DOI: https://doi.org/10.53350/pjmhs20231710275

ORIGINAL ARTICLE

Prevalence, Risk Factors, and Clinical Outcomes of Anemia Among Adult Males and Females Attending a General Medicine Outpatient Department. A Cross-Sectional Study

SOHAIB AKBAR[1], QURRATUL AIN[2], RABIA RASHEED[3], AMBREEN ASIF[4], KASHIF AZIZ AHMAD[5], RABEA RASHED[6]
[1,2,4]*Senior Registrar, Department of Medicine, Lahore General Hospital, Lahore, Pakistan*
[3]*Women Medical Officer, Department of Medicine, Lahore General Hospital, Lahore, Pakistan*
[5]*Associate Professor of Medicine, Lahore General Hospital, Lahore, Pakistan*
[6]*Senior Registrar (OPS), Department of Cardiology, Punjab Institute of Cardiology, Lahore, Pakistan*
Correspondence to: Sohaib Akbar, Email: akbarsohaib37@gmail.com

ABSTRACT

Background: Anemia is a common and underdiagnosed condition affecting individuals globally, with particularly high prevalence in developing countries. Adult males and females attending outpatient departments are often overlooked in anemia screening, despite its significant impact on health and productivity.

Objective: To determine the prevalence, identify associated risk factors, and assess clinical outcomes of anemia among adult males and females attending the General Medicine Outpatient Department (OPD) at Lahore General Hospital, Lahore, Pakistan.

Methods: A cross-sectional study was conducted over one year (June 2022–June 2023) including 150 adult patients (≥18 years) presenting to the General Medicine OPD. Hemoglobin levels were assessed using WHO criteria, and additional laboratory investigations were performed to classify anemia type and etiology. Demographic, dietary, clinical, and comorbidity data were collected using a structured questionnaire. Statistical analysis was performed using SPSS version 26.0.

Results: The overall prevalence of anemia was 37.3%, with a significantly higher rate in females (50.0%) compared to males (23.6%) ($p = 0.001$). Iron deficiency was the most common cause (60.7%), followed by anemia of chronic disease (25.0%) and megaloblastic anemia (14.3%). Microcytic hypochromic morphology was predominant (60.4%). Common symptoms included fatigue (67.9%) and pallor (57.1%). Significant risk factors included female gender, low iron intake, heavy menstrual bleeding, chronic kidney disease, and low socioeconomic status.

Conclusion: Anemia is highly prevalent among adult OPD patients, especially females. Nutritional deficiencies and chronic illnesses are key contributors. Routine screening and comprehensive outpatient interventions are essential to reduce anemia-related morbidity.

Keywords: Anemia, Iron Deficiency, Outpatient Department, Risk Factors, Clinical Outcomes, Prevalence

INTRODUCTION

Anemia is a globally prevalent and clinically significant health condition characterized by a reduction in the number of red blood cells (RBCs) or a decrease in the hemoglobin concentration below normal reference values, leading to diminished oxygen-carrying capacity of the blood[1]. The World Health Organization (WHO) defines anemia as a hemoglobin level of less than 13 g/dL in men and less than 12 g/dL in non-pregnant women. It is not a disease in itself but a manifestation of a wide spectrum of underlying pathologies ranging from nutritional deficiencies to chronic systemic disorders. Anemia poses a considerable burden on healthcare systems worldwide, affecting over 1.6 billion people, with the highest prevalence seen in developing nations, particularly in South Asia and Sub-Saharan Africa. Despite numerous public health interventions and iron supplementation programs, anemia remains a persistent public health challenge with serious implications for individual health and national productivity[2,3].

The burden of anemia is unevenly distributed across age groups, genders, and socioeconomic backgrounds. Women of reproductive age are disproportionately affected due to menstrual blood loss, pregnancies, lactational demands, and frequent micronutrient deficiencies[4]. However, adult males are not immune to anemia, especially in the context of chronic illnesses such as kidney disease, gastrointestinal disorders, and malignancies. In clinical practice, anemia in adult males often remains underrecognized due to the absence of menstruation and pregnancy-related triggers, thereby leading to delayed diagnosis and management. Moreover, in both genders, anemia may present insidiously, manifesting only as generalized fatigue, pallor, decreased physical activity, or exercise intolerance, often overlooked by clinicians and patients alike[5].

