Prevalence of anemia among adolescent girls in Nalut city

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الملخص:

يعتبر فقر الدم من أهم المشاكل الصحية العالمية، والتي تحدث في جميع الفئات العمرية، منها فترة المراهقة، إذ ترتبط العديد من العوامل الغذائية والديموغرافية والثقافية والحيض عند الفتيات بالحدوث المرتفع لفقر الدم، هدفت هذه الدراسة إلى معرفة نسبة انتشار فقر الدم بين المراهقات في مدينة نالوت اللاتي تتراوح أعمارهن بين (14–19) عاما حيث إن متوسط أعمار المشاركات يتراوح بين (16-17عاما) ، كما هدفت الدراسة إلى تحديد العوامل المرتبطة بحدوث فقر الدم مثل العمر و مؤشر كتلة الجسم ودخل الأسرة الشهري ونمط الحيض والسلوكيات الغذائية والنظام الغذائي ومستوى المعرفة بفقر الدم، اعتمدت الدراسة على المنهج الوصفي التحليلي من خلال استبانة أجابت عليه 207 فتاة مراهقة ومن ثم قياس مستوى الهيموجلوبين وحساب مؤشر كتلة الجسم بقياس الوزن والطول، من خلال الدراسة.

أوضحت النتائج أن معدل انتشار فقر الدم بين المراهقات بلغ 21.8%، حيث تم العثور على علاقة ذات دلالة إحصائية بين كل من العمر ونمط الحيض والإصابة بفقر الدم ولم تبين نتائج الدراسة وجود علاقة بين الدخل الشهري والعادات الغذائية والنظام الغذائي ومستوى المعرفة وخطر الإصابة بفقر الدم.

واستنتجت الدراسة ان نسبة انتشار فقر الدم بين المراهقات معتدلة الخطورة، إذ لابد الحد من العوامل التي تقلل من تفاقم هذه المشكلة على المدى البعيد.

الكلمات المفتاحية: فقر الدم، الهيموجلوبين، العامل المصاحب، المراهقة.

Abstract

Back ground : Anemiais considered one of the most importantglobal health problems , and it occurs in all age groups , including the adolescence period , as many nutrition , demographic, cultural and menstruation factors in girls are associated with a high incidence of anemia. This study aimed to identify the prevalence of anemia among adolescence girlsin Nalut city aged between (14-19 years) as the average age of participations ranges between (16-17 years) , as well as related factors such as age , body mass index , monthly family income , menstruation pattern , nutritional behaviors , diet and knowledge level.

Methods : the study relied on the descriptiveanalyticalapproach through a questionnaire answered by 207 adolescent girls , then measuring the level of hemoglobin and calculating the body mass index by measuring weight and height , through the study

Results : The results showed that the prevalence rate of anemiaamongadolescent girls reached 21.8% , where a statistically significantrelationship was found between each of age and menstrual pattern with anemia on the other hand, there was no statistically significant relationship between monthly income , nutritional behaviors , diet , knowledge leveland risk of anemia .

Keywords : Anemia, Hemoglobin , Associatedfactor, Adolescence

Introduction :

Anemia is one of the most important global health problems, with more than two billion people worldwide estimated to be anemic. Adolescents are particularly at risk of developing anemia due to increased nutritional needs at this age, accelerated growth, malnutrition and the onset of menstrual cycle in girls, which can lead to cognitive impairment and learning difficulties. Many dietary, social and cultural factors are associated with high anemia. Anemia is defined as a low level of hemoglobin in the blood below normal (less than 12 milligrams/dL) and is one of the most prevalent nutritional problems in the world, with anemia prevalence among adolescents at 28% in developing countries and 6% in

developed countries. Adolescence can be defined as the period of life that begins with the emergence of secondary sexual characteristics and ends with the cessation of physical development, and the World Health Organization (WHO) has defined the period of adolescence from 10 to 19 years in males and females (1).

Anemia during adolescence is more prevalent due to a growth spurt, the onset of menstruation, and malnutrition, so adolescent girls should be careful to eat a healthy and balanced diet, and anemia prevention is effective when the strategy since adolescence focuses on future life. Regular nutritional education campaigns must be conducted to raise awareness among adolescent girls about anemia and the most important factors that cause its increase and work to get rid of its causes to reduce its spread among this group (2). In recognition of its detrimental impact on the individual and social levels, reducing the spread of anemia has been identified as one of the WHO's 2025 **Global Nutrition Goals**. This study was conducted to shed light on the problem of adolescent anemia by determining how widespread it is among this age group, as well as studying the factors related to its occurrence.

