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Anemia and Its Associated Factors among Adult Female Patients Attending Medicine Outpatient Departments in Bangladesh

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ABSTRACT

Introduction: Anemia remains one of the most common nutritional and public health problems among adult women, particularly in low- and middle-income countries, where it contributes to considerable morbidity and reduced quality of life. Therefore, the present study was conducted to determine the factors associated with anemia among adult female patients attending the Medicine Outpatient Department of a tertiary care hospital in Bangladesh. **Methods & Materials:** This cross-sectional observational study was conducted in the Medicine Outpatient Department, Sirajganj Medical College, Sirajganj, Bangladesh, from February 2025 to January 2026. A total of 104 adult female patients were selected as study subjects by purposive sampling technique. Data were entered, cleaned, and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. A p-value <0.05 was considered statistically significant. **Result:** The study found some selected sociobiology of females with anemia. The incidence of anemia was 46.2%, with 52.1% of cases being mild. Anemia was significantly associated with lower educational status (50.0% vs. 28.6%; p=0.028), monthly family income <20,000 BDT (41.7% vs. 17.9%; p=0.011), underweight BMI (33.3% vs. 7.1%; p=0.001), heavy menstrual bleeding (45.8% vs. 17.9%; p=0.003), and inadequate iron-rich food intake (72.9% vs. 44.6%; p=0.004). Underweight BMI (AOR=3.21), heavy menstrual bleeding (AOR=2.84), low income (AOR=2.63), and inadequate iron-rich food intake (AOR=2.51) were independent predictors of anemia. **Conclusion:** The present study revealed that anemia remains a substantial health concern among adult female patients, with nearly one-half of the participants being affected. Mild anemia constituted the predominant severity category. Significant associations were observed between anemia and lower educational attainment, lower monthly family income, underweight body mass index, heavy menstrual bleeding, and inadequate consumption of iron-rich foods.

Keywords: *Anemia, Adult Female, Hemoglobin*

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INTRODUCTION

Anemia is one of the most common nutritional and hematological disorders worldwide and continues to pose a major public health challenge, particularly among women in low- and middle-income countries [1]. According to the World Health Organization (WHO), anemia is defined as a hemoglobin concentration below 12.0 g/dL in non-pregnant women and below 11.0 g/dL in pregnant women. The condition results in reduced oxygen-carrying capacity of the blood and manifests clinically with fatigue, weakness, dizziness, impaired physical performance, reduced cognitive function, and diminished quality of life [1]. Recent estimates from the Global Burden of Disease (GBD) Study demonstrated that anemia remains one of the leading causes of years lived with disability worldwide, affecting billions of individuals and contributing substantially to the global disease burden despite improvements in healthcare over the past three decades [2]. Women are disproportionately affected by anemia because of menstruation, pregnancy, lactation, increased iron requirements, and nutritional deficiencies [1,3]. Iron deficiency remains the leading cause of anemia globally, although deficiencies of folate and vitamin B12, chronic infections, inflammatory disorders, parasitic infestations, chronic kidney disease, inherited hemoglobin disorders, and malignancies also contribute to its development [3]. The WHO estimated that approximately 30% of women aged 15–49 years and 37% of pregnant women worldwide were anemic, highlighting the continuing magnitude of this problem [1]. South Asian countries continue to experience one of the highest burdens of anemia globally. Bangladesh is no exception, where anemia remains prevalent despite ongoing nutritional interventions and public health programs. Analysis of the Bangladesh Demographic and Health Survey reported that approximately two-fifths of non-pregnant ever-married women were anemic, with higher prevalence among women from poorer households, those with lower educational attainment, and those who were undernourished [4]. Similarly, a multicountry analysis involving Bangladesh, Nepal, and the Maldives found that anemia remained highly prevalent among women of reproductive age and was significantly associated with pregnancy status, nutritional status, household wealth, and educational level [5]. Several studies conducted in Bangladesh have further demonstrated the multifactorial nature of anemia among women. A study in Dhaka city reported that maternal anemia was significantly associated with maternal age, educational status, household income, and place of residence [6]. Another investigation among rural Bangladeshi pregnant women demonstrated that both iron deficiency and environmental factors, including groundwater iron concentration, influenced the occurrence of anemia [7]. Furthermore, a nationwide analysis revealed that underweight women had significantly greater odds of anemia than women with normal body mass index, emphasizing the importance of nutritional status in maintaining adequate hemoglobin levels [8]. More recently, research conducted among adolescent girls, pregnant women, and lactating mothers in southern Bangladesh also identified inadequate dietary diversity, poor nutritional practices, lower socioeconomic status, and limited access to health services as important determinants of anemia [9]. Although these studies provide valuable information regarding anemia among specific population groups, evidence regarding adult female patients attending medicine outpatient departments remains limited. Women seeking care in medicine outpatient departments frequently present with chronic diseases, nutritional deficiencies, menstrual disorders, endocrine abnormalities, gastrointestinal illnesses, and other conditions that may predispose them to anemia [10]. Therefore,

the present study aims to determine the prevalence of anemia and its associated factors among adult female patients attending medicine outpatient departments in Bangladesh.

