

Review Article

Prevalence and awareness of anaemia among medical students

Shabina Anjum¹, Maydaa M. Dabi^{2*}, Nouf A. Aldahlawi², Manar M. Dabi³

¹Department of Anatomy, College of medicine, Taibah university, Al-Madinah Al-Munawwara, Saudi Arabia

²College of Medicine, Taibah university, Al-Madinah Al-Munawwara, Saudi Arabia

³Eastern Health Cluster, Dammam, Saudi Arabia

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*Correspondence:

Dr. Maydaa M. Dabi,

E-mail: maydaa.dabi.55@gmail.com

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ABSTRACT

The prevalence of anemia, which is the most common cause for anemia, is 52% in women aged 15 to 49 years, as per WHO statistics. Health consequences of anemia include reduced immunity, increased morbidity, and impaired cognitive performance. The main objective of this article is to give insight on the significant impact of anemia on the individual's health and the whole country and the importance of raising awareness about anemia. A number of studies were viewed during this semester, which were about anemia which is a medical problem in which the number of RBCs or HB concentrations is below the normal value, some of studies were about the prevalence and risk factor of anemia, the other dealt with its complications and what is the treatment for it, and some talked about the classification of anemia and how to diagnose it. Anemia is a worldwide medical condition that affects individuals and even countries. Medical students are of increased risk of mild anemia, but anemia is slightly higher in females. Despite anemia in medical students is mild, it is still worrying because it may be due to bad habits in eating or resources of food present at hostels. As a result, efforts should be made to prevent anemia, especially in medical students.

Keywords: Anemia, Diet deficient, Prevention of anemia, Prevalence of the disease

INTRODUCTION

Anemia is a worldwide medical condition affecting 24% of people according to WHO.¹ It is the most common hematological disorder and resulted into about 180,000 deaths.² Anemia is a defect in the quantity or the quality of circulating RBCs per unit of blood. That reduction affects oxygen carrying capacity and oxygen delivery to tissues so that affects the ability to study and to work so affect the productivity.³ Anemia is a critical load on the economic improvement of both developing and developed countries with higher incidence in the developing ones. The most prevalent type of anemia is iron deficiency anemia affects mostly the growing period when there is an increase in need of nutrients required for growth. There are also many reasons for anemia such as menstrual blood losses, different types of infections and vitamin deficiency.³ Many studies have been made and

proved that students especially medical students are the most exposed to anemia. Medical students specifically the females who live in lodging houses represent the most to be exposed to anemia as a result of their helpless dietary patterns, skipping breakfast and long periods in colleges and continuous stressful studying.^{4,5}

Fortunately, iron deficiency anemia is a preventable disease. It is avoided by warning people, especially medical students of the healthy diet, to encourage them to modify their lifestyle and medical students should understand that they are the highest risk group. So that they avoid the risk factors and take care more of their health and feeding. Repetitive screening of the medical students for anemia and continuous checkup will reduce the burden of anemia and allow its early detection and treatment. No doubt that there is a great variation in the prevalence of anemia according to awareness of the

disease, application of prevention programs, socioeconomic state, lifestyle and feeding habits.⁶ The human body requires fundamental nutrients and different supplements to form RBCs. Eating food that is low in iron, foliate, vitamin B12, and protein lead to anemia. Conditions that affect quality of absorption in the GIT may also cause anemia. Diets lack certain types of food or diets that do not contain adequate animal-based products may cause anemia, so anemia is an important problem to which efforts should be directed strongly.³

Anemia, similar to a fever, is an indication that expects examination to decide the hidden etiology. Regularly, rehearsing doctors ignore gentle frailty. This is like neglecting to look for the etiology of a fever. A significant number of the side effects of sickness are brought about by diminished oxygen conveyance to the body's crucial tissues and organs. Sickness is estimated by the measure of hemoglobin which is the protein inside low cells that conveys oxygen from the lungs to the body's tissues.³