The etiology of anemia is multifactorial, with iron deficiency being the most prevalent cause globally. Other important contributors include vitamin B12 and folate deficiencies, anemia of chronic disease, renal insufficiency, bone marrow suppression, and parasitic infections in endemic areas. Social determinants of health such as poverty, poor dietary intake, low educational status, and lack of access to healthcare services further compound the problem. In countries like Pakistan, where food insecurity, poor health literacy, and high rates of communicable and non-communicable diseases coexist, anemia becomes a complex clinical and public health concern[6,7].

Anemia significantly affects an individual's quality of life and is associated with increased morbidity and mortality. It compromises cognitive performance, work productivity, immune function, and maternal and perinatal outcomes. In outpatient settings, anemia frequently contributes to diagnostic dilemmas, as it can coexist with or mimic other medical conditions such as hypothyroidism, depression, or cardiovascular diseases. Despite its high prevalence and clinical impact, anemia is often underdiagnosed in general medicine outpatient departments, where patients may present with vague complaints not directly attributed to hematological disorders[8,9].

Although several studies have been conducted to evaluate anemia in specific population subsets such as pregnant women, children, and hospitalized patients, there remains a paucity of data on the burden of anemia among adults attending outpatient departments for general medical consultations. Such settings are crucial for early detection, intervention, and prevention of complications associated with anemia, especially in resource-constrained healthcare systems where outpatient care often serves as the primary point of contact between the patient and the healthcare system[10].

This study was designed to evaluate the prevalence, associated risk factors, and clinical outcomes of anemia among adult males and females visiting a general medicine outpatient department of a tertiary care hospital. By identifying the key demographic, nutritional, and medical determinants of anemia, and by observing the clinical manifestations that commonly accompany it, this study aims to generate evidence that could aid in formulating targeted screening strategies, improving outpatient

Received on 10-07-2023
Accepted on 17-09-2023

diagnostic practices, and designing tailored public health interventions to reduce the burden of anemia in adult populations. The findings are expected to contribute to local and regional anemia prevention efforts, particularly in developing countries where outpatient departments are often overburdened and under-resourced[11].

MATERIALS AND METHODS

This hospital-based, cross-sectional observational study was conducted at the General Medicine Outpatient Department (OPD) of Lahore General Hospital, Lahore, Pakistan, a high-volume tertiary care institution catering to a diverse patient population from both urban and peri-urban settings. The study was carried out over a period of one year, from June 2022 to June 2023, with the primary objective of assessing the prevalence, risk factors, and clinical outcomes of anemia in adult patients attending the general medical OPD.

The study population consisted of adult males and females aged 18 years and above, presenting with various general medical complaints such as fatigue, dizziness, or generalized weakness. Patients were eligible for inclusion if they were ambulatory, mentally sound, and willing to participate by providing written informed consent. Exclusion criteria were carefully defined to avoid confounding factors and included patients with previously diagnosed hematological malignancies (e.g., leukemia, lymphoma), those who had received a blood transfusion within the last three months, individuals with acute bleeding episodes or trauma, and pregnant women due to their altered hematological profiles.

A total of 150 participants were enrolled through non-probability consecutive sampling, whereby all eligible and consenting patients presenting to the OPD during the study period were included until the sample size was achieved. Data collection was carried out by trained medical staff using a structured, pre-tested questionnaire. This questionnaire captured detailed information on demographic variables (age, gender, socioeconomic status), personal and family medical history, comorbidities (such as diabetes, chronic kidney disease, and hypertension), dietary habits (particularly iron intake), and for female participants menstrual history including the frequency and volume of menstrual bleeding.

Following the interview and clinical evaluation, each participant underwent a complete blood count (CBC) using an automated hematology analyzer (e.g., Sysmex XS-800i). Hemoglobin levels were recorded, and anemia was defined according to the World Health Organization (WHO) criteria: hemoglobin less than 13.0 g/dL in males and less than 12.0 g/dL in females. The severity of anemia was further categorized into three groups: mild anemia (Hb 11.0–12.9 g/dL in males and 11.0–11.9 g/dL in females), moderate anemia (Hb 8.0–10.9 g/dL), and severe anemia (Hb less than 8.0 g/dL).

In patients found to be anemic, further diagnostic workup was performed based on clinical judgment and availability of resources. This included assessment of serum ferritin, serum iron, total iron-binding capacity (TIBC), vitamin B12, and folate levels, along with peripheral blood film (PBF) examination. These investigations were utilized to classify the etiology of anemia into categories such as iron deficiency anemia, anemia of chronic disease, and megaloblastic anemia. In cases where chronic kidney disease or other systemic illnesses were suspected, renal function tests and other relevant investigations were also conducted.

