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Research Article

Knowledge & Awareness of Iron Deficiency Anemia among the Adult Population

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ABSTRACT
Background: Anemia remains a significant global public health concern, with substantial implications for morbidity, quality of life, and economic productivity. Despite its high prevalence, community awareness and understanding of its causes, symptoms, and long-term consequences are often inadequate.
Objectives: This study aimed to assess the knowledge and awareness of iron deficiency anemia among adult population.
Methods: A cross-sectional study was conducted among 80 adults aged 18-65 years, selected via convenience sampling. A structured questionnaire assessed knowledge regarding definition, causes, symptoms, consequences, and prevention of anemia. Additionally, a basic pathology profile (Complete Blood Count with emphasis on hemoglobin, hematocrit, MCV, MCH, and serum ferritin for a subset) was obtained.
Results: The mean age of participants was 36.4 ± 10.7 years, with a male-to-female ratio of 35:45. Overall, 52.5% (n=42) had "poor" knowledge (score <50%), 35% (n=28) had "average" knowledge (50-75%), and only 12.5% (n=10) had "good" knowledge (>75%). Awareness of non-nutritional causes (e.g., chronic diseases, hemoglobinopathies) was particularly low (17.5%). Fatigue was the most recognized symptom (88.8%), but serious health consequences like cognitive impairment (30%), cardiovascular strain (22.5%), and poor pregnancy outcomes (41.3% of females) were poorly recognized. Pathology profiles revealed 21 participants (26.25%) were anemic (WHO criteria). Of these, 71.4% (n=15) had microcytic hypochromic anemia suggestive of iron deficiency, aligning with the most commonly identified cause (dietary iron deficiency: 68.8%). However, only 33.3% of anemic individuals were self-aware of their condition.
Conclusion: There is a significant gap in comprehensive knowledge about anemia, especially regarding its diverse etiology and serious health sequelae, among adults. Poor awareness coexists with a measurable prevalence of the condition, indicating a need for targeted public health education that integrates basic pathological concepts to improve early detection, prevention, and management.

Introduction

Anemia, a condition characterized by a reduction in the red blood cell mass or hemoglobin concentration below physiologically normal levels, stands as a pervasive global health burden with profound implications for individuals and societies. According to the World Health Organization (WHO), an estimated 1.8 billion people worldwide are affected, with the highest prevalence concentrated in low- and middle-income countries.[1] While often clinically silent in its early stages, anemia's sequelae are far from benign, contributing to a substantial loss of healthy life years through its impact on cognitive and physical development, work productivity, maternal and fetal outcomes, and overall quality of life.[2] The etiology of anemia is complex and multifactorial, forming a critical pathology spectrum that ranges from the highly prevalent nutritional deficiencies—primarily of iron, vitamin B12, and folate—to chronic inflammatory diseases, renal insufficiency, inherited hemoglobinopathies like thalassemia, and bone marrow disorders.[3] This diverse pathological landscape necessitates a correspondingly nuanced public understanding for effective prevention, timely recognition, and appropriate management. However, in many community settings, anemia is often simplistically equated with iron deficiency and perceived as a minor ailment manifesting only as fatigue or pallor. This limited awareness fails to capture its role as a critical indicator of underlying systemic health and a direct contributor to serious morbidity.[4] A profound gap exists between the clinical and public health significance of anemia and the level of community knowledge regarding its varied causes, broad symptomatology, and long-term health consequences. This knowledge gap represents a significant barrier to effective

primary and secondary prevention strategies.[5] Without informed awareness, individuals may fail to recognize symptoms, delay seeking care, or lack the understanding to adhere to preventive nutritional or medical interventions. Furthermore, poor awareness of non-nutritional causes can lead to inappropriate self-management, allowing treatable conditions to progress undiagnosed. In this context, assessing the baseline knowledge and awareness of anemia within a community becomes a vital first step in designing targeted health promotion programs. While several studies have evaluated knowledge among specific groups like pregnant women or adolescents, comprehensive data among the general adult population, particularly when correlated with objective hematological parameters, remains sparse. This study, therefore, aims to bridge this gap by undertaking a dual assessment. First, it evaluates the depth and breadth of knowledge regarding anemia—its definition, etiology, symptoms, and consequences—among a sample of adults. Second, it integrates a basic pathological profile, including a Complete Blood Count (CBC) and supporting indices, to objectively determine the local prevalence and morphological types of anemia present within the same population. This combined approach allows for a powerful correlation between subjective awareness and objective health status, revealing the critical disconnect between what people know and what they may be experiencing physiologically. The findings are intended to provide evidence-based insights that can inform the development of more effective, context-specific educational initiatives to elevate public understanding, thereby empowering communities to actively participate in mitigating the silent burden of anemia.

Methodology

Research Design

This study employed a descriptive, cross-sectional research design. The study was conducted at the outpatient department of General Medicine at Saraswathi Institute of Medical Sciences, Hapur. The target population was adults aged 18 to 65 years residing in the urban and peri-urban catchment area of the community health center.

