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Original Article

Evaluation of diagnosis and treatment approaches related to iron deficiency of family physicians

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ABSTRACT

Background Anaemia is defined by the World Health Organization (WHO) as a hemoglobin value below 13 g/dL in men and 12 g/dL in women. It is a serious public health problem that can significantly affect the quality of life.

Methods Our study, whose universe consists of family physicians who actively work in family health centers in Rize province, was conducted in 2021. After being informed about our study, 81 family physicians who agreed to participate voluntarily were included.

Results Our research is a cross-sectional descriptive type of research. A 20-question survey prepared by scanning the literature was presented as a data collection tool. While 73 (90.1%) participants are general practitioners, 8 (8.9%) are family medicine specialists. The rate of physicians correctly knowing the ferritin value to diagnose iron deficiency anemia in a patient without acute infection was 70.4% (n: 57). After the diagnosis of iron deficiency anemia, physicians recommended gastrointestinal system screening in 39.5% (n: 32) of all men and 87.7% (n: 71) of postmenopausal women. The rate of recommending treatment for 3-6 months after the hemoglobin level returned to normal was 93.8% (n: 76).

Conclusion Based on the data we obtained, it was seen that family physicians' knowledge level about iron deficiency anemia management was insufficient, and there were deficiencies in the diagnosis and treatment processes. For this reason, interactive, applied training programs should be organized.

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INTRODUCTION

Iron deficiency anaemia (IDA) is the most common form worldwide. The World Health Organization (WHO) defines anaemia as haemoglobin (Hb) levels below 13 g/dL in men and below 12 g/dL in women.[1] In pregnant women, anaemia is defined as Hb levels of 11 g/dL or lower. According to WHO data, the prevalence of anaemia among adults is 24.8% globally. IDA is a significant public health problem that can substantially impact the quality of life due to its clinical manifestations. The symptoms in patients with IDA are influenced by factors such as age, severity of anaemia, comorbidities and the duration of anaemia. As a result of tissue hypoxia, symptoms such as weakness, fatigue, dizziness, headache, and palpitations may occur.[2] Regardless of the presence or absence of symptoms, iron deficiency should be treated with or without anaemia because failure to replenish iron stores may worsen anaemia and lead to organ ischaemia.[3] Family physicians have observed significant differences in diagnostic and treatment approaches for anaemia management, highlighting the need for evidence-based local or national guidelines.[4,5] Therefore, we aimed to evaluate the management of anaemia by family physicians in light of existing guidelines.

MATERIAL AND METHODS

Our study was conducted between December 2020 and April 2021. Our research population consists of 101 family physicians, including general practitioners and family physician specialists, who are actively working in family health centres in Rize province. Before the study, family physicians were contacted via telephone, e-mail, and other mobile communication programmes and were given detailed information about the study. A total of 81 physicians volunteered to participate in the study. Physicians who could not be reached or did not want to participate were excluded from the study. Face-to-face interviews with participating physicians were avoided due to the COVID-19 pandemic. Our research is a cross-sectional descriptive study. A 20-question survey including sociodemographic characteristics was used as a data collection tool. The survey questions included age, gender, title, years of work experience, education level, the definition of anaemia, symptoms, and the patient groups for whom they recommend gastrointestinal system screening. Three case studies were presented, and participants were asked to respond to related questions.

Statistical analysis

Pearson's Chi-Square and Fisher's Exact test were used to evaluate categorical variables. A statistical significance level of $p<0.05$ was considered.

RESULTS

Of the family physicians who participated in the study, 73 were general practitioners, and 8 were family medicine specialists. The findings of these two groups could not be compared because the difference in numbers between these two groups was too large to find significant results in statistical tests. Of the participants in the study, 17 were female and 64 were male. When the age distribution of the participants was analysed, 22 physicians were in the 25-35 age group, 38 physicians were in the 36-45 age group, and 21 physicians were in the 45+ age group. It was observed that 91.4% of the physicians diagnosed and treated patients based on the knowledge they gained in medical school or during their specialization training. The percentage of physicians who reported attending a seminar or training session on iron deficiency after graduation or specialization was 58%. Additionally, 71.6% of physicians stated that they had read a guideline on treating iron deficiency, while 87.6% expressed a desire to receive further training on this topic (Figure 1).