Anemia is the overall name for a scope of problems influencing red blood cells. Red blood cells contain hemoglobin, which is answerable for conveying oxygen in the blood. To create red blood cells, the body needs iron, nutrient B12 and folic corrosive. In the event that at least one of these is insufficient, weakness will create. Red blood cells are delivered in the bone marrow and course in the circulation system before they are separated in the spleen. In the event that the degree of red blood cells (and in this manner of hemoglobin), in the blood is anomalously low the oxygen-conveying limit of blood is diminished, and sickness creates.³

Therefore, the main objective of this article is to give insight on the significant impact of anemia on the individual's health and the whole country and the importance of raising awareness about anemia with following objectives. To recognize risk factors of anemia among medical students. To give an idea about the clinical picture of anemia so allow its early diagnosis, treatment and prevent its serious complications. Prevention is better than cure and awareness is the cornerstone of prevention. Prevalence of the disease especially in medical students.

This review article was conducted by systematically searching relevant literature in databases such as PubMed, Saudi medical journal, and Google Scholar. Focusing on the prevalence and risk factors of anemia among medical students. To identify relevant studies, keywords such as "anemia," "medical students," and "iron deficiency anemia" were used.

Literature of review

Higher levels of hemoglobin (Hb) levels are related with improved execution and personal satisfaction (QOL). Its inadequacy, known as iron deficiency, causes helpless

pregnancy result, imperfect learning, and psychological capacity, upset conduct, helpless consideration and development issues in the influenced people. The meaning of weakness as clarified by the World Health Organization (WHO) and most regularly utilized in epidemiologic investigations is when Hb focus is <12 g/dL in ladies and 13 g/dL in men. Paleness is a typical however multifactorial condition which keeps on being an issue in the creating scene. Roughly one-fourth of the world's complete populace is experiencing sickness. Paleness has numerous sorts, and among them, iron-insufficiency weakness (IDA) has the most noteworthy commonness. In many agricultural nations, it has reached to a plague level and is recorded as the most common micronutrient inadequacy on the planet. Its insufficiency has surprising negative impacts on the enduring people. Among the ordinarily known negative results, disabled mental and actual development, helpless engine work, lessened work limit, and a general poor QOL are the most articulated ones.⁷

What is anemia?

Anemia is a medical problem in which the number of RBCs or HB concentrations is below the normal value. Humans need sufficient RBCs with normal HB regarding quality and quantity to deliver sufficient O₂ to tissues to enable body cells to do their function normally. If tissues are not well perfused, there will be a decrease in tissue perfusion resulting in manifestations of anemia such as malaise, breathing difficulties, chest pain and irregular heartbeats. HB requirement to meet the body needs are variable according to Age, gender, residence, lifestyle, growing age and pregnancy.⁸

Risk factors of anemia

Diet deficient in specific nutrients and minerals. An eating routine reliably low in iron, nutrient B-12 and folate expands your danger of paleness. Intestinal problems, having an intestinal issue that influences the assimilation of supplements in your small digestive system, for example, Crohn's illness and celiac infection puts you in danger of frailty. Menstruation, ladies who have not had menopause have a more serious danger of iron lack sickness than do men and postmenopausal ladies. Monthly cycle causes the deficiency of red blood cells. Pregnancy, in case you are pregnant and aren't taking a multivitamin with folic corrosive and iron, you're at an expanded danger of weakness. Chronic health conditions, In the event that you have malignancy, kidney disappointment, diabetes or another ongoing condition, you could be in danger of pallor of persistent sickness. These conditions can prompt a deficiency of red blood cells. Moderate, persistent blood misfortune from an ulcer or other source inside your body can exhaust your body's store of iron, prompting iron insufficiency pallor. Family ancestry, On the off chance that your family has a past filled with an acquired weakness, for example, sickle cell frailty, you additionally may be at expanded danger of the

condition. Different components, A background marked by specific contaminations, blood sicknesses and immune system problems expands your danger of pallor. Liquor abuse, openness to poisonous synthetics, and the utilization of certain prescriptions can influence red blood cells creation and lead to iron deficiency. And finally, age individuals over age 65 are at expanded danger of pallor.^{9,10}

