PREVALENCE OF IRON DEFICIENCY ANEMIA AND ASSOCIATED RISK FACTORS AMONG ADULT PATIENTS TREATED IN OUTPATIENT CLINICS AT ROYAL MEDICAL SERVICES IN JORDAN

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ABSTRACT:

Background: Iron deficiency anemia (IDA) affects many people worldwide and has a detrimental impact on their health and quality of life.

Study objectives: This study aims to identify the causes and prevalence of iron deficiency anemia (IDA) in adult patients who attend Jordanian outpatient clinics operated by Royal Medical Services (RMS).

Methods and subjects: A retrospective study design will be conducted to collect data from electronic records of patients with IDA who are treated in RMS. The study sample will include a total of 500 patients.

Inclusion criteria: Age ≥18 years.

Exclusion criteria: Having a medical history of hemoglobinopathies or anemias unrelated to iron deficiency.

Study variables: Study variables include age, gender, medical history, hematological findings including hemoglobin level, and other blood investigations.

Statistical analysis: A working Excel spreading data sheet will be created to collect data from the electronic record files of the patients. Data will be analyzed using SPSS version 25. Descriptive statistics will be used to describe the data including frequency and percentages for categorical variables, whereas continuous variables will be described using the mean and standard deviation. The relationship between variables will be computed based on T-test and Chi-Square. Significance will be considered if $p \leq 0.05$.

Results: The results of the present study showed that the prevalence of anemia in the study sample was 28.6%. A significant association was found between the prevalence of anemia with gender ($p=0.036$), social status ($p=0.028$), and pregnancy ($p=0.048$).

Conclusion: This study adds to what is known about how common anemia is in Jordanian people and what makes them more likely to get it. It looks at things like gender, social class, and having children that might raise the risk

KEYWORDS: Anemia, iron deficiency, prevalence, pregnancy, outpatients

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1. INTRODUCTION

Iron deficiency anemia (IDA) is the most common type of anemia and a growing public health issue in many countries (1). All age groups may develop IDA, but the presentation of the symptoms may not be consistent across different age groups and genders (2). Despite the large body of evidence that has illustrated the prevalence of IDA among specific populations, the understanding of the potential risk factors for developing IDA in outpatient therapeutic care in different healthcare services is limited (3).

Any form of anemia is defined as mild when the Hb level is between 11–12.9 g/dL for adult females and 11–13.9 g/dL for adult males, with an Hb level of less than 11 g/dL for both genders being classified as moderate to severe anemia (4). Different studies among different populations, including blood donors, pregnant women, adolescent females, and sub-Saharan African populations, have shown the great significance of this health issue (5). Not all health conditions are the same in their importance and health burden; the meaning of the studied issue depends on the context involved, hence the potential impact of the question needs to be addressed within the context of where the study subjects belong (6).

Over two billion people worldwide suffer from iron deficiency anemia, and one in four of them are anemic, making IDA the most common nutritional condition in the world (3). A study carried out in Iran revealed that 19.7% of the general population had IDA (6)..

General epidemiological data concerning IDA prevalence have shown slight variations by population and geographical region (7). One study found that iron deficiency anemia was a rare result, with less than 1% of adults having IDA (8). However, several studies have reported that immigrant populations from Asia, the Middle East, and Africa are at high risk of iron deficiency anemia, and the risk is reported to be higher in women between the ages of 12 and 50 (9).

According to research, women in their reproductive years are more prone to experience chronic gastrointestinal blood loss, and persons who follow specific dietary regimens are particularly vulnerable to iron deficiency anemia (10). In a study of adults aged 18 to 65,a study showed the relationship between food insecurity and anemia among adults between the ages of 18 and 65, which was significant in all strata of anemia(11). In addition, several studies have shown that dietary intake is an important risk factor for the anemic condition(11). Furthermore, iron deficiency often results from the interaction between biological factors, such as iron absorption regulation, and environmental factors, particularly dietary intake and socioeconomic conditions (12). In contrast, a study found that cigarette smoking was a protective factor for anemia in the future in a population permanently free of anemia at baseline (13).

The main objectives of the present study were to identify the causes and prevalence of iron deficiency anemia (IDA) in adult patients who attend Jordanian outpatient clinics operated by Royal Medical Services (RMS).

Methods and subjects

Study design and setting

A retrospective study design was conducted to collect data from electronic records of patients with IDA who are treated in RMS. The study sample included a total of 500 patients.

Inclusion criteria:

- *Age ≥18 years.*
Exclusion criteria:
- Having a medical history of hemoglobinopathies or anemias unrelated to iron deficiency.
Study variables:

Study variables included age, gender, medical history, hematological findings including hemoglobin level, and other blood investigations.

Statistical analysis:

A working Excel spreading data sheet was created to collect data from the electronic record files of the patients. Data was analyzed using SPSS version 25. Descriptive statistics were used to describe the data including frequency and percentages for categorical variables, whereas continuous variables were described using the mean and standard deviation. The relationship between variables was computed based on T-test and Chi-Square. Significance was considered if $p \leq 0.05$.

