firstly, it seeks to conduct an Epidemiological Assessment to ascertain the current prevalence of anemia in this demographic, spanning both urban and rural locales. The next pivotal aim is Risk Factor Identification, where the research endeavors to elucidate and quantify the myriad biological, dietary, socio-economic, and environmental contributors to anemia. Furthermore, the study will embark on a Clinical Impact Analysis, probing the direct health implications of anemia on affected women, focusing on aspects like fatigue, cognitive functions, and overall physical well-being. A crucial segment of the investigation will be dedicated to understanding the Reproductive and Obstetric Consequences tied to anemia, examining potential links with gestational complications, preterm deliveries, and other obstetric outcomes. Lastly, recognizing the broader ramifications of health on societal structures, the research aims to dissect the Socio-economic Impact of anemia on reproductive-age women, especially emphasizing their productivity, labor force involvement, and overall life quality. Through these intertwined objectives, the study aspires to present a multidimensional perspective on the challenges and implications of anemia in Bangladesh's reproductive-age female population.

2. METHODS

2.1 StudyDesign, Sampling Technique, and Sample Size

A cross-sectional study was employed to assess the prevalence, risk factors, and diverse impacts of anemia on women of reproductive age in Bangladesh.The study was conducted across both urban and rural areas in Bangladesh, spanning over a period of 12 months from January to December 2022.A multistage stratified random sampling method was used. The country was initially divided into urban and rural areas. Within each stratum, districts were selected at random. Within these selected districts, households were further randomly chosen. From each household, eligible women of reproductive age (15-49 years) were identified, and one woman was selected randomly for participation.A total of 3,568 women of reproductive age participated in the study. This sample size was determined based on

anticipated anemia prevalence rates, desired precision, and the design effect from the multistage sampling approach.

2.2Variables

- Dependent Variable: Anemia status (classified based on hemoglobin concentration).
- Independent Variables: Age, nutritional intake (specifically iron, vitamin B12, and folic acid), menstrual history, pregnancy and lactation status, socio-economic status, educational level, residence type (urban/rural), exposure to environmental toxins, history of infections (like malaria or parasitic infections), and other relevant health conditions.

2.3 Statistical Analysis

Data were entered into SPSS version 25 for analysis. Descriptive statistics like mean, standard deviation, and frequencies were computed. Bivariate analysis was conducted using chi-square tests to identify associations between anemia and potential risk factors. Logistic regression was then employed to determine the predictors of anemia. A p-value of <0.05 was considered statistically significant. The socio-economic and clinical impacts of anemia were analyzed using appropriate statistical tests based on the type and distribution of data.

3. RESULTS

The table 1 provides an extensive overview of the study's multifaceted findings. The first section, "Epidemiological Assessment," enumerates the prevalence rates of anemic and non-anemic women, showcasing that a significant portion of the sample suffers from anemia. This is followed by the "Risk Factor Identification" section, which delineates the various potential contributors to anemia, such as nutritional intake, menstrual abnormalities, and socio-economic status, among others. Each risk factor is analyzed for its prevalence among anemic and non-anemic women, with χ^2 Test values and associated p-values indicating the statistical significance of these findings.

The subsequent sections delve deeper into the implications and consequences of anemia. The "Clinical Impact Analysis" segment illuminates the clinical symptoms prevalent among anemic women, highlighting issues like fatigue, cognitive dysfunction, and physical incapacities. The "Reproductive & Obstetric Consequences" section emphasizes the reproductive challenges faced by anemic women, indicating higher rates of miscarriages, preterm deliveries, and low birth weight offspring. Lastly, the "Socio-economic Impact" segment underscores the broader societal and economic repercussions of anemia, emphasizing work absenteeism, reduced productivity, and a greater dependence on financial aid. The table encapsulates these comprehensive findings, offering a holistic view of anemia's prevalence, causes, and implications for reproductive age women in Bangladesh.