Studies support the increased prevalence of anemia in medical students

The first study done among medical students at Nobel medical college Studies. It has proved that the medical students are of increased prevalence of anemia due to insufficient food intake and long duration of their timetables which impacts their performance. Thus, concerning the long duration of medical studies, it has become a serious medical issue. Methods of the study: It is a qualitative study which was done on Teaching Hospital from January 2017 to December 2017 where all the subjects were chosen with inspecting samples. The all out of 150 MBBS understudies (male=95, female=55), aged 18-25 years were remembered for the investigation who were clinically solid. The segment information (name, age, sex, address) and anthropometric measurements were recorded and hemoglobin was assessed by Sahil's corrosive hematin strategy. Results: Just 42.1% of all out were mellow pale and 11.6 % were respectively pallid. Among females, 1.8% were seriously iron deficient, 9.1% were decently sickly and 41.8% were gentle week. Contrasted with male, sickliness in female clinical understudies was discovered to be) broader.¹¹

Another study done on university students in Hodeida Province, Yemen which also proved the prevalence of anemia especially iron deficiency anemia among medical students. Technique. 500 blood tests (326 guys and 174 females) were gathered haphazardly from clinical understudies at Hodeida College. Members were exposed to various tests including total blood checks (CBC), serum ferritin, serum iron and complete iron restricting limit (TIBC). Additionally, a survey was intended to gather socioeconomics, food and drink propensities, and financial status. Result. The general predominance of iron deficiency anemia was 30.4%, of whom 54.00% were females and 46.0% were guys. Understudies matured 20–22 years were discovered more pallid with pervasiveness 59.2% than understudies matured 17–19 years (25.0%) and 23–25 years (15.8%). Factual investigation demonstrated routinely eating had critical ($p<0.001$) part in forestalling advancement of iron deficiency anemia contrasted and sporadically eating. Inconsistent utilization of vegetables/natural products, meat, fish, chicken, tea drinking, low family unit pay, smoking and khat (*Catha edulis*) biting demonstrated a huge job ($p<0.001$) in inciting of iron deficiency anemia, though utilization of espresso and cola indicated inconsequential impact on iron deficiency anemia. At the End, this investigation uncovered that most of college understudies, particularly

females, have iron deficiency anemia that may turn out to be more regrettable by hunger, way of life propensities, and absence of mindfulness. Our outcomes propose that iron deficiency anemia can be forestalled by giving appropriate information on the stimulating eating routine, improved way of life, and destructive impact of Iron deficiency anemia to the understudies.¹²

Last study was aimed to investigate the prevalence of iron deficiency anemia (IDA) among female medical students in Saudi Arabia. The study found a prevalence of 13% for iron deficiency anemia among the participants. The majority of anemic individuals exhibited microcytic anemia, suggesting iron deficiency as the primary cause. The study highlights the need for targeted interventions to improve dietary habits, manage stress, and promote overall well-being among this population.¹³

Worldwide magnitude of anemia (In KSA, in general, medical students)

Nearly 32% of people all over the world were anemic in 2010-2012. The most common people exposed to anemia are children<5 years (40% anemic in 2016), especially infants and children<2 years, pregnant (45%), females in general especially medical student females, people with old age. Geographical distribution as Africa, South Asia and the Caribbean have the greatest incidence of anemia. The percentage of decreasing anemia has been overall slowly progressing. Anemia has declined with a percentage of 7% between 2009-2016.⁷ In Saudi Arabia the overall country prevalence of iron deficiency anemia was 30–56%. A cross-sectional study done in a university of Riyadh City showed that the prevalence was 40.5% among female adolescents (16–18) years old.⁵

Classification of anemias

There are a few sorts and arrangements of weakness. The event of pallor is because of the different red blood cell deformities, for example, creation imperfection (aplastic paleness), development imperfection (megaloblastic type), absconds in hemoglobin blend (iron insufficiency sickliness), hereditary deformities of hemoglobin development (thalassemia) or because of the combination of unusual hemoglobin (haemoglobinopathies, sickle cell weakness and thalassemia) and actual loss of red blood cells (hemolytic anemias). This is a condition where the body does not have the measure of red blood cells to stay aware of the body's interest for oxygen. Understanding the various characterizations can assist with perceiving the manifestations and furthermore to maintain a strategic distance from weakness in the first place.¹⁴