METHODS & MATERIALS

This cross-sectional observational study was conducted in the Medicine Outpatient Department, Sirajganj Medical College, Sirajganj, Bangladesh, from February 2025 to January 2026. A total of 104 adult female patients aged 18 years and above who attended the Medicine OPD during the study period and fulfilled the eligibility criteria were enrolled using a purposive sampling technique. Patients who were pregnant, had received blood transfusion within the previous three months, were critically ill, or declined to participate were excluded from the study. Data were collected using a pretested, semi-structured questionnaire through face-to-face interviews. Information regarding sociodemographic characteristics (age, educational status, residence, and monthly family income), menstrual history, dietary habits, and relevant clinical history was recorded. Anthropometric measurements were obtained to calculate body mass index (BMI) using standard procedures. Venous blood samples were collected under aseptic precautions for estimation of hemoglobin concentration using the hospital laboratory's standard hematological analyzer. Anemia was diagnosed according to the World Health Organization (WHO) criteria for adult women (hemoglobin <12.0 g/dL for non-pregnant women), and severity was classified as mild (11.0–11.9 g/dL), moderate (8.0–10.9 g/dL), and severe (<8.0 g/dL). The primary outcome variable was the prevalence of anemia, while the secondary outcome was the identification of factors associated with anemia. Data were entered, cleaned, and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean ± standard deviation (SD), whereas categorical variables were presented as frequency and percentage. Associations between anemia and selected independent variables were assessed using the Chi-square test. Variables showing statistical significance in the bivariate analysis were entered into a multivariable logistic regression model to determine independent predictors of anemia. The strength of association was expressed as adjusted odds ratios (AORs) with 95% confidence intervals (CIs). A p-value <0.05 was considered statistically significant. Ethical approval was obtained from the appropriate Institutional Review Board/Ethical Review Committee of the study hospital. Written informed consent was obtained from all participants.

RESULTS

Among the 104 participants, the largest age group was 30–39 years (30.8%), followed by 18–29 years (26.9%). The mean age was 38.7 ± 12.4 years. Most participants had secondary education (32.7%), 59.6% resided in urban areas, and 40.4% had a monthly family income of BDT 20,000–39,999 (*Table I*).

Table I
Sociodemographic characteristics of the study participants (*n* = 104).

Characteristics	Frequency (n)	Percentage (%)
Age group (years)		
18–29	28	26.9
30–39	32	30.8
40–49	24	23.1
≥50	20	19.2
Mean age (years)	38.7 ± 12.4	
Educational status		
No formal education	14	13.5
Primary	26	25.0
Secondary	34	32.7
Higher secondary & above	30	28.8
Residence		
Urban	62	59.6
Rural	42	40.4
Monthly family income (BDT)		
<20,000	30	28.8
20,000–39,999	42	40.4
≥40,000	32	30.8

Nearly half of the participants had a normal BMI (50, 48.1%). Underweight was observed in 20 participants (19.2%), while 34 participants (32.7%) were overweight or obese (*Table II*).

Table II
Body Mass Index of the study participants (*n* = 104).

BMI category	Frequency (n)	Percentage (%)
Underweight (<18.5 kg/m²)	20	19.2
Normal	50	48.1
Overweight/Obese	34	32.7

Heavy menstrual bleeding was reported by 32 women (30.8%), and 28 women (26.9%) had a history of chronic disease. Regarding dietary practices, only 44 participants (42.3%) reported regular intake of iron-rich foods, whereas the majority, 60 participants (57.7%), had inadequate iron-rich food intake (*Table III*).

Table III
Menstrual, chronic disease, and dietary history of the study participants (*n* = 104).

Characteristics	Frequency (n)	Percentage (%)
Heavy menstrual bleeding	32	30.8
History of chronic disease	28	26.9
Regular iron-rich food intake	44	42.3
Inadequate iron-rich food intake	60	57.7

The overall prevalence of anemia was 46.2% (48/104). Among the anemic participants, 52.1% had mild anemia, 37.5% had moderate anemia, and 10.4% had severe anemia (*Table IV*).

Table IV
Incidence and severity of anemia among the study participants (*n* = 104).

