EXPLORING THE GAPS AND GAINS: A COMPREHENSIVE STUDY ON KNOWLEDGE, ATTITUDE, PRACTICES, AND PRESCRIBING TRENDS RELATED TO ANAEMIA AMONG IN-PATIENTS

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Anaemia refers to the common blood disorder that affects around one-third of the world's population. Infection risk is raised due to a lack of knowledge about anaemia.

The aim of the study. *The aim of the study is to examine patient knowledge, attitude, practice, and prescription trends regarding anaemia among patients. Also, to identify a correlation between haemoglobin levels and KAP score among patients.*

Materials and methods. *A prospective observational study was carried out in 133 in-patients admitted to SVIMS Hospital, General Medicine department diagnosed with anaemia for 6 months. Patient data were gathered through a review of their medical case records to evaluate prescribing patterns, while a structured and validated questionnaire was used to conduct face-to-face interviews with the patients, aiming to assess their knowledge, attitudes, and practices regarding anaemia.*

Results. *Males comprised 38 (29%) and females 95 (71%). For microcytic hypochromic anaemia, Tablet. Ferrous fumarate with tablet folic acid and Inj. Eldervit were prescribed 64 times. Vitamins and folic acid (23 prescriptions). KAP scores were linked to haemoglobin. Hb levels were inversely connected with patients' knowledge scores (p < 0.05). Highly conclusive, patients' attitude assessments and Hb levels were positively correlated (p < 0.05). Practice score and Hb levels correlated positively (p < 0.05).*

Conclusions: According to this study, anaemic individuals' medicine prescription behaviours should be monitored. Anaemia awareness should be enhanced

Keywords: *anaemia, attitude, haemoglobin, knowledge, practice, prescribing pattern*

1. Introduction

Anaemia is a common haematological disorder defined by a decrease in haemoglobin concentration below the reference range specific to age and gender, resulting in impaired oxygen delivery to peripheral tissues. It arises from multiple etiologies, but nutritional anaemia is the most prevalent form [1, 2]. Anaemia is acknowledged as a serious global health issue that affects both developed and emerging nations, having a significant negative impact on both social and economic advancement and health. The WHO assess that 1.62 billion humans across the globe were affected with anaemia that contributes 24.8 % of the world population. When compared to all other developing countries, India has a higher rate of anaemia prevalence [3]. The World Health Organization (WHO) defines anaemia based on a hemoglobin of less than 13 grams/dl in men and 12 grams/dl in women. The severity grading of anaemia based on the World Health Organization refers to Grade 0 (WNL): 11.0 g/dl, Grade 1 (Mild): 9.5 to 10.9 g/dl, Grade 2 (Moderate): 8 to 9.4 g/dl, Grade 3 (Extreme): 6.5 to 7.9 g/dl [4].

A proper understanding of anaemia among individuals, encompassing their knowledge, attitude, and practices (KAP), plays a pivotal role in effective disease management and overall health outcomes [5]. Knowledge about the causes, symptoms, and treatment options empowers patients to recognize early signs and seek timely medical intervention [6]. A positive attitude towards disease management fosters motivation and adherence to prescribed therapies, while appropriate practices such as dietary modifications, compliance with supplementation, and avoidance of risk factors like caffeine and smoking [7]. There is a need to improve education and awareness about anaemia, especially among patients with lower haemoglobin levels, to enhance treatment outcomes [8].

Recent research highlights considerable variability in the prescribing patterns and decision-making factors for anaemia management [7]. Prescriptions are often influenced by the type and severity of anaemia, patient comorbidities, and nutritional status. While oral iron remains the most frequently prescribed interven-

tion, differences persist in the choice of formulations, combination therapies, and treatment duration. Additionally, the concurrent use of vitamin B12, folic acid, and multivitamins is often empirical rather than evidence-based [8, 9].

Many people have anaemia, but they still lack the right awareness and practices to manage anaemia [10]. Similarly, variations in prescribing trends across healthcare settings focus on the importance of evaluating current clinical approaches [11]. This study was undertaken to explore the knowledge, attitudes, and practices (KAP) regarding anaemia among in-patients, along with assessing prescribing patterns. Also, to identify a correlation between haemoglobin levels & KAP score among patients.

2. Planning (methodology) of research

The study followed a three-stage process to explore the knowledge, attitude, practices (KAP), and prescribing trends related to anaemia among in-patients.

In the first stage, the primary objective was to assess the patients' understanding and behaviour towards anaemia. For this purpose, a well-structured and pre-validated questionnaire was designed in both English and Telugu to ensure clarity and cultural relevance for the target population. The questionnaire included items that evaluated the patients' knowledge about anaemia symptoms, diet and prevention; their attitudes towards preparation and consumption of diet; and their practices related to diet, smoking and caffeine consumption.