Prevention of anemia

Because anemia has a significant impact on the individual's health and a long-lasting effect on the whole country, it is important to make many efforts to prevent anemia as far as possible. This is achieved by many ways,

the most important one is awareness which is the cornerstone of avoidance. Health care providers (doctors and nurses) should help in raising awareness of anemia by organizing health Campaigns, remind people of awareness days, organize Online meetings and encourage Tv advertisements to talk about the risk factors and how to avoid them, symptoms, signs and diagnosis of anemia.

Despite the simplicity in diagnosis of anemia, it may pass unnoticed because of the vague symptoms. As anemia is related to decreased physical activity, just as enduring impacts on learning and intellectual capacity, consideration, conduct and development, recognizable proof of the sickness and contributing components are an initial move toward its management. Putting signs in the public sites and colleges containing examples of food rich in substances that prevent anemia. Enhancing dietary iron with iron tablets, syrups, drops and sustaining handled nourishments with iron are the best guard against this reason for the disease. Where strongholds have been assessed in explicit populations, it has improved iron status and reduced the prevalence of anemia.¹⁵

Treatment of anemia

Given the multifactorial idea of this infection, rectifying pallor regularly requires an incorporated methodology. All together to adequately battle it, the contributing components should be recognized and tended to. In settings where iron insufficiency is the most continuous reason, extra iron admission is as a rule given through iron enhancements to weak gatherings, specifically pregnant ladies, and small kids. Food- based ways to deal with increment iron admission through food fortress and dietary enhancement are significant, sustainable techniques for forestalling IDA in the overall population. In settings where iron insufficiency is not the as it were reason for paleness, moves toward that join iron interventions with different measures are required. Methodologies ought to incorporate tending to different reasons for iron deficiency and ought to be incorporated into the essential medical care framework and existing projects. These strategies ought to be customized to neighborhood conditions, taking into account the particular etiology and pervasiveness of anemia in a given setting and populace gathering Healthful substitutions of (iron, B12, folate) should start right away. In iron inadequacy, substitutes should proceed for at any rate three months after the standardization of iron levels, to reestablish iron stores. Typically, nutritional inadequacies have a decent forecast whenever treated early and enough.¹⁶⁻¹⁸

Health consequences of anemia

Frailty of anemia is a marker of both helpless nourishment and chronic weakness. The most emotional wellbeing impacts of iron deficiency is the expanded danger of maternal and child mortality because of extreme pallor, which have been all around recorded

notwithstanding. The negative results of IDA on psychological and physical advancement of youngsters, and on actual execution especially work efficiency in grown-ups – are of major concern.¹⁹

Approach for diagnosis of anemia

History of iron deficiency anemia

History of the distressing complaint and search for symptoms such as, dyspnea and breathing problem, Weakness, Dizziness, chest pain especially in individuals with underlying heart conditions. Anemia may also be incidentally discovered during routine blood tests. The history should explore the onset and duration of symptoms, as well as any recent illnesses or infections. Look for ongoing contamination (cold agglutinin following Mycoplasma disease, red blood cell aplasia following viral diseases esp. Parvovirus B19) and Related manifestations renal disappointment and low platelets recommend HUS. It's crucial to inquire about a history of blood loss, including menstrual bleeding, gastrointestinal bleeding, or other types of hemorrhage. Past clinical history including Persistent kidney sickness or liver infection Past malignant growths and past chemotherapy or radiotherapy, Lymphoproliferative infection (expanded danger of immune system hemolytic frailty). Inherent, ischemic or valvular coronary illness. Gastrointestinal malabsorption [coeliac illness, provocative inside disease] or lack of healthy sustenance, Gallstones (expanded bile shades in ongoing hemolysis), Ischemic or valvular coronary illness (will fuel indications). Medication history, particularly the use of proton pump inhibitors and H2 receptor antagonists, should be considered as these medications can interfere with iron absorption. Social history, including alcohol consumption and dietary habits, should also be assessed. A vegetarian or vegan diet may limit iron intake, while excessive tea consumption can inhibit iron absorption.²⁰