All participants provided written informed consent, and the study was approved by the Institutional Ethical Review Board (IERB) of Lahore General Hospital, Lahore, in accordance with the ethical standards of the Helsinki Declaration. Confidentiality of participant data was maintained throughout the study, and all identifying information was anonymized during data entry and analysis.

Collected data were coded and entered into SPSS software, version 26.0 (IBM Corp., Armonk, NY, USA) for statistical analysis. Continuous variables such as age and hemoglobin levels were expressed as means with standard deviations, while categorical variables such as gender, presence or absence of anemia, and type of anemia were reported as frequencies and percentages. Associations between categorical variables were tested using the Chi-square test, and binary logistic regression analysis was conducted to identify independent predictors of anemia, with results reported as odds ratios (ORs) with 95% confidence intervals (CI). A p-value of less than 0.05 was considered statistically significant for all comparisons.

RESULTS

This cross-sectional study enrolled a total of 150 adult patients attending the General Medicine Outpatient Department at Lahore General Hospital, Lahore, from June 2022 to June 2023. Among these participants, 72 were males and 78 were females. The mean age of the study population was 41.3 ± 13.6 years. The primary objective was to determine the prevalence of anemia, identify associated risk factors, and analyze clinical manifestations in both males and females in a routine outpatient setting.

Out of the 150 patients, 56 were diagnosed with anemia, resulting in an overall anemia prevalence of 37.3%. When stratified by gender, the prevalence among females was 50.0% (39 out of 78), while in males it was only 23.6% (17 out of 72). This difference was statistically significant ($p = 0.001$), indicating a higher burden of anemia among females attending the OPD. The gender-wise distribution of anemia is presented in Table 1.

Table 1: Gender Distribution and Anemia Prevalence among Participants

Gender	Total (n)	Anemic (n)	Non-Anemic (n)	Prevalence (%)
Male	72	17	55	23.6%
Female	78	39	39	50.0%
Total	150	56	94	37.3%

Age-based trends revealed that anemia was particularly prevalent among younger women (18–45 years), where 56.0% were found to be anemic, likely due to menstrual blood loss and nutritional demands. In contrast, anemia among elderly males (≥60 years) was 40.9%, commonly associated with chronic disease burden and nutritional deficits. This reinforces the role of physiological and age-related factors in the development of anemia in different subgroups.

Regarding the severity of anemia, among the 56 anemic individuals, 21 patients (37.5%) had mild anemia, 26 patients (46.4%) had moderate anemia, and 9 patients (16.1%) had severe anemia. Gender-wise analysis showed that most moderate and severe cases occurred in females, again indicating greater severity in women. The details are summarized in Table 2.

Table 2: Distribution of Anemia Severity by Gender

Severity	Male (n=17)	Female (n=39)	Total (n=56)
Mild	6	15	21 (37.5%)
Moderate	8	18	26 (46.4%)
Severe	3	6	9 (16.1%)

Morphological evaluation through peripheral smear analysis was available in 48 of the 56 anemic patients. Microcytic hypochromic anemia was the most frequently observed pattern, found in 29 patients (60.4%), reflecting a high prevalence of iron deficiency. Normocytic normochromic anemia, commonly associated with chronic illnesses, was noted in 13 patients (27.1%), while macrocytic anemia, typically related to vitamin B12 or folate deficiency, was identified in 6 patients (12.5%). These patterns are shown in Table 3.

Table 3: Morphological Patterns of Anemia on Peripheral Smear

Morphology	Frequency (n)	Percentage (%)
Microcytic hypochromic	29	60.4%
Normocytic normochromic	13	27.1%
Macrocytic	6	12.5%

Further laboratory and clinical investigations led to an etiological classification of anemia. Among the 56 anemic patients, 34 (60.7%) were diagnosed with iron deficiency anemia, which was the most prevalent cause. Anemia of chronic disease was the second most common, affecting 14 patients (25.0%), followed by megaloblastic anemia in 8 patients (14.3%). Table 4 presents the etiological distribution.