In the second stage, the focus shifted towards analysing prescribing trends. This involved a detailed review of patient prescriptions to identify the frequency and types of therapeutic interventions used in the treatment of anaemia. Special attention was given to the use of oral and parenteral iron supplements, folic acid tablets, and multivitamin injections.

The third stage aimed to explore the potential relationship between patients' haemoglobin levels and their KAP scores.

Stages of the study:

1. Literature review of publications on patient's knowledge, attitude, and practices (KAP) concerning anaemia.

2. Submission of protocol and granting of Ethical Committee approval.

3. Selection of anaemia patients according to the inclusion criteria and collection written informed consent.

4. KAP Assessment through a structured, pre-validated questionnaire conducted through face-to-face interview with patients.

5. Evaluation of frequency and types of drugs used, including iron supplements, folic acid, and multivitamin injections.

5. Processing and analysis of obtained results.

6. Identification of correlation between Hb levels and KAP scores.

3. Materials and methods

Study design.

A prospective and observational study was conducted in the General Medicine department, Sri Venkateswara Institute of Medical Sciences [SVIMS] Tirupati, between November 2021 and April 2022.

Inclusion and exclusion criteria.

Patients diagnosed with anaemia who were above 18 years of age and volunteered their consent to participate in the study were included. Patients who were on ventilator, critical illness, below 18 years of age and declined to give consent were excluded. The institutional ethics committee at SVIMS authorized the study and issued a certificate of ethical clearance.

Data collection.

A total of 133 anaemic individuals were included in the study. Each patient was informed about the study's purpose before providing their informed consent. Data of patients, including name, address, gender, age, occupation, economic status, social habits, laboratory investigations, comorbidities, drug profile, family history, chief complaints, and clinical outcomes, were acquired using a patient data collection form. In our study, questions about anaemia and its awareness were included in a printed KAP questionnaire form that had been adapted from FAO standards and other research articles.

Ethical clearance.

All the procedures followed in this study were per institutional ethical standards. This study was approved by the Institutional Ethics Committee (IEC), Sri Venkateswara Institute of Medical Sciences, Tirupati on July 29, 2022. The IEC granted ethical clearance, and the IEC No: 1323 was acquired from the study site, and the informed consent of patients were secured.

All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the IEC, SVIMS Hospital.

Statistical analysis.

All data was entered & saved to excel software of Microsoft windows. Demographic, clinical, and laboratory data on continuous variables was summarized as mean +/- standard deviation. Comparison of means was done by Karl PearsSon correlation coefficient test. Descriptive data was presented as numbers and percentages. A P-value < 0.05 was considered as statistically significant.

4. Results

Based on the inclusion and exclusion criteria, a total of 133 anemic patients were enrolled in the study. There were 38 (29%) males and 95 (71%) females among the 133 patients interviewed. The average age of the total subjects was 47.19 and the average age of the male and female was found to be 51.7 and 46.4 respectively. Among 133 patients, about 79 (59%) patients were housewives, followed by farmers 5 (4%), business 13 (10%), employees 8 (6%) and followed by students 10 (7%) (Table 3). Out of 133 patients, 66 (49.5%) patients were educated, 67 (50.5%) patients were uneducated. Out of 133 patients, 50 individuals

were with only anaemia followed by 51 patients had other comorbid conditions.

DISTRIBUTION OF PATIENTS BASED ON WHO CATEGORISATION OF HAEMOGLOBIN

MILD 8%
MODERATE 21%
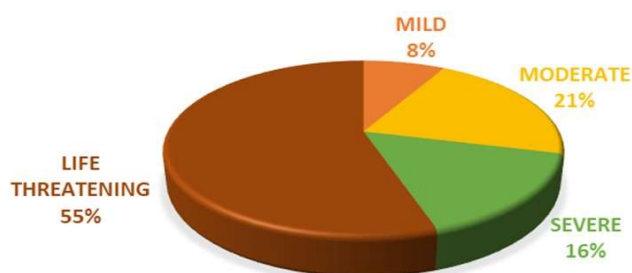LIFE THREATENING 55%
SEVERE 16%

Fig. 1. Distribution of patients based on WHO categorisation of haemoglobin levels. The pie chart illustrates the proportion of anaemic in-patients according to severity: life-threatening anaemia (55%), moderate anaemia (21%), severe anaemia (16%), and mild anaemia (8%). The classification is based on WHO haemoglobin thresholds, highlighting a high prevalence of critical anaemia among the study patients

WHO categorisation of haemoglobin.
Approximately 15 (11.27%) of the 133 patients had mild anaemia. There were 64 (48.12%) patients with serious life-threatening anaemia, 23 (17.29%) patients with severe anaemia, and 31 (62.32%) patients with moderate anaemia (Fig. 1).