Examination of iron deficiency anemia

A physical examination may reveal signs of anemia, such as pallor, especially in the conjunctiva. Hyperdynamic circulation, characterized by a bounding pulse and heart murmur, may also be present. Additionally, signs of iron, vitamin B12 and folate deficiency, including koilonychia (spoon-shaped nails), atrophic glossitis (smooth, red tongue), and angular cheilitis (cracks at the corners of the mouth), may be observed.²⁰

Investigation of anemia

Laboratory tests play a crucial role in diagnosing anemia. A complete blood count (CBC) is often the initial test, assessing parameters such as hemoglobin, hematocrit, red blood cell counts and mean corpuscular volume (MCV). A low MCV suggests microcytic anemia, which is often associated with iron deficiency. Blood smear examination can help identify specific cell abnormalities, such as

hypochromic microcytic red blood cells in iron deficiency anemia. While a bone marrow aspiration is the gold standard for diagnosing iron deficiency anemia, it is rarely performed due to its invasive nature. In any case, well patients, serum ferritin intently relates to press stores as is a valuable test for iron inadequacy. In the setting of intense irritation, serum ferritin rises so it loses its utility as a test. Serum iron transferrin varies with diurnal musicality and falls in irritation, so it and transferrin immersion are likewise infrequently supportive. Dissolvable transferrin receptor levels are less impacted by irritation however not broadly accessible. Obtained hypochromia, and less significantly microcytosis, is quite often because of iron lack.

A stepwise approach can be used to evaluate the type of anemia. The first step involves performing a complete blood count (CBC). If the mean corpuscular volume (MCV) is low, it suggests microcytic anemia, which is often associated with iron deficiency. In such cases, further tests like serum iron, total iron-binding capacity (TIBC), and soluble transferrin receptor can be helpful to confirm the diagnosis of iron deficiency anemia. However, it's important to note that hemoglobin concentration remains the most reliable indicator of anemia. In the absence of menstrual bleeding, iron deficiency anemia should prompt further investigation, including upper and lower gastrointestinal endoscopy, to identify potential sources of blood loss.²¹

DISCUSSION

This review highlights the significant prevalence of anemia among medical students, particularly females. These findings are supported by the fact that the population indeed has a highly risky lifestyle concerning iron deficiency anemia due to factors such as poor dietary habits, irregular meal patterns and high academic stress. Most of the anemia in the medical students was mild. However, even mild anemia can cause impairment in cognitive function, physical performance and health in general.²²

The review also emphasized that early detection and timely intervention can reduce the adverse effects of anemia, its prevention generally involves addressing its causes by promoting dietary modification, frequent intake of meals, and reduction in the level of stress. In addition to all these, regular screening programs for anemia will help to detect the condition early for better management and to ensure optimum health and academic performance in medical students.²²

However, it highlights the need for further research to address specific knowledge gaps. Exploring the prevalence of other types of anemia, such as vitamin B12 and folate deficiency, among medical students is essential. Additionally, investigating the long-term consequences of anemia on the health and career also remain to be evaluated. By addressing these research

questions, we can develop more comprehensive strategies to prevent and manage anemia in this critical population.

CONCLUSION

Anemia is a worldwide medical condition that affects individuals and even countries. Medical students are of increased risk of mild anemia, especially females, and has serious consequences for the students' performance in academics, physical fitness and overall health. Poor eating habits, infrequent eating patterns, and high levels of academic stress are some of the predisposing factors for anemia. To effectively address this issue, a multi-faceted approach is necessary. This includes promoting healthy dietary habits, encouraging regular meal intake, and implementing stress management techniques. Additionally, regular screening programs for anemia can facilitate early detection and timely intervention. By addressing these factors, we can improve the health and academic performance of medical students and ensure a future generation of healthy healthcare professionals.

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