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Prevalence and Predictors of Iron Deficiency Anemia Among Students of Ajadabia High Institute

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KEYWORDS

Prevalence, predictors, Iron Deficiency Anemia.

ABSTRACT:

Anemia is a condition of low red blood cells (RBCs) or hemoglobin. Iron deficiency is the most common cause. Adolescents are recognized as a vulnerable population regarding anemia.

Objectives: To identify prevalence and determinant factors of iron deficiency anemia among students.

Subjects and methods: cross sectional study was conducted on128 students of Ajadabia high institute. Semi structured questionnaire was used for data collection and laboratory investigation includes, hemoglobin level, red blood cell count was done.

Result: this study displayed that mean age of studied students was 21.14 years and 46.9% of surveyed students were anemic. 77.9% of anemic students were females. 13.2% of anemic students are smokers. 47.1% of anemic students consuming iron inhibiting food with significant statistical difference.

Conclusion: IDA were more prevalent in females than males. Iron inhibiting food, sex and smoking were significant associated factors of IDA.

Introduction

The World Health Organization (WHO) defines Iron Deficiency Anemia (IDA) as a state in which blood hemoglobin concentrations are abnormally low in virtue of the deficiency of one or more essential nutrients, no matter what the cause of this deficiency (1).

Anemia is a condition of low red blood cells (RBCs) or hemoglobin. Iron deficiency is the most common cause. Although iron deficiency causes a decrease in hemoglobin and RBCs production, which in turn lowers hemoglobin concentration and hematocrit, there are many other causes of anemia that do not involve iron (2).

According to WHO, due to the public health problem, anemia in a population is identified according to population prevalence as: not a public health problem (≤4.9%); mild (5.0–19.9%); moderate (20.0–39.9%); or severe (≥40.0%) (3).

Anemia is currently the most widespread nutritional deficiency worldwide, affecting around 25 % of the world population (4).

Anemia is part of malnutrition problems, with determinants: growth and development process, physiological, sex, age, and race, also associated with infection such as helminth infections, schistosomiasis, malaria, human immunodeficiency virus (HIV), tuberculosis, genetic disorders of hemoglobin,

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thalassemia, social behavioral, and environmental determinants (6).

The lack of hemoglobin resulting from anemia limits blood oxygen transport, resulting in reduced physical and mental capacity, along with other health risks (7).

Despite its multifactorial etiology and distribution amongst all social strata, anemia is more frequent in contexts characterized by poor socioeconomic conditions, and where there is a low consumption of iron alongside the intake of substances that inhibit iron absorption (8).

the risk factors for anemia most frequently cited in the literature are low family income, low maternal level of education, and inadequate iron intake (8).

Adolescents are recognized as a vulnerable population regarding anemia (9). This age group's vulnerability is often attributed to the increased physiological demands for micronutrients (such as iron and folic acid) that accompany rapid physical growth, as well as to the micronutrient losses that may be caused by intestinal parasitic infestations, especially in developing countries (9). Towards the end of adolescence, boys tend to replenish their nutrient stores, whereas girls continue to be vulnerable to anemia because of menstrual blood loss, and possibly gestation and lactation in the case of adolescent pregnancy, which is still common in several developing countries (10).

Aim of the study

1-To identify prevalence and determinant factors of iron deficiency anemia among students of Ajadabia high institute

Subjects and Methods:

Study design: analytic Cross-sectional study

Study population: the study was conducted on 128 students of Ajadabia high institute.

Sample size: Sample size was calculated using EPI INFO VERSION 7 software. Sample size calculation was based on prevalence of Iron Deficiency Anemia was 4.8% (11). With a power of 80% and confidence level of 99%, the sample needed for the study was 122 respondents.

Sampling technique: the studied students were chosen by simple random sample

Data collection tools:

Semi structured questionnaire was used for data collection. It was developed by the researchers based on extensive review of relevant and current research literature.

A questionnaire was used to collect. It consists of two sections, the first section questioning about demographic and background variables and nutritional determinants of the children. The second section is Anthropometric measurements (Height and weight measurements were taken for all sampled participants) laboratory investigation include, hemoglobin level, red blood cell count.