A total of 89 subjects (66.9%) were having microcytic hypochromic anaemia, another 29 study subjects (21.8%) had normocytic normochromic anaemia, and 15 study subjects (11.27%) were having dimorphic anaemia. Only 28 patients (21%) had social habits, out of the 105 study patients who did not have any sort of social habits. Table 1 shows the demographic and clinical data of the patients.

KAP was assessed using a well-structured and pre validated questionnaire. The knowledge of anaemia among in-patients is used to determine their awareness level. Scores were based on the number of correct or informed answers to questions about anaemia, its symptoms, prevention, and dietary factors. For example, only 41% of patients knew what anaemia is, and over half (52%) could not identify any symptoms. A similar thing was seen in questions about iron-rich food and dietary practices, with many answering "don't know." A higher score was given for correct or comprehensive responses (e.g., selecting "All"), while low or uncertain responses reflected limited knowledge. This scoring helped categorize overall knowledge levels.

The attitude scores were determined based on patient's responses to questions assessing their awareness and perception of anaemia and iron-rich foods. Positive or informed answers (e.g., recognizing anaemia as significant, considering iron-rich food important, and having confidence in preparing it) were given higher scores. Uncertain or negative responses (e.g., "Don't know" or "Not important") were assigned lower scores. The total score from all questions helped categorize the respondents' attitudes as positive, moderate, or negative. For example, 60.7% agreed that iron-rich food is important, and 59.5% felt confident in preparing such meals, indicating a generally positive attitude among many patients.

The practice scores were determined by evaluating patient's daily habits related to diet and lifestyle that influence anaemia. Patients were asked about their intake of iron-rich foods (like leafy vegetables and meat), vitamin C consumption, fruit intake timing, tea/coffee habits, and tobacco use. Healthy practices such as eating leafy vegetables (51.8%), consuming vitamin C-rich foods (88.7%), and avoiding tobacco (85%) were given higher scores. Less beneficial or uncertain responses received lower scores. The overall practice score was calculated based on these responses, allowing classification into good, moderate, or poor practice levels regarding anaemia prevention and management.

Table 1

Demographic characteristics

Gender	Number of Patients (n)	Percentage (%)	
Male	38	29	
Female	95	71	
Age (years)	Male n (%)	Female n (%)	Percentage n (%)
18-25	10 (26.3%)	16 (17%)	26 (19.50%)
26-35	0	10 (10.5%)	10 (7.50%)
36-45	3 (7.9%)	20 (21%)	23 (17.30%)
46-55	7 (18.4%)	21 (22%)	28 (21.20%)
56-65	5 (13.2%)	13 (13.7%)	18 (13.50%)
>65	13 (34.2%)	15 (15.8%)	28 (21.20%)
Occupation			
Business	13 (10%)		
Farmer	5 (4%)		
Housewife	79 (59%)		
Employee	8 (6%)		
Student	10 (7%)		
Worker	13 (10%)		
Others	5 (4%)		
Education			
Up to 10 th/SSC	28 (21%)		
Intermediate	18 (13.5%)		
Degree	20 (15%)		
Uneducated	67 ((50.5%)		
Gender	Microcytic Hypochromic n (%)	Normocytic Normochromic n (%)	Dimorphic n (%)
Male	25 (28.1%)	8 (27.5%)	5 (33.33%)
Female	64 (71.9%)	21 (72.4%)	10 (66.66%)
Total	89 (66.9%)	29 (21.8%)	15 (11.27%)

As $R = -0.2013$ the correlation among two variables is weak. Knowledge level of study subjects was negatively correlated & significant (i.e., p=0.02 < 0.05) with their haemoglobin level. As R=0.4961, the relationship between

the two variables is weak. The attitude score of study subjects was correlated and significant (i.e., $p = 0.00001 < 0.05$) with their Hb score. As $R = 0.2531$, the relationship between two variables is weak. Practice score of study subjects was significantly correlated ($p = 0.00001 < 0.05$) with their Hb score (Table 2).

The prescription patterns were scrutinized. It was found that there were 2.9 medications per prescription. 20.9% of prescriptions were filled using generic names. The majority of prescriptions for antibiotics and 86.4% of prescriptions for injections were filled. 100% of medications prescribed came from the list of essential medications.