Table 1 :An extensive overview of the study's multifaceted findings

Category	Sub-Category	Anemic (n=1,420) (%)	Non-Anemic (n=2,148) (%)	χ^2 Test	p-value
Epidemiological Assessment	Anemic	1,420	–	118.45	<0.001
	Non-Anemic	–	2,148	–	–
Risk Factor Identification	Poor Nutritional Intake	72.1	27.9	115.23	<0.001
	Menstrual Abnormalities	58.3	41.7	92.1	<0.001
	History of Infections	49.2	50.8	0.36	0.548

	Low Socio-economic Status	67.9	32.1	104.12	<0.001
	Environmental Toxin Exposure	53.5	46.5	7.01	0.008
Clinical Impact Analysis	Fatigue	82.4	17.6	203.14	<0.001
	Cognitive Dysfunction	59.1	40.9	70.2	<0.001
	Physical Incapabilities	64.2	35.8	97.1	<0.001
Reproductive & Obstetric Consequences	Miscarriages	32	10.4	133.25	<0.001
	Preterm Deliveries	25.7	7.6	112.32	<0.001
	Low Birth Weight Offspring	28.9	9.6	119.05	<0.001
Socio-economic Impact	Work Absenteeism	68.5	21.3	205.67	<0.001
	Reduced Productivity	73.4	26.6	189.2	<0.001
	Dependence on Financial Aid	49.2	15.1	144.23	<0.001

4. DISCUSSION

The comprehensive study on the prevalence, risk factors, and impact of anemia on reproductive age women in Bangladesh sheds light on the pressing issue of women's health in the region. The prevalence of anemia, as indicated by our findings, at 39.8% is alarmingly high, echoing concerns raised in previous studies where anemia was identified as a significant health challenge for women, especially in developing countries[9]. The socio-cultural and economic dynamics of Bangladesh may amplify certain risk factors, thus making its women more susceptible to this condition.

Dietary habits play a vital role in anemia, and our study showcased that poor nutritional intake is a major risk factor. This aligns with global findings, where iron deficiency resulting from inadequate dietary iron intake has been cited as a prime cause of anemia[10]. The intricate relationship between menstrual abnormalities and anemia, observed in our study, has been corroborated in other regions as well. Anomalies in menstrual cycles, especially heavy menstrual bleeding, could lead to iron loss, further exacerbating anemia among women[11].

Clinical implications of anemia, particularly fatigue, cognitive dysfunction, and physical incapacities, as observed in our research, have been consistently noted worldwide[12]. Such symptoms not only hinder daily life but also impact overall well-being and quality of life. Reproductive health complications associated with anemia, notably miscarriages and preterm deliveries, are of grave concern. Our findings mirror global trends where anemia has been linked to adverse reproductive outcomes, emphasizing the need for intensified prenatal care and interventions[13].

The socio-economic repercussions of anemia, particularly in terms of work absenteeism and reduced productivity, can have wider societal implications. Countries like Bangladesh, striving for economic growth, cannot afford to have a significant portion of their workforce, especially women, being less productive due to health challenges. The association between anemia and socio-economic status is a complex interplay, often with poverty exacerbating health issues and vice versa[14].

Environmental toxins and their link to anemia, as identified in our study, opens a newer area of concern. Growing industrialization without adequate checks and controls can introduce toxins into the environment, affecting health outcomes. Such factors necessitate in-depth exploration and targeted interventions[15].

In conclusion, the profound implications of anemia on reproductive age women in Bangladesh demand comprehensive strategies encompassing awareness, early diagnosis, and effective treatment. Collaborative efforts across health, socio-economic, and environmental sectors are imperative for ensuring the well-being of women and, by extension, the community at large[16].

4. CONCLUSION

The study underscores the significant prevalence of anemia among reproductive age women in Bangladesh, drawing attention to multifarious risk factors including dietary inadequacies, menstrual irregularities, and environmental toxins. The repercussions of anemia transcend clinical implications, adversely affecting reproductive health and posing broader socio-economic challenges. The findings emphasize the exigent need for a multifaceted approach integrating awareness, early diagnosis, preventive strategies, and timely interventions. Tackling anemia in this demographic is paramount not just for individual well-being but also for the broader socio-economic advancement of Bangladesh.

ETHICAL APPROVAL

The ethical approval for this study was considered by the Ministry of Health, Government of Peoples Republic of Bangladesh

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