Blood samples were collected and were used to estimate the level of hematological parameters.

The Hb cut-off values of anemia were HB < 12 gm/dl in non-pregnant females and < 13 gm /dl in males (11,12).

Red blood cell count for females was considered normal in the range of 4200–5800/mm3 and for males, 3600 – 5600/mm3 (12,13).

Ethical considerations:

Informed consent was obtained from study participants after explaining the objectives of the study. Privacy and confidentiality of data was assured.

Statistical analysis:

All data management processes; data entry, cleaning, revision, and recoding (if required) was done using SPSS version 20 for Windows (SPSS Inc., Chicago, IL, USA). Descriptive statistics: mean ± SD and range for quantitative variables, frequency and percent for qualitative variables.

RESULT

Table (1): Distribution of students by demographic characteristics and life style.

variable	N0	%
Age	13	19.1
18-	25	19.5

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22-	74	57.8
23-25	29	22.7
Mean ± SD	21.14± 1.84	
Sex		
male	43	33.6
female	85	66.4
Marital status		
Single	110	85.9
Married	18	14.1
Smoking		
yes	28	21.9
no	96	75.0
Ex smoker	4	3.1
Sport		
yes	54	42.2
no	74	57.8
Total	**128**	**100.0**

Table (1) shows that mean age of studied students was 21.14 years ,66.4 % of them were females and 85.9 % of the students were single. on the other hand, 21.9 % of them were smoker and 42.2% of them practice sport.

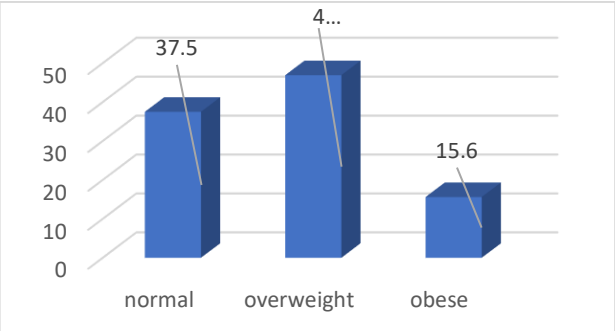

Fig (1) Distribution of respondents by body mass index

Fig (1) reveals that 46.9% of surveyed students were overweight.

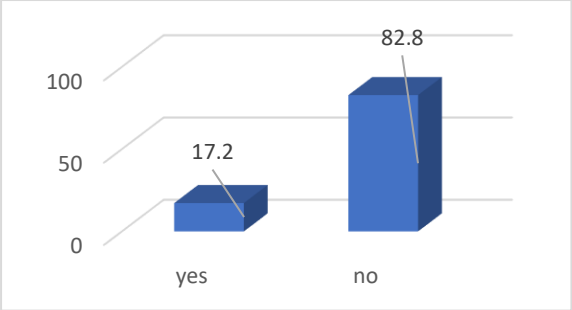

Fig (2) Distribution of respondents by chronic disease

Fig (2) displays that only 17.2% of students were complaining of chronic diseases.

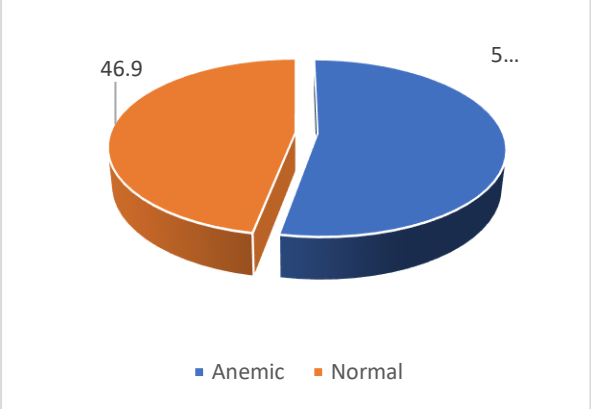

Fig **(3): Distribution of students by anemia (HB level)**

Fig (3) displays that 46.9% of surveyed students were anemic.