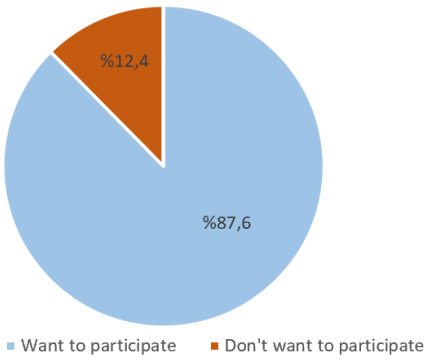

Figure 1. Willingness to participate in a training opportunity regarding the diagnosis and treatment of iron deficiency anemia

In patients without an acute infection, 70.4% of physicians correctly identified the ferritin level required to diagnose IDA. When asked about the symptoms they investigate in patients suspected of having IDA, the most frequently questioned symptom was menorrhagia, reported by 90.1% of physicians.

Table 1. Symptoms questioned by physicians when investigating the cause of iron deficiency

Symptoms	Questioned	Not questioned
Reflux symptoms	45 (55.6%)	36 (44.4%)
Weight loss	59 (72.8%)	22 (27.2%)
Melena	71 (87.7%)	10 (12.3%)
Hematochezia	59 (72.8%)	22 (27.2%)
Pica	68 (84%)	13 (16%)
Menorrhagia	73 (90.1%)	8 (9.9%)
Chest pain	22 (27.2%)	59 (72.8%)
Dyspnea	37 (45.7%)	44 (54.3%)
Hair loss	68 (84%)	13 (16%)
Restless leg symptoms	29 (35.8%)	52 (64.2%)
History of parasites	44 (54.3%)	37 (45.7%)

Other symptoms, ranked from most to least often investigated, included melena (87.7%), pica and hair loss (84%), weight loss and hematochezia (72.8%), abdominal pain and reflux symptoms (55.6%), a history of parasitic infections (54.3%), dyspnea (40.7%), restless leg syndrome symptoms (35.8%), and chest pain (27.2%) (Table 1).

After diagnosing IDA, gastrointestinal system screening was recommended by 39.5% of physicians for all male patients, while 87.7% recommended it for postmenopausal women. In the case-based questions, +2 valence iron preparations were recommended for asymptomatic IDA patients at rates of 66.7% and 24.7%, respectively. 31.8% of physicians considered high platelet levels in patients with IDA to be secondary to anaemia. In the case of asymptomatic IDA, 24.7% (n: 20) recommended +2-valent oral iron preparation treatment, 3.7% (n: 3) recommended +3-valent oral iron preparation treatment, 38.3% (n: 31) recommended parenteral iron treatment and 33.3% (n: 27) recommended erythrocyte suspension (Figure 2).

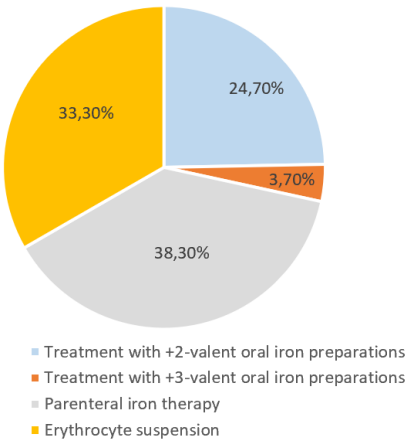

Figure 2. How should asymptomatic iron deficiency anemia be treated?

It was recommended by 93.8% of participants that iron therapy should continue for 3–6 months after Hb levels return to normal. In cases where Hb levels did not improve with oral iron therapy, participants most frequently considered bleeding (81.5%), celiac disease (59.3%), Helicobacter pylori (40.7%), or all of these factors combined (44.4%). For elderly patients with coronary artery disease and symptomatic anaemia, 53.1% of physicians recommended oral iron therapy following erythrocyte suspension transfusion.

DISCUSSION

As a result of the literature review, we concluded that our study is the first in our country to evaluate family physicians' diagnosis and treatment approaches regarding IDA. In other countries, there are studies on physicians' knowledge, attitudes, and perceptions of iron deficiency. Examples of these include a cross-sectional study among physicians on transfusion practice in patients with anaemia without bleeding by von Babo et al., a cross-sectional study by Al Sulayyim et al. on the management of diagnostic and treatment modalities by physicians in paediatric IDA patients, and a study by Desai et al. on anaemia in the elderly conducted on lecturers and resident physicians in the departments of family medicine and internal medicine at Rhode Island Memorial Hospital.[2,4,5]

The topic of education on iron deficiency after graduation or specialization was evaluated. More than half of the physicians had attended such a training session. As the years of professional experience of physicians increased, their desire for training also grew, and this difference was statistically significant (p=0.031). Additionally, it was found that most family physicians were willing to participate if a new

educational opportunity was offered.