Inclusion Criteria

- Adults aged 18-65 years.
- Willing and able to provide informed consent.
- Visiting the health center for non-emergency, routine purposes.

Exclusion Criteria

- Individuals with a known diagnosis of a hematological malignancy (e.g., leukemia, lymphoma).
- Individuals who were critically ill or in significant distress.
- Those with known severe cognitive impairment or communication barriers that would prevent them from understanding or completing the questionnaire.

Procedure for Data Collection

Data collection occurred over a continuous three-month period. Eligible individuals were approached in the waiting area, and the study was explained. Written informed consent was obtained from all participants. The procedure involved two sequential steps:

1. **Questionnaire Administration:** A trained research assistant administered a structured, pre-tested questionnaire in a private room. The questionnaire collected socio-demographic data and assessed knowledge across four domains: basic understanding, causes, symptoms, and consequences/prevention of anemia. Each interview lasted approximately 15-20 minutes.
2. **Pathology Sample Collection:** Immediately following the interview, participants were directed to the on-site laboratory for venous blood sample collection (approximately 3-4 ml in an EDTA tube for CBC and a serum separator tube for ferritin, if indicated). Samples were processed using automated hematology analyzer. Serum ferritin was analyzed using a chemiluminescent immunoassay (CLIA) for the subset of anemic participants.

Data Management

All data were handled confidentially. Questionnaire responses were entered into a Microsoft Excel spreadsheet using double data entry to ensure accuracy. The cleaned data was imported into IBM SPSS Statistics for Windows, Version 26.0 for statistical analysis.

Table 1: Socio-Demographic Characteristics of Study Participants (N=80)

Characteristic	Category	Frequency (n)	Percentage (%)
Age (Years)	18-30	32	40.0%
	31-45	28	35.0%
	46-65	20	25.0%
Mean ± SD	36.4 ± 10.7		
Gender	Male	35	43.8%
	Female	45	56.2%
Educational Level	Up to High School	24	30.0%
	Intermediate/Diploma	36	45.0%
	Graduate or Above	20	25.0%
Occupation	Employed/Self-Employed	42	52.5%
	Homemaker	22	27.5%
	Student	10	12.5%
	Unemployed	6	7.5%

As detailed in Table 1, the study participants had a mean age of 36.4 ± 10.7 years, with a slight female preponderance (56.2%, n=45). The cohort represented varied educational backgrounds, with the largest group (45%) having completed intermediate or diploma-level education. More than half (52.5%) were employed or self-employed.

Table 2: Overall Knowledge Level Regarding Anemia among Participants (N=80)

Knowledge Category	Score Range	Frequency (n)	Percentage (%)	Mean Score (Mean ± SD)
Poor Knowledge	< 50%	42	52.5%	
Average Knowledge	50% - 75%	28	35.0%	48.6 ± 16.2%
Good Knowledge		10	12.5%	

The overall assessment of knowledge, presented in Table 2, indicates a substantial deficit. The mean knowledge score was 48.6 ± 16.2%. Notably, more than half of the participants (52.5%, n=42) were categorized as having "poor knowledge" (score <50%), while only 12.5% (n=10) demonstrated "good knowledge."

Table 3: Domain-Specific Knowledge of Anemia among Participants (N=80)

Domain	Specific Item	Correct Responses (n)	Percentage (%)
Definition	Correctly defines anemia as low Hb/RBC	25	31.2%
Causes (Multiple)	Dietary Iron Deficiency	55	68.8%
	Vitamin B12 / Folate Deficiency	22	27.5%
	Chronic Blood Loss (e.g., ulcers, heavy periods)	28	35.0%
	Chronic Disease (e.g., CKD, inflammation)	9	11.3%
	Genetic (e.g., Thalassemia)	7	8.8%
Symptoms (Multiple)	Fatigue / Weakness	71	88.8%
	Pallor (paleness)	58	72.5%
	Shortness of Breath	49	61.3%
	Palpitations	29	36.3%
	Koilonychia (spoon nails)	5	6.3%
Consequences (Multiple)	Impaired Work Capacity / Productivity	41	51.3%
	Poor Pregnancy Outcomes	19 (out of 45 females)	42.2%*

	Cognitive Impairment / Poor Concentration	24	30.0%
	Developmental Delays in Children	23	28.8%
	Increased Cardiovascular Strain	18	22.5%

A domain-wise breakdown in Table 3 highlights specific areas of strength and weakness. While common symptoms like fatigue (88.8%) and pallor (72.5%) were well-recognized, understanding of etiology was narrow. Dietary iron deficiency was the most known cause (68.8%), but awareness of other causes such as vitamin deficiencies (27.5%), chronic disease (11.3%), and genetic disorders (8.8%) was markedly low. Crucially, knowledge of serious health consequences was poor, with less than one-third recognizing cognitive impairment (30%) and only 22.5% aware of potential cardiovascular strain.