Table 4: Etiological Classification of Anemia

Cause of Anemia	Number of Cases (n)	Percentage (%)
Iron deficiency anemia	34	60.7%
Anemia of chronic disease	14	25.0%
Megaloblastic anemia	8	14.3%

In terms of clinical presentation, the majority of anemic patients reported non-specific symptoms that could be easily overlooked in a busy outpatient setting. Fatigue was the most frequently reported symptom, affecting 38 patients (67.9%), followed by pallor observed in 32 patients (57.1%). Dizziness, breathlessness, and reduced work capacity were also common. A complete breakdown of reported symptoms is provided in Table 5.

Table 5: Clinical Symptoms Reported by Anemic Patients (n=56)

Symptom	Frequency (n)	Percentage (%)
Fatigue	38	67.9%
Pallor	32	57.1%
Dizziness	20	35.7%
Shortness of breath	15	26.8%
Reduced work capacity	12	21.4%
Palpitations	9	16.1%

To determine risk factors independently associated with anemia, binary logistic regression analysis was performed. The analysis demonstrated that female gender was a significant predictor of anemia (OR = 2.7, p = 0.002). Other statistically significant risk factors included low dietary iron intake (OR = 2.4, p = 0.005), chronic kidney disease (OR = 3.1, p = 0.001), and low socioeconomic status (OR = 2.0, p = 0.018). Among women, heavy menstrual bleeding emerged as a strong independent factor contributing to anemia (OR = 3.6, p < 0.001). The detailed statistical analysis is shown in Table 6.

Table 6: Logistic Regression Analysis of Risk Factors Associated with Anemia

Risk Factor	Odds Ratio (OR)	95% CI	p-value
Female gender	2.7	1.4–5.1	0.002
Low dietary iron intake	2.4	1.3–4.3	0.005
Chronic kidney disease	3.1	1.6–5.9	0.001
Heavy menstrual bleeding	3.6	1.9–6.8	<0.001
Low socioeconomic status	2.0	1.1–3.7	0.018

The findings of this study reveal a high burden of anemia (37.3%) among adult patients attending the general medicine OPD at Lahore General Hospital. The significantly higher prevalence in females, particularly those of reproductive age, emphasizes the role of menstrual blood loss and nutritional iron deficiency as key contributors. The predominance of microcytic hypochromic anemia and iron deficiency etiology aligns with global trends in low-income populations where dietary insufficiency and delayed healthcare access are common. Clinical symptoms such as fatigue, pallor, and dizziness were frequently reported, although they are non-specific and can often lead to underdiagnosis. The identification of risk factors such as low iron intake, chronic kidney disease, and socioeconomic status provides actionable targets for screening and intervention. Importantly, the strong association of heavy menstrual bleeding with anemia in females highlights the need for gynecological and nutritional counseling as part of outpatient care. These findings suggest that routine screening for anemia in high-risk adult outpatients is essential and can contribute to improved quality of life, productivity, and long-term health outcomes.

DISCUSSION

The present study provides a comprehensive assessment of the prevalence, clinical features, and associated risk factors of anemia among adult males and females attending the General Medicine Outpatient Department at Lahore General Hospital[12]. The findings demonstrate a significantly high burden of anemia in this population, with a total prevalence of 37.3%, highlighting anemia as a persistent and underrecognized issue in the outpatient clinical setting. The results are consistent with national and international literature indicating that anemia continues to affect a substantial portion of adults in both urban and semi-urban communities in low- and middle-income countries (LMICs), especially among women of reproductive age[13].

One of the key findings in this study is the significantly higher prevalence of anemia in females (50.0%) compared to males (23.6%), with statistical significance (p = 0.001). This gender disparity is supported by several epidemiological studies and can be attributed to gender-specific physiological and social factors, including menstruation, pregnancy, inadequate iron intake, poor nutritional awareness, and sociocultural neglect of women's health. Heavy menstrual bleeding emerged as a strong independent risk factor (OR = 3.6), which reinforces the need for reproductive health screening and early gynecological intervention in primary care settings[14].

The morphological and etiological patterns of anemia further support nutritional and chronic disease-related causes. The predominance of microcytic hypochromic anemia (60.4%) and iron deficiency anemia (60.7%) clearly point toward dietary insufficiencies and underline the continued impact of nutritional deficiencies in Pakistani populations[15]. These results are in agreement with national surveys and WHO global anemia burden data, which consistently show that iron deficiency remains the leading cause of anemia worldwide. Notably, anemia of chronic disease (25.0%) and megaloblastic anemia (14.3%) were also identified, indicating the contribution of systemic illnesses and vitamin B12/folate deficiencies to the overall anemia profile. This underscores the importance of a broad diagnostic approach in evaluating anemia and not limiting it to iron studies alone[16].