Study findings:

As seen in Table (1), the general characteristics of participants were given. The mean age of participants was 54.67 ± 15.6 years. The majority of participants were males (66%). Regarding social status, 84% of participants were married. About 17% of participants were pregnant.

Table 1: General characteristics of patients (N=500)

Variable	Description
Age (M±SD) years	54.67±15.6
Gender (N, %): - Male - Female	328 (65.5%) 172 (34.4%)
Social status (N, %): - Married - Single	420 (84%) 80 (16%)
Pregnancy (N, %): - Yes - No	86 (17.2%) 414 (82.8%)

The prevalence of anemia was 28.6% as indicated in Table (2)

Table 2: Prevalence of anemia among study participants

Variable	Description
Anemia (N, %): - Yes - No	143 (28.6%) 357 (71.4%)

As demonstrated in Table (3), significant relationships wereseen between the prevalence of anemia and eachof gender (p=0.036), social status (p=0.028), and pregnancy (p=0.048).

Table 3: The relationship between anemia and study variables

Variable	Anemia		P -value
	Yes (N=143)	**No (N=357)**	
Gender (N, %): **Male** **Female**	12 (8.39%) 131 (91.61%)	316 (88.52%) 41 (11.48%)	0.036
Social status (N, %): **Married** **Single**	97 (67.83%) 46 (32.17%)	323 (90.48%) 34 (9.52%)	0.028
Pregnancy (N, %): **Yes** **No**	50 (34.96%) 93 (65.04%)	36 (10.08%) 321 (89.92%)	0.048

DISCUSSION:

The present study was conducted toidentify the causes and prevalence of iron deficiency anemia (IDA) in adult patients who attend Jordanian outpatient clinics operated by Royal Medical Services (RMS).

The data of the present study showed that the prevalence of anemia is 28.6% among adults who attend Jordanian outpatient clinics operated by Royal Medical Services (RMS). This result is similar to what other similar studies have found in different parts of the world, though the prevalence rates have been seen to vary because of changes in the populations and healthcare systems. A study done in Saudi Arabia shows that between 20% and 25% of adults in basic healthcare settings there had anemia (14). Jordan and other Middle Eastern countries may have different eating habits, access to health care, and social factors that affect the rate of anemia (15) that may explain the slightly higher rate of anemia in this study.

It was found that there is a strong link between gender and anemia. Anemia affects more women (91.61%) than men (8.39%) (p=0.036). This fits with what Gardner et al. (16) said about how women around the world, especially those who can have children, have higher rates of anemia because they lose blood when they have their periods and need more iron when they are pregnant.

Status in culture and having anemia. A highly significant link was also found between anemia and social class (p=0.028). People who were married were 678.33% more likely to have anemia than people who were single (32.17%). Even though it hasn't been looked into as much, there is some proof that being married can cause anemia (17).

Many people have more social and money issues when they are married. For example, they may have to do more jobs or have trouble getting enough food while pregnant or raising a child (18).The statistical link between anemia and pregnancy was found to be 0.048 or less.About 35% of pregnant women had anemia, while only 10.88% of non-pregnant women did. Other study from around the world has also found this: pregnancy has long been known to raise the risk of anemia because the baby needs more iron to grow and the blood volume increases (18).

Conclusion:

This study adds to what is known about how common anemia is in Jordanian people and what makes them more likely to get it. It looks at things like gender, social class, and having children that might raise the risk. To get rid of more people with anemia and make health conditions better in the area, it will be very important to do more research and come up with more ways to help these groups.

References:

1- Iolascon A, Andolfo I, Russo R, Sanchez M, Busti F, Swinkels D, Aguilar Martinez P, Bou-Fakhredin R, Muckenthaler MU, Unal S, Porto G. Recommendations for diagnosis, treatment, and prevention of iron deficiency and iron deficiency anemia. Hemasphere. 2024 Jul;8(7):e108.

2- Al Hinai M, Jansen EC, Song PX, Peterson KE, Baylin A. Iron Deficiency and Vitamin D Deficiency Are Associated with Sleep in Females of Reproductive Age: An Analysis of NHANES 2005–2018 Data. The Journal of Nutrition. 2024 Feb 1;154(2):648-57.

3- Kumar SB, Arnipalli SR, Mehta P, Carrau S, Ziouzenkova O. Iron Deficiency Anemia: Efficacy and Limitations of Nutritional and Comprehensive Mitigation Strategies. Nutrients. 2022 Jul 20;14(14):2976. doi: 10.3390/nu14142976. PMID: 35889932; PMCID: PMC9315959.

4- Lidia-Maria M, Alina-Camelia C, Liiana-Carmen P, Madalina V, Romeo-Gabriel M. The Impact of Anemia on the Survival of Patients Diagnosed With Low-Grade Malignant B-cell Lymphomas. Cureus. 2024;16(7).

5- Mangala C, Maulot-Bangola D, Moutsinga A, Okolongo-Mayani SC, Matsomo-Kombet GE, Moundanga M, Mombo-Maganga C, Mabika-Obanda AK, Fokam J. Prevalence and factors associated with transfusion-transmissible infections (HIV, HBV, HCV and Syphilis) among blood donors in Gabon: Systematic review and meta-analysis. PloS one. 2024 Aug 19;19(8):e0307101.