Table 2

Patient's KAP on anaemia

Knowledge level	Number (n)	Percentage (%)
1	2	3
1. Knowledge of anaemia		
a. Yes	54	41
b. No	36	27
c. I am not sure	43	32
2. Heard about symptoms of anaemia		
a. Tiredness	3	2.25
b. Pale face	20	15
c. Koilonychia	0	0
d. Shortness of breath	5	4
e. Others	8	6
f. Don't know	69	52
g. All	28	21
3. Prevention of anaemia		
a. Consumption of iron rich food	33	25
b. Consumption of vitamin C food	5	3.75
c. Consume iron tablets	15	11.2
d. Others	3	2.25
e. Don't know	49	36.8
f. All	28	21
4. Iron rich food		
a. Flesh (organ meat)	8	6
b. Non-vegetarian foods	6	4.5
c. Leafy vegetables	16	12.2
d. Others	0	0
e. Don't know	46	34.5
f. All	57	42.8
5. Is aware of the following		
a. Foods with a higher vitamin C content	48	36.01
b. Don't know	77	58
c. other foods with vitamin C	8	6.01
6. Food that prevents the absorption of iron		
a. Tea	26	19
b. Coffee	13	9.77
c. Don't know	66	50
d. Others	28	21.05
7. Beverages that decrease iron absorption		
a. Yes	20	15
b. No	8	6
c. Don't know	105	79
Attitude grade	Number (n)	Percentage (%)
1. Awareness of anaemia		
a. Not Aware	54	40.9
b. Aware	56	421
c. Don't know	23	17
2. Opinion regarding the significance of anaemia		
a. Anaemia is regarded as a significant medical condition	36	27.1
b. Anaemia is not regarded as a serious issue	66	49.6
c. Have no idea	31	23.3

Continuation ot Table 2

1	2	3
3. The Importance of Consuming Iron-Rich Food		
a. Not significant	10	7.5
b. Significant	80	60.7
c. Don't know	43	32.3
4. Attitude towards meals high in iron		
a. Very challenging	18	13.5
b. Not challenging	48	36.2
c. Don't know	67	50.3
5. Confidence when preparing dishes high in iron		
a. Having Confidence	79	59.5
b. Not having confidence	23	17.2
c. Not know	31	23.3
6. Considers foods high in iron to be delicious		
a. Tasty	82	61.6
b. Not tasty	38	28.5
c. Don't know	13	9.9
Practice Grade	Number (*n*)	Percentage (%)
1. Consuming meals		
a. Flesh (organ meats)	13	10
b. Non veg food	23	17.2
c. Fish	0	0
d. Food with leafy vegetables	69	51.8
e. Others	28	21.0
2. Consumption of vitamin C rich food		
a. Taking vitamin C food	118	88.7
b. Not taking vitamin C food	13	9.8
c. Don't know	2	1.5
3.Time of intake of fruits		
A. Eating before meal	33	24.8
b. Eating after meal	82	61.7
c. Other times	18	13.5
4. Consumption of tea / coffee		
a. Consumed	66	49.6
b. Not consumed	67	50.4
5. Exposure of tobacco		
a. Yes	20	15.0
b. No	113	85

Table 3
Relationship between knowledge, attitude and practice on haemoglobin level

Factors	Mean	Standard deviation	Correlation index (*r*)	P value
Knowledge	3.32	2.17	–0.2013	0.02
Attitude	3.08	0.822	0.4961	0.00001
Practice	4.17	1.128	0.736	0.00001

5. Discussion

In the current study we observed that females were more prone to anaemia than males (29%) and the results are supported by [12]. where among 180 patients, 126 (70%) were females [13]. We categorized the patients according to their age group and found that the mean age of the total study population was 47 years [14]. The patients between age group of 46–55 (28%) were more prone to anaemia than any other age groups [15]. Our results are supported by [16] as 50 years aged patients have moderate anaemia, severe type of anaemia condi-

tion rise rapidly along with rise of age. We categorized the patients according to the peripheral smear test of RBC and HB level found that 89(67%) of patients were having microcytic hypochromic anaemia than that of normocytic normochromic, dimorphic anaemia. Our results are supported by a study conducted by [17, 18].