Hemoglobin status	Frequency (n)	Percentage (%)
Non-anemic	56	53.8
Anemic	48	46.2
Severity of anemia (n = 48)		
Mild	25	52.1
Moderate	18	37.5
Severe	5	10.4

Anemia was significantly associated with lower educational status (p=0.028), lower monthly family income (p=0.011), underweight BMI (p=0.001), heavy menstrual bleeding (p=0.003), and inadequate iron-rich food intake (p=0.004). Although anemia was more common among women aged 40 years or older, the association was not statistically significant (p=0.064) (*Table V*).

Table V
Association between selected characteristics and anemia (*n* = 104).

Variables	Anemic n (%)	Non-anemic n (%)	p-value*
Age (≥40 years)	25 (52.1)	19 (33.9)	0.064
Education (Primary or below)	24 (50.0)	16 (28.6)	0.028
Monthly income <20,000 BDT	20 (41.7)	10 (17.9)	0.011
Underweight BMI	16 (33.3)	4 (7.1)	0.001
Heavy menstrual bleeding	22 (45.8)	10 (17.9)	0.003
Inadequate iron-rich food intake	35 (72.9)	25 (44.6)	0.004

**Chi-square test.*

Multivariable logistic regression demonstrated that underweight BMI (AOR=3.21, 95% CI: 1.34–7.70; p=0.009), heavy menstrual bleeding (AOR=2.84, 95% CI: 1.20–6.71; p=0.018), monthly family income below BDT 20,000 (AOR=2.63, 95% CI: 1.10–6.25; p=0.030), and inadequate iron-rich food intake (AOR=2.51, 95% CI: 1.09–5.79; p=0.032) were independent predictors of anemia. Lower educational status showed a borderline association with anemia (p=0.065) (*Table VI*).

Table VI
Multivariable logistic regression analysis of factors associated with anemia (*n* = 104).

Variables	Adjusted OR	95% CI	p-value
Underweight BMI	3.21	1.34–7.70	0.009
Heavy menstrual bleeding	2.84	1.20–6.71	0.018
Monthly income <20,000 BDT	2.63	1.10–6.25	0.030
Inadequate iron-rich food intake	2.51	1.09–5.79	0.032
Primary education or below	2.12	0.96–4.67	0.065

DISCUSSION

The present study found anemia in 46.2% of adult female OPD attendees, with 52.1% of cases being mild, 37.5% moderate, and 10.4% severe. This prevalence is higher than the 41.8% anemia prevalence reported by Rahman et al. among women of reproductive age in Bangladesh, Maldives, and Nepal, where the Bangladesh subgroup also showed a substantial burden of moderate/severe anemia among non-educated and pregnant women [5]. It is also higher than the 37.7% prevalence reported by Rahman et al. among school-going adolescent girls in rural Bangladesh, where 33.8% had mild anemia and 3.9% had moderate anemia [11]. However, the present figure is close to the 42.9% prevalence found by Fardaus et al. among female university students in Jashore, Bangladesh, among whom 60.5% had mild anemia, 36.6% moderate anemia, and 2.9% severe anemia [12]. These patterns suggest that anemia remains highly prevalent across Bangladeshi female populations, and the burden is at least as important among adult women seeking outpatient care. In the present study, anemia was more common among women with lower education and lower family income. This agrees with Rahman et al., who found that in Bangladesh, non-educated women had higher odds of moderate/severe anemia, while poverty and lower socioeconomic status were important correlates of anemia overall [5]. Kamruzzaman et al. likewise reported that anemia among non-pregnant ever-married women in Bangladesh was strongly influenced by illiteracy, poverty,

and undernutrition [4]. The current study also showed that underweight BMI and inadequate intake of iron-rich foods were important factors associated with anemia. This is consistent with Kamruzzaman's national analysis, which showed that underweight women had a higher likelihood of anemia, while obese/overweight women had a lower likelihood; in the binary model, severely underweight women had an odds ratio of 1.2680, whereas obese women had an odds ratio of 0.4038 compared with normal BMI [4]. Rahman et al. also found that undernutrition was associated with anemia among adolescent girls in rural Bangladesh with an odds ratio of 2.40, and irregular lunch consumption remained significant in multivariable analysis with an adjusted odds ratio of 2.92 [11]. Similarly, Fardaus et al. reported that low red meat consumption markedly increased the odds of anemia (OR 15.48), while tea or coffee soon after meals also raised risk (OR 5.79) [12]. Heavy menstrual bleeding and chronic disease history were also important in the present study. This is biologically plausible because WHO identifies heavy menstruation, chronic diseases, poor nutrition, infections, and family history as common causes of anemia, and notes that women of reproductive age remain one of the most vulnerable groups worldwide [13]. Rahman et al. further showed that reproductive status mattered in South Asian women, with pregnancy and recent menstruation linked to higher odds of anemia, while the Bangladesh subgroup had a large overall burden of anemia [5].