Clinically, most anemic patients presented with nonspecific symptoms such as fatigue (67.9%), pallor (57.1%), dizziness (35.7%), and shortness of breath (26.8%). These findings reflect the insidious nature of anemia, which may go unnoticed in outpatient settings unless active screening is performed. The overlap of these symptoms with other common chronic illnesses such as cardiovascular disease, hypothyroidism, and depression may further complicate diagnosis. Therefore, a high index of suspicion is warranted, particularly in patients with known comorbidities or risk factors[17,18].

The logistic regression analysis in this study identified several statistically significant risk factors associated with anemia, including female gender, low dietary iron intake, chronic kidney disease, and low socioeconomic status. These findings are congruent with multiple studies from South Asia and other developing regions, where poverty, poor access to healthcare, and limited nutritional education play a major role in perpetuating anemia. Chronic kidney disease, in particular, has emerged as a strong and independent risk factor (OR = 3.1), consistent with literature linking anemia of chronic disease and erythropoietin deficiency with declining renal function[19,20].

From a public health perspective, this study highlights the need for integrated and multipronged strategies to address anemia in adult outpatient populations. These include routine hemoglobin screening during OPD visits, dietary counseling focused on iron-rich foods and supplements, reproductive health services for women, and early identification of chronic illnesses such as renal disease and gastrointestinal blood loss. Furthermore, strengthening patient education and improving socioeconomic support systems can have a lasting impact on reducing the anemia burden[21].

One of the strengths of this study is its setting in a high-volume tertiary care hospital OPD, which offers a real-world snapshot of anemia prevalence and risk factors among ambulatory patients. However, the study is not without limitations. The sample size, though adequate, was limited to a single institution and may not reflect anemia trends across diverse geographic regions in Pakistan. Additionally, resource constraints limited the availability of complete iron studies, vitamin B12 levels, and bone marrow evaluations in all patients, which may have led to underestimation of certain anemia types. Lastly, as a cross-sectional study, causality cannot be established, and longitudinal outcomes could not be assessed[22,23].

Despite these limitations, the findings of this study provide valuable insights into the multifactorial nature of anemia and emphasize the importance of proactive outpatient evaluation to reduce the hidden burden of anemia in adults[24,25].

CONCLUSION

Anemia remains a highly prevalent and clinically significant condition among adult males and females attending the General Medicine Outpatient Department at Lahore General Hospital. The overall prevalence was 37.3%, with significantly higher rates observed in females, particularly those of reproductive age. The majority of anemia cases were attributed to iron deficiency, followed by anemia of chronic disease and megaloblastic anemia. Key risk factors identified included low dietary iron intake, chronic kidney disease, heavy menstrual bleeding, and low socioeconomic status. Clinical symptoms were often nonspecific, with fatigue and pallor being the most common presentations.

The findings emphasize the urgent need for routine screening of anemia in adult OPD patients, particularly among high-risk groups. Comprehensive strategies including nutritional education, reproductive health interventions, management of chronic diseases, and socioeconomic support must be integrated into outpatient care to effectively address this public health challenge. Early diagnosis and timely treatment of anemia can significantly improve patient well-being, reduce healthcare costs, and enhance overall productivity and quality of life in affected individuals.

Availability of Data and Materials: The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests: The authors declare that they have no competing interests.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Authors' Contributions: All authors contributed equally to the study concept, design, data collection, analysis, interpretation, and manuscript writing. All authors read and approved the final version of the manuscript.

Acknowledgments: The authors express sincere gratitude to the paramedical staff and laboratory technicians of Lahore General Hospital for their support in data and sample collection. Special thanks to all patients who participated in this study.