However, the study found that the majority of patients had life-threatening anaemia (6.5g/dl), i.e., 64 patients out of 133 patients, by categorizing the patients according to Hb level [19]. Our results are contrasted by [20, 21] where most of the patients had mild anaemia. We found that most patients had comorbid conditions, i.e.,51 (38.3%) had comorbidities, followed by 50 (37.6%) only cases of anaemia and around 33 (24.1%) cases due to fever. In this study, we found that the majority of the patients, 67 (50.5%), were uneducated. We also categorized the patients based on their occupation, showing that the majority of the patients were housewives. Of a total of 133 patients, the majority, 54 patients (41%), had heard about anaemia. 20 patients (37.2%) recognized pallor as

a symptom of anaemia. A quarter of all patients (33) believe that eating foods high in iron can save against anaemia. Furthermore, green vegetables had higher iron contents, according to 16 (12.2%) of the patients. 66 patients, or 50% of the total, were unaware of the foods that restrict iron absorption, whereas 77 patients (58%) were unaware that meals high in vitamin C aid in iron absorption. The fact that beverages can reduce iron absorption was unknown to 105 individuals (or 79%) [22, 23].

The majority of the study patients, 56 (42.1%), were aware of anaemia. The majority of study patients, 66 (49.6%), believe that anaemia is not a significant condition. 80 of them (60.7%) believed that eating foods high in iron can help avoid anaemia. 79 people (59.5%) expressed confidence in the preparation of foods high in iron. Interestingly, 61.6–80% preferred the flavour of iron-rich foods [24]. On the day before the survey, 69 study patients, or 51.8%, consumed green vegetables. Most of them, 118 (88.7%), consume vitamin C-rich fruits. Most of them, 82 (61.7%), take fruits after meals. 67 patients (50.4%) consumed tea/coffee regularly. Most of the patients 113(85%) were not exposed to tobacco [25]. Questions about expertise, character, and practice were provided. The correlation coefficient was determined to explain the potential correlation between the variables after grading them suitably and comparing them with hemoglobin levels. The knowledge score of the study patients was substantially associated ($p = 0.02$) with Hb levels. A study by Jose et al. validated this conclusion [16]. This demonstrates that the study patients were aware of anaemia's causes, effects, symptoms, and diets that raise hemoglobin levels.

Between study individuals attitude scores and hemoglobin levels, there is a relatively significant positive relationship ($p = 0.00001$). Similar findings are suggested by a study by [26]. This demonstrates that having a self-awareness of anaemia, attitude about how serious anaemia is, attitude about how important it is to consume foods high in iron, attitude about how to prepare foods high in iron, and attitude about having confidence in one's ability to prepare foods high in iron all contribute to higher hemoglobin levels [27].

The practice results of the study subjects and their hemoglobin levels, showed a positive significant association (i.e., $p = 0.00001$). Practices like eating leafy vegetables, drinking vitamin C-rich fruit juice, time of eating, and avoiding drinking tea or coffee frequently led to better hemoglobin levels in patients, which is supported by research done by [28]. According to Table 2, the computed average number of medications per contact was 2.9, and 20.9% of those drugs were prescribed with a generic name. The majority of patient medication records contained antibiotic prescriptions, it was discovered. 86.4% of patient medication records included prescriptions for injections. 100% of the medications prescribed came from the EML (essential medical list).

Practical relevance. The study examines inpatient anaemia knowledge, attitudes, practices, and prescribing trends to close healthcare delivery gaps. Healthcare practitioners can improve educational and therapeutic strategies by assessing patients' understanding of their disease and treatment adherence. By examining prescribing data, drug utilization can be optimized to meet clinical criteria and improve therapeutic outcomes. This holistic approach enables patient-centred care and tailored treatments that improve treatment.

Research limitations. Some limitations exist in this investigation. The study's small patient pool limits its scope, and relying on self-reported data may introduce recall bias and social desirability effects. Additionally, since the sample was drawn from a single institution, the findings may not be easily generalizable to larger or more diverse populations.

Prospects for further research. Future research should employ longitudinal approaches to assess the effectiveness of targeted educational interventions aimed at enhancing anemia patients' awareness and adherence. Investigating socio-cultural influences will support the development of personalized, community-oriented care strategies. Larger multi-center studies incorporating qualitative data can provide deeper insights into barriers to care. Additionally, integrating telemedicine and digital health technologies can improve prescription accuracy, ultimately addressing existing gaps and enhancing outcomes for anemic inpatients.

6. Conclusion

According to the survey, most patients were women. An increase in stress from family, home, an imbalanced diet, menstruation, or gynaecological disorders is likely to induce anaemia. Most of our research patients had neutral knowledge, positive attitudes, and average KAP ratings for practice. Analysis of drug prescribing practices might reveal inappropriate prescriptions. To increase QALY, anaemia must be treated based on type and severity. Anaemic drug-prescription patterns must be considered to prescribe drugs wisely. Unhealthy food and lifestyle behaviours dramatically affect nutritional and overall health. Changing diet and health behaviour requires good habits, knowledge, and attitude.

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