6- Zamani M, Poustchi H, Shayanrad A, Pourfarzi F, Farjam M, Noemani K, Ghaderi E, Mohammadkarimi V, Kahnooji M, Mansour-Ghanaei F, Rastegar A. Prevalence and determinants of anemia among Iranian population aged≥ 35 years: A PERSIAN cohort–based cross-sectional study. PloS one. 2022 Feb 9;17(2):e0263795.

7- Li S, Bo Y, Ren H, Zhou C, Lao X, Zhao L, Yu D. Regional Differences in the Prevalence of Anaemia and Associated Risk Factors among Infants Aged 0-23 Months in China: China Nutrition and Health Surveillance. Nutrients. 2021 Apr 14;13(4):1293. doi: 10.3390/nu13041293. PMID: 33919830; PMCID: PMC8070845.

8- Killip S, Bennett JM, Chambers MD. Iron deficiency anemia. American family physician. 2007 Mar 1;75(5):671-8.

9- McGillivray G, Skull SA, Davie G, Kofoed SE, Frydenberg A, Rice J, Cooke R, Carapetis JR. High prevalence of asymptomatic vitamin D and iron deficiency in East African immigrant children and adolescents living in a temperate climate. Archives of Disease in Childhood. 2007 Dec 1;92(12):1088-93.

10- Prabhu K, Warricker F, Almilaji O, Williams E, Snook J. Role of prescribed medication in the development of iron deficiency anaemia in adults—a case–control study. BMJ open gastroenterology. 2024 Jun 1;11(1):e001305.

11- Mchau G, Killel E, Azizi K, Henry S, Ainan S, Jumbe T, Bundara N, Kystikila W, Mwingira F, Machafuko P, Wilson B. Co-occurrence of Overweight, Stunting, and Anemia among Adolescents (10–19 Years) in Tanzania Mainland: A School-Based Cross-Sectional Study. Current Developments in Nutrition. 2024 Jan 1;8(1):102016.

12- Lavoie A, Lemire M, Lévesque B, Ayotte P. Determinants of iron deficiency and anemia among Nunavimmiut: results from the Qanuilirpitaa? 2017 Nunavik Health Survey. Canadian Journal of Public Health. 2024 Jan;115(Suppl 1):152-67.

13- de Wit A, Bootsma BT, Huisman DE, van Wely B, van Hoogstraten J, Sonneveld DJ, Moes D, Wegdam JA, Feo CV, Verdaasdonk EG, Brokelman WJ. Risk Factor Targeted Perioperative Care Reduces Anastomotic Leakage after Colorectal Surgery: The DoubleCheck study. Annals of Surgery. 2024 Jul 11:10-97.

14- Hakami W, Dobie G, Alneami KA, Shaabi M, Essawi K, Saboor M, Madkhali AM, Nahari MH, Almasoudi HH, Akhter MS, Hakami FH, Zarbatan FA, Hakamy A, Chandika RM, Fageehi AA, Mobarki AA, Hamali HA. Assessing Nutritional Anemia Among University Students in Jazan, Saudi Arabia: A Public Health Perspective. J Blood Med. 2024 Feb 9;15:51-60. doi: 10.2147/JBM.S436673. PMID: 38352049; PMCID: PMC10863464..

15- Alem AZ, Efendi F, McKenna L, Felipe-Dimog EB, Chilot D, Tonapa SI, Susanti IA, Zainuri A. Prevalence and factors associated with anemia in women of reproductive age across low- and middle-income countries based on national data. Sci Rep. 2023 Nov 20;13(1):20335. doi: 10.1038/s41598-023-46739-z. PMID: 37990069; PMCID: PMC10663544.

16- Gardner WM, Razo C, McHugh TA, Hagins H, Vilchis-Tella VM, Hennessy C, Taylor HJ, Perumal N, Fuller K, Cercy KM, Zoeckler LZ. Prevalence,

years lived with disability, and trends in anaemia burden by severity and cause, 1990–2021: findings from the Global Burden of Disease Study 2021. The Lancet Haematology. 2023 Sep 1;10(9):e713-34.

17- Aziz Ali S, Feroz A, Abbasi Z, Aziz Ali S, Allana A, Hambidge KM, Krebs NF, Westcott JE, McClure EM, Goldenberg RL, Saleem S. Perceptions of women, their husbands and healthcare providers about anemia in rural Pakistan: Findings from a qualitative exploratory study. PLoS One. 2021 Apr 27;16(4):e0249360. doi: 10.1371 /journal.pone .0249360. PMID: 33905421; PMCID: PMC8078764.

18- Murphy R, Marshall K, Zagorin S, Devarshi PP, Hazels Mitmesser S. Socioeconomic Inequalities Impact the Ability of Pregnant Women and Women of Childbearing Age to Consume Nutrients Needed for Neurodevelopment: An Analysis of NHANES 2007-2018. Nutrients. 2022 Sep 16;14(18):3823. doi: 10.3390/nu14183823. PMID: 36145198; PMCID: PMC9500720.