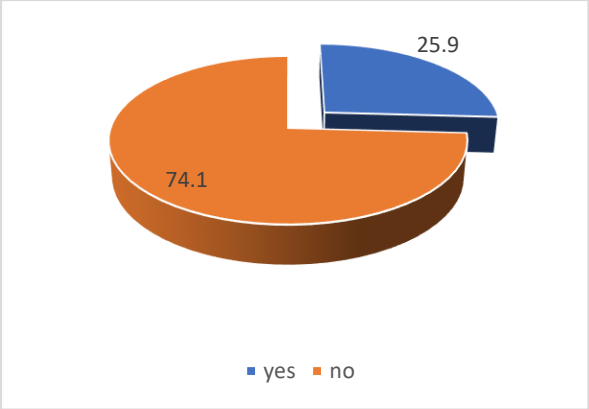

Fig **(4): Distribution of female students by menorrhagia**

Figure (4) displays that 25.9% of female students complain of heavy menstrual bleeding

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Table (2): Distribution of female students by mean of menstrual bleeding days and age of menarche

Variable	**Mean** ± SD
Menstrual period	5.68± 1.12
Age of menarche	13.49±1.93

Table (2) showed that mean duration of menstrual bleeding was 5.68 days while mean age of menarche was13.49 years.

Table (3): Distribution of students by mean HB level and sex

Sex	**Mean** ± SD of **HB level**	**P value**
Males	13.40 ± 2.42	0.001*
Females	11.57± 1.45	

Table (2) showed that the mean **HB level** of male students surveyed was13.40 and mean **HB level** of females was 11.57 with significant statistical difference.

Table (4): Risk factors for iron deficiency anemia .

Variables	**Anemic**	**Normal**	**Total**	**P value**
sex				
male	15 (22.1%)	28 (46.7%)	43 (33.6%)	0.003*
female	53 (77.9%)	32(53.3%)	85 (66.4%)	
Marital status				
Single	55 (80.9%)	55 (91.7%)	110 (85.9%)	0.08
Married	13 (19.1%)	5 (8.3%)	18 (14.1%)	
Smoking				
yes	9 (13.2%)	19 (31.7%)	28 (21.9%)	0.03*
no	57 (83.8%)	39 (65.0%)	96 (75.0%)	
Ex smoker	2 (2.9%)	2 (3.3%)	4 (3.1%)	
BMI				
normal	25 (36.8%)	23 (38.3%)	48 (37.5%	0.65
overweight	34 (50.0%)	26 (43.3%)	60 (46.9%)	
obese	9 (13.2%)	11 (18.3%)	20 (15.6%)	
Practice of Sport				
Yes	25 (36.8%)	29 (48.3%)	54 (42.2%)	0.1
No	43 (63.2%)	31 (51.7%)	74 (57.8%)	
Total	68 (100.0%)	60 (100.0%)	128 (100.0%)	

Table (4) reveals that 77.9% of anemic students were females and 13.2% of anemic students are smokers. 50.0% anemic students were overweight. on the other hand, sex and smoking were significant risk factors.

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Table (5): Nutritional risk factors for iron deficiency anemia .

	Anemic	**Normal**	**Total**	**P value**
Iron boosting foods				
Yes	23 (33.8%)	26 (43.3%)	49 (38.3%)	0.11
Sometimes	36 (52.9%)	32 (53.3%)	68 (53.1%)	
No	9 (13.2%)	2 (3.3%)	11 (8.6%)	
Iron inhibiting food				
Yes	32 (47.1%)	17 (28.3%)	49 (38.3%)	0.02*
sometimes	25 (36.8%)	40 (66.7%)	65 (50.8%)	
No	11 (16.2%)	3 (5.0%)	14 (10.9%)	
Total	68 (100.0%)	60 (100.0%)	128 (100.0%)	

Table (5) reveals that nearly half of anemic respondents (47.1%) consuming iron inhibiting food with significant statistical difference .

Table (6): Multivariate analysis of factors affecting for iron deficiency anemia .