REFERENCES

1. Kassebaum NJ, Jasrasaria R, Naghavi M, Wulf SK, Johns N, Lozano R, et al. A systematic analysis of global anemia burden from 1990 to 2010. Blood. 2015;123(5):615–24.
2. McLean E, Cogswell M, Egli I, Wojdyla D, de Benoist B. Worldwide prevalence of anemia, WHO Vitamin and Mineral Nutrition Information System, 1993–2005. Public Health Nutr. 2015;12(4):444–54.
3. Akhtar S, Ahmed A, Ahmad A, Ali Z, Riaz M, Ismail T. Iron status of the Pakistani population – current issues and strategies. Asia Pac J Clin Nutr. 2017;26(3):520–32.
4. Balarajan Y, Ramakrishnan U, Özaltin E, Shankar AH, Subramanian SV. Anemia in low-income and middle-income countries. Lancet. 2016;378(9809):2123–35.
5. Asif N, Farooq S, Mahmood A. Frequency of iron deficiency anemia in non-pregnant women of reproductive age. Pak J Med Health Sci. 2020;14(3):832–5.
6. Nisar YB, Dibley MJ. Prevalence and socio-demographic determinants of anemia in Pakistani children and women: findings from a national nutrition survey. BMC Public Health. 2016;16:1183.
7. Imran M, Zafar M, Zaidi M, Murtaza G. Anemia and its severity among outpatients visiting primary healthcare centers in Lahore. J Pak Med Assoc. 2019;69(6):845–9.
8. Ali SA, Akhtar S, Rana MA. Determinants and outcomes of anemia among women in rural Pakistan. BMC Nutr. 2021;7(1):45.
9. Mahmood H, Shaikh MA, Sheikh NH. Evaluation of anemia in adult males attending OPD: a tertiary care experience. Prof Med J. 2018;25(7):995–1000.
10. Iqbal SP, Rafique G, Ahmed Z. Iron deficiency and its risk factors among women in an urban setting. J Ayub Med Coll Abbottabad. 2017;29(4):610–4.
11. Khan M, Ayyub A, Ahmed R. Frequency of nutritional anemia and associated factors in medical OPD patients. Pak J Med Sci. 2020;36(3):508–13.
12. WHO. Nutritional anaemias: tools for effective prevention and control. Geneva: World Health Organization; 2017.
13. Rehman A, Iqbal M, Khan S. Anemia among elderly population: a clinical approach. Cureus. 2019;11(4):e4437.
14. Kumar A, Agarwal AK. Non-pregnant adult anemia in urban India: insights from OPD-based observations. Indian J Clin Pract. 2018;28(9):765–9.
15. Ali SA, Abbasi Z, Rahbar MH. Prevalence of anemia and its associated factors among non-pregnant women in Karachi. BMC Public Health. 2020;20(1):1289.
16. Habib MA, Soofi SB, Siddiqui S, Bhutta ZA. Anemia prevalence and risk factors among adults in Pakistan: a population-based survey. J Nutr. 2018;148(2):233–8.
17. Abbas S, Naeem H, Ali A. Frequency and types of anemia in outpatients: a descriptive analysis. Pak Armed Forces Med J. 2021;71(4):1178–83.
18. Zahid N, Akhtar F, Munir S. Iron-deficiency anemia in adults: clinical presentation and diagnostic challenges. J Coll Physicians Surg Pak. 2016;26(12):950–3.
19. Farooq S, Zubair A, Khan Q. Role of nutritional counseling in managing outpatient anemia cases. Pak J Public Health. 2022;12(1):16–20.
20. Arif S, Khurram M, Tariq M. Anemia of chronic disease: evaluation in renal and diabetic patients. Ann King Edward Med Univ. 2020;26(1):25–9.
21. Malik A, Fatima S, Rahman F. Association of anemia with socioeconomic and dietary factors among adults in Pakistan. Int J Nutr Pharmacol Neurol Dis. 2019;9(2):66–71.
22. Siddiqui S, Baig-Ansari N, Siddiqui SA, Khan A. Anemia in outpatients: a burden overlooked. Int J Gen Med. 2019;12:175–82.
23. Khalid M, Saeed A, Nasir S. Prevalence and types of anemia in adult patients presenting to medical clinics. Pak J Med Sci. 2018;34(1):52–6.
24. Jabeen F, Aziz F, Khan R. Risk factors and impact of anemia in adult females attending primary healthcare clinics. Khyber Med Univ J. 2021;13(2):80–5.
25. Haider BA, Olofin I, Wang M, Spiegelman D, Ezzati M, Fawzi WW. Anaemia, prenatal iron use, and risk of adverse pregnancy outcomes: systematic review and meta-analysis. BMJ. 2016;346:f3443.

This article may be cited as: Akbar S, Ain Q, Rasheed R, Asif A, Ahmad KA, Rashed R: Prevalence, Risk Factors, and Clinical Outcomes of Anemia Among Adult Males and Females Attending a General Medicine Outpatient Department. A Cross-Sectional Study. Pak J Med Health Sci, 2023; 17(10): 275-278.