Table 4: Pathological Profile and Anemia Status of Participants (N=80)

Parameter	Category	Frequency (n)	Percentage (%)
Anemia Status (WHO Criteria)	**Anemic (Overall)**	21	**26.3%**
Morphological Classification (Anemic, n=21)	Non-Anemic	59	73.8%
	Microcytic Hypochromic (Low MCV/MCH)	15	71.4%
	Normocytic Normochromic	4	19.0%
	Macrocytic	2	9.5%
Awareness Among Anemic Individuals (n=21)	Self-Aware of Being Anemic	7	33.3%
	Unaware of Anemic Status	14	66.7%

Table 4 outlines the objective pathological profile, which found an anemia prevalence of 26.3% (n=21) using WHO criteria. Among anemic individuals, the majority (71.4%, n=15) exhibited a microcytic hypochromic picture, strongly indicative of iron deficiency. A critical finding was the disconnect between objective status and subjective awareness: two-thirds (66.7%) of the anemic individuals were unaware of their condition.

Table 5: Association between Knowledge Level and Selected Characteristics

Characteristic	Category	Poor Knowledge (n=42)	Average/Good Knowledge (n=38)	p-value
Gender	Male	17 (48.6%)	18 (51.4%)	0.32
	Female	25 (55.6%)	20 (44.4%)	
Education Level	Up to High School	20 (83.3%)	4 (16.7%)	**<0.01**
	Intermediate/Diploma	18 (50.0%)	18 (50.0%)	
	Graduate or Above	4 (20.0%)	16 (80.0%)	
Anemia Status	Anemic (n=21)	13 (61.9%)	8 (38.1%)	0.25
	Non-Anemic (n=59)	29 (49.2%)	30 (50.8%)	
Recent Blood Test	Had test in last 2 years	22 (44.0%)	28 (56.0%)	**0.04**
	No recent test	15 (75.0%)	5 (25.0%)	

Finally, Table 5 presents associations between knowledge level and key variables. A statistically significant association ($p<0.01$) was found between higher educational attainment and better knowledge. Furthermore, participants with average or good knowledge were significantly more likely to have undergone a blood test in the preceding two years ($p=0.04$). No significant association was found between knowledge level and gender or anemic status.

DISCUSSION

This study provides a critical snapshot of the substantial gap that exists between the objective burden of anemia and the subjective understanding of it within a community of adults. The findings reveal a triad of concern: a

high prevalence of anemia (26.3%), a predominantly poor level of comprehensive knowledge about the condition, and an alarming lack of self-awareness among those who are anemic. This triad underscores a significant public health challenge where a common, consequential, and often treatable condition persists largely unrecognized by those it affects. The overall knowledge deficit observed, with over half the participants scoring poorly, aligns with studies from similar settings. For instance, a community-based study in Ethiopia also reported inadequate knowledge, particularly regarding non-nutritional causes, mirroring our finding that awareness was heavily skewed towards iron deficiency.[6] This narrow focus presents a risk. While our pathological profile confirmed iron deficiency anemia (IDA) as the predominant type (71.4% of anemic cases), the almost exclusive public association of anemia with dietary iron can lead to two problematic outcomes. First, individuals with anemia from other causes (e.g., chronic kidney disease, thalassemia trait) may pursue ineffective dietary interventions, delaying diagnosis of the underlying pathology.[7] Second, it may trivialize the condition, reducing it to a simple nutritional issue rather than recognizing it as a possible marker of systemic disease or a serious health threat in its own right. The poor recognition of anemia's systemic consequences is particularly disconcerting. While fatigue was widely acknowledged, less than a quarter of participants associated anemia with increased cardiovascular strain, a well-established complication due to compensatory mechanisms like increased cardiac output.[8] This gap in understanding the long-term morbidity risks undermines motivation for screening and prevention. Our finding that individuals with better knowledge were more likely to have had a recent blood test ($p=0.04$) suggests that improved awareness can directly translate into health-seeking behavior. This is supported by research highlighting the role of health literacy in promoting preventive care utilization.[9] A pivotal and concerning result is that 66.7% of the anemic individuals in our sample were unaware of their status. This "silent" prevalence is perhaps the most compelling argument for enhanced community-based screening linked with education. The significant association between higher education and better knowledge further indicates that vulnerable, less-educated groups are at a double disadvantage: they are both less informed and, as literature suggests, often at higher risk for nutritional deficiencies.[10] Therefore, public health campaigns must be designed to reach beyond traditional literate audiences, employing visual aids and community-level discussions.

CONCLUSION

In conclusion, this study illuminates a critical disconnect. A significant prevalence of anemia, primarily microcytic and suggestive of iron deficiency, coexists with a community knowledge base that is incomplete and often inaccurate, particularly regarding etiology and severe health outcomes. This knowledge gap is a barrier to prevention, early detection, and appropriate management. To mitigate the silent burden of anemia, public health strategies must evolve from generic messages about iron. They should integrate basic pathological concepts—explaining, for example, what different red blood cell sizes can indicate—to foster a more nuanced public understanding. Coupling targeted, low-health-literacy-friendly education with accessible community screening programs is an essential step towards empowering individuals to address this pervasive condition.

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