	B	S.E.	Wald	df	Sig.	Exp(B)
Iron inhibiting food			14.181	2	.001	
Iron inhibiting food (1)	.362	.851	.181	1	.670	1.437
Iron inhibiting food (2)	1.851	.770	5.781	1	.016	6.369
sex (1)	1.184	.789	2.253	1	.133	3.267
smoking			.955	2	.620	
smoking (1)	1.061	1.158	.839	1	.360	2.889
smoking (2)	.573	1.332	.185	1	.667	1.774
Constant	-2.291-	1.682	1.855	1	.173	.101

Table (6) shows that by logistic regression analysis, the significant independent factor associated with anemia was iron inhibiting food.

DISCUSSION

Iron deficiency anemia is the most common type of anemia and nutritional deficiency in several developing countries and has important health, social and economic consequences (14).

In the adolescence stage, iron need is increased because of rapid growth. In order to increase the absorption of iron, the level of ferritin decreases. Additionally, the onset of menstruation in girls results in reduced ferritin levels. Irregular eating habits and the lower consumption of animal source foods

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Prevalence of Anemia: Based on the results of the analysis of data in this study showed that 46.9% of surveyed students were anemic. On the other hand, 77.9% of anemic students were females. this finding agrees with Singh P et al revealed that the overall prevalence of anemia was 52% for both males and females. 29.7% of the females and 22.4% of the males were anemic (15).

El-Sahn et al documented that 46.6% of adolescents aged 12-18 old years in Egypt were anemic (16)

The Zanzibar National School Health and Nutrition Survey reported that almost half of school children and adolescents 5-19 years in Zanzibar are anaemic with a prevalence of 45.7% (17)

Centre (BHRC), Biratnagar, Morang District of Nepal 2012 showed the prevalence, among adolescents in the region, of 47.7 % and 52.3% in males and females respectively (18).

On the other hand, Alboueishi etal., reported that the overall prevalence of IDA was 34%. Moreover, IDA prevalence was higher in women (44.78%; than in men among Libyan workers and their families (19) .

Study was conducted among children at Benghazi was revealed that about 50 % of children had iron deficiency anemia (14).

Another study was conducted among Libyan adolescent girls reported that 50% of adolescent girls were anemic (20).

Predictors and prevalence of iron deficiency anemia:

Our findings revealed that iron inhibiting food, sex and smoking were significant associated factors of IDA.

Alboueishi etal., displayed that There was a corresponding significant difference between the male and female participants in serum ferritin, serum iron, and total iron-binding capacity. Age, marital status, residence, occupational status, dietary habits, and family history of IDA were the main risk factors (19).

Additionally, many studies reported that the higher prevalence rates of IDA among women may be due to iron loss during menstruation or poor nutritional status (21,22).

Elbaruni etal found that students who consumed high levels of soft drinks and chips as part of their diet were more likely to suffer from iron deficiency anemia (11).

Polyphenols (tannins) found in tea, coffee, and cocoa prevent the intestines from absorbing iron, which can result in the development of IDA (23). In the intestine, phenolic chemicals can combine with iron to produce complexes that prevent absorption. Black tea was the most effective beverage, lowering iron absorption by 79% to 94% (24). Almost all beverages decreased iron absorption. Strong statistically significant correlations between iron absorption and tea and coffee consumption were found (25). Similarly, cola consumption significantly increased the risk of IDA (26).

Patrick etal., indicated that anemia in school children and adolescents is strongly associated with gender, age, school ownership, meal frequency and family income (27).

Benazir etal., reported that middle socioeconomic status, literacy level of the parents, and dietary habits were major risk factors for IDA (28).

On the other hand, this study revealed that body mass index insignificant associated with IDA.

Kamruzzaman revealed that normal and overweight participants were less likely to have IDA, whereas underweight women were more likely to have IDA (29).

Conclusion

Nearly half of surveyed students were anemic. IDA were more prevalent in females than males. Iron inhibiting food, sex and smoking were significant associated factors of IDA.

Recommendation

It is recommended nutritional educational program raise awareness about the risk factors of IDA and promote the intake of iron-rich foods.

Lifestyle Modification encouraging healthy food consumption and physical activities and sports.

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