LIMITATIONS

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

The present study demonstrated that anemia is highly prevalent among adult female patients attending the Medicine Outpatient Department, affecting nearly half of the study participants. Mild anemia was the most common form, while lower educational status, lower family income, underweight body mass index, heavy menstrual bleeding, and inadequate intake of iron-rich foods were significantly associated with anemia.

RECOMMENDATION

Routine screening for anemia should be incorporated into the evaluation of adult female patients attending medicine outpatient departments, particularly those with low socioeconomic status, undernutrition, heavy menstrual bleeding, or poor dietary practices. Nutritional counseling, promotion of iron-rich diets, timely iron supplementation when indicated, and appropriate management of underlying causes should be strengthened. Further large-scale multicenter studies are recommended to better understand the burden of anemia and guide effective prevention and control strategies in Bangladesh.

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CONFLICT OF INTEREST

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REFERENCES

1. Safiri S, Kolahi AA, Noori M, Nejadghaderi SA, Karamzad N, Bragazzi NL, Sullman MJ, Abdollahi M, Collins GS, Kaufman JS, Grieger JA. Burden of anemia and its underlying causes in 204 countries and territories, 1990–2019: results from the Global Burden of Disease Study 2019. Journal of hematology & oncology. 2021 Nov 4;14(1):185.
2. Gardner WM, Razo C, McHugh TA, Hagins H, Vilchis-Tella VM, Hennessy C, Taylor HJ, Perumal N, Fuller K, Cercy KM, Zoeckler LZ. Prevalence, years lived with disability, and trends in anaemia burden by severity and cause, 1990–2021: findings from the Global Burden of Disease Study 2021. The Lancet Haematology. 2023 Sep 1;10(9):e713-34.
3. Camaschella C. Iron deficiency. Blood, The Journal of the American Society of Hematology. 2019 Jan 3;133(1):30-9.
4. Kamruzzaman M, Rabbani MG, Saw A, Sayem MA, Hossain MG. Differentials in the prevalence of anemia among non-pregnant, ever-married women in Bangladesh: multilevel logistic regression analysis of data from the 2011 Bangladesh Demographic and Health Survey. BMC Women's Health. 2015 Jul 29;15(1):54.
5. Rahman MA, Rahman MS, Aziz Rahman M, Szymlek-Gay EA, Uddin R, Islam SM. Prevalence of and factors associated with anaemia in women of reproductive age in Bangladesh, Maldives and Nepal: Evidence from nationally-representative survey data. PLOS ONE. 2021 Jan 7;16(1):e0245335.
6. Chowdhury HA, Ahmed KR, Jebunessa F, Akter J, Hossain S, Shahjahan M. Factors associated with maternal anaemia among pregnant women in Dhaka city. BMC Women's Health. 2015 Sep 22;15(1):77.
7. Ahmed F, Khan MR, Shaheen N, Ahmed KM, Hasan A, Chowdhury IA, Chowdhury R. Anemia and iron deficiency in rural Bangladeshi pregnant women living in areas of high and low iron in groundwater. Nutrition. 2018 Jul 1;51:46-52.
8. Kamruzzaman M. Is BMI associated with anemia and hemoglobin level of women and children in Bangladesh: A study with multiple statistical approaches. PloS one. 2021 Oct 28;16(10):e0259116.
9. Ara G, Hassan R, Haque MA, Boitchi AB, Ali SD, Kabir KS, Mahmud RI, Islam KA, Rahman H, Islam Z. Anaemia among adolescent girls, pregnant and lactating women in the southern rural region of Bangladesh: Prevalence and risk factors. PLOS ONE. 2024 Jul 10;19(7):e0306183.
10. World Health Organization. Global anaemia reduction efforts among women of reproductive age: impact, achievement of targets and the way forward for optimizing efforts. World Health Organization; 2020.
11. Rahman MJ, Rahman MM, Sarker MH, Kakehashi M, Tsunematsu M, Ali M, Ahmed A, Hawlader MD, Shimpuku Y. Prevalence and influencing factors with knowledge, attitude, and practice toward anemia among school-going adolescent girls in rural Bangladesh. PloS one. 2024 Nov 18;19(11):e0313071.
12. Fardaus F, Choyon MN, Hossain MS, Obydullah M, Khatun F, Milton MH, Hafiz FM, Ahmad T. Prevalence of anemia and its associated factors among female university students in Jashore, Bangladesh. Discover Public Health. 2025 Aug 9;22(1):462.
13. Hasan MM, Magalhaes RJ, Garnett SP, Fatima Y, Tariqujjaman M, Pervin S, Ahmed S, Mamun AA. Anaemia in women of reproductive age in low-and middle-income countries: progress towards the 2025 global nutrition target. Bulletin of the World Health Organization. 2022 Jan 20;100(3):196.