When analyzing responses to questions regarding the symptoms physicians investigate in patients suspected of having IDA, menorrhagia was found to be the most frequently queried symptom, at a rate of 90.1%. The responses showed significant variability. Symptoms of IDA vary depending on the severity and progression of anaemia, its aetiology and any accompanying conditions.[6] Symptoms and findings related to the underlying aetiology may also be present; a patient presenting with hematochezia or weight loss could potentially have colon cancer.[7] A comprehensive inquiry into patients' symptoms suspected of IDA may be more beneficial, enabling accurate diagnosis and effective treatment. A thorough evaluation of symptoms of IDA may be helpful, and an effective treatment can be provided to patients with the correct diagnosis.

Gastrointestinal system screening is one of the investigations required when exploring the aetiology of IDA. According to the 2019 Turkish Hematology Association Guidelines for the Diagnosis and Treatment of Iron Deficiency in Adults, gastrointestinal system screening should be performed in all male and postmenopausal women unless there is an apparent non-gastrointestinal system source of bleeding.[8] Similarly, the American Gastroenterological Association and several other guidelines recommend gastrointestinal system screening for all male patients and postmenopausal women.[9,10] In our study, participants demonstrated an appropriate approach to gastrointestinal system screening in 39.5% of male cases and 87.7% of female cases. While the management of female patients was satisfactory, the same cannot be said for the management of male patients. Family physicians would benefit from educational programs to enhance their knowledge and skills.

In an asymptomatic iron deficiency case with a reported platelet count of 800,000/μL (reference range: 140-450×10³/μL), participants were asked about their approach to management. IDA is a common cause of secondary thrombocytosis.[11,12] Fewer than half of the participants adopted the correct approach by attributing the condition to secondary thrombocytosis caused by iron deficiency. When monitoring is sufficient, recommending participant referrals will likely incur additional costs to patients and the healthcare system.

Participants were presented with three different cases and asked to provide their responses. The results showed that Fe^{+2} preparations were preferred at varying rates. While we consider Fe^{+2} therapy an appropriate approach, it is insufficient and requires improvement. Iron replacement therapy is essential to improve quality of life and reduce the risk of anaemia-related complications. Oral iron supplementation is typically the first-line treatment; however, this method often proves challenging to tolerate due to side effects such as nausea, abdominal pain, and constipation.[13] Additionally, some physicians recommended parenteral iron and erythrocyte suspension as treatment options. Considering that these treatments were not indicated in our cases, such recommendations are quite concerning. The off-label use of parenteral iron and erythrocyte suspension treatments poses significant risks, including patient complications, increased costs, and added burdens on the healthcare system.[14,15] In another case, a symptomatic IDA patient aged 70 with coronary artery disease and a Hb level of 7.5 g/dL was recommended erythrocyte suspension in 87.7% (n: 71) of responses, and erythrocyte suspension followed by oral iron therapy in 53.1% (n: 43) of responses. In symptomatic IDA cases, blood transfusion provides an acute correction of anaemia, but this remains a temporary solution without subsequent iron therapy. Blood transfusion is one of the primary treatment options for patients with anaemia.[16]

When the results were analyzed, it was concluded that improvements should be made in health policies. Enhancing education and awareness in primary healthcare services, disseminating diagnostic and treatment guidelines, increasing awareness about symptom assessment, promoting the broader and more effective use of laboratory tests, creating informational materials and screening programs for the diagnosis and treatment of IDA, and adopting a proactive approach in health services are expected to contribute positively to public health.

This study has certain limitations. The sample size was limited because not all physicians in the province participated, which may affect the generalizability of the findings. The study was confined to the province of Rize and may not reflect physicians' knowledge, attitudes, and practices in other regions. Due to the COVID-19 pandemic, face-to-face interviews were avoided, and alternative methods were used. This may have increased the risk of misinterpretation or misunderstanding of the questions and potentially

affected the accuracy of the survey responses. The predominance of general practitioners among physicians serving as family doctors may have contributed to the inability to achieve the targeted outcomes.

CONCLUSIONS

Based on the data we obtained, it was seen that family physicians' knowledge level about IDA management was insufficient, and there were deficiencies in the diagnosis and treatment processes. For this reason, interactive, applied training programs should be organized. In addition, local and national guidelines should be created and used practically in IDA diagnosis and treatment management. Programs and models that will increase the communication of family physicians with internal medicine clinics should be planned. There is a need to create national guidelines and programs based on the data obtained by conducting further studies covering larger regions.

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Statement

The study was planned by the Declaration of Helsinki and ethical rules. Written informed consent was obtained from the participants. The study was approved by Recep Tayyip Erdoğan University Faculty of Medicine Ethics Committee on 18 February 2021 with protocol number 32.

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Authors' Contribution

Study Conception: KK, EA; Study Design: KK, EA; Literature Review: KK, EA; Critical Review: KK, EA; Manuscript preparing: KK, EA;

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