Material and methods:

This study was conducted on 207 adolescents from the city of Nalut between the ages of 14 to 19 years, studying at Al Majd School, Jaber bin Zaid Preparatory School, Al Khansa High School, and the Faculty of Medical Technology in a period ranging from January secondto March 18th , 2023. Adolescents who were under the age of 14 and over 19 years were excluded, and teenagers who did not reach menstruation at the time of the study were excluded. The samples were selected randomly and the study was based on the analytical descriptive approach.

This study included two sections:

Drawing blood samples from a vein for adolescent girls to perform a CBC (complete blood count) analysis to see if they have anemia or not, fill out

a questionnaire before knowing the results of the analysis with information related to age, school stage and economic aspect, level of knowledge about anemia, menstrual pattern, diet, and dietary habits followed, where the questionnaire was distributed to each individual adolescent to ensure that they understood all the questionnaire questions.

The weight of the participants was also measured in light clothing and without shoes by the digital weight scale , and the height was measured using the manual length gauge, and then the BMI) was determined for all participants by calculating the weight (kg) / square length (m), and the participants were classified as normal weight or underweight or overweight or obese based on the World Health Organization's BMI rating.

Data Analysis

The data was statistically analyzed using the SPSS (Statistical Package For The Social Science version 25) program to analyze the data and find out the results. The P-Value level of morale was used to find the relationship between anemia, age, menstrual pattern, diet, diet, body mass index and monthly household income, with a confidence score of 95%, that there is (no relationship) if it is (P-value > 0.050), but if the value (P-value <0.050) that is, (there is a relationship)

Results:

Section I: Demographic data for the study sample

Table 1. Frequency and percentages of sample age

Age group	Frequency	Percentage
15-14	73	35.2%
17-16	72	34.8%
19-18	62	30.0%
Total	207	100%

We note from the previous table that the category ((15-14) amounted to (35.2%) of the total study sample members, which indicates that most of the sample members belong to this category, while the category (17-16%)

(34.8%) ranked second, and the category (19-18) came with (30.0) and is considered the lowest category in the study sample.

Table 2. The Frequency and percentage of the mass index in the study sample

Mass index	Frequency	Percentage
Underweight (less than 18.5 kg/m2)	24	11.5%
Normal weight (18.5 - 24.9 kg/m2)	136	65.7%
Overweight (25 - 29.9 kg/m2)	36	17.4%
Primary obesity (30 - 34.9 kg/m2)	8	3.9%
Secondary obesity (35 - 39.9 kg/m2)	2	1%
Very severe obesity (more than 40 kg/m2)	1	0.5%
Total	207	100%

The previous table shows the iterative table of the BMI variable, where the largest percentage of the study sample was for normal weight with 136 adolescents at 65.7%, followed by weight gain with 36 adolescents at 17.4%. It was also found that 24 adolescents were underweight and reached 11.5% of the study sample, and 8 adolescents were obese at 3.9%, while the lowest percentages were in favor of secondary obesity and very obese at 2% and 1%, respectively.

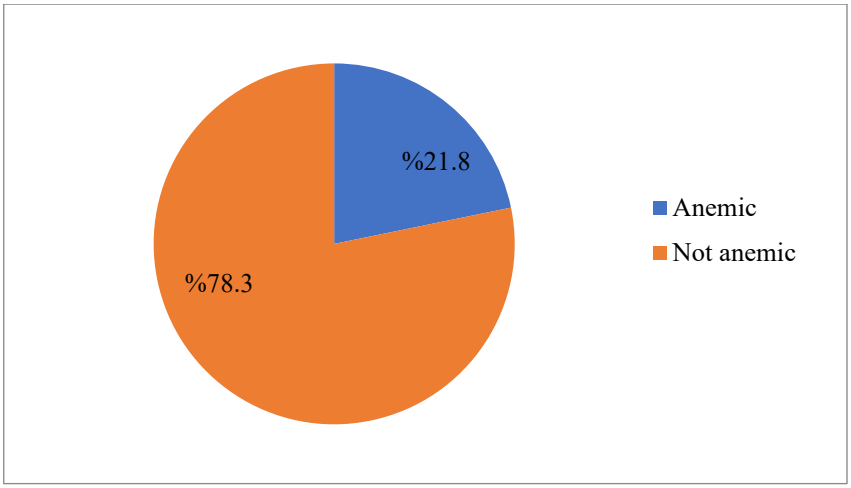

Figure 1. Prevalence of adolescent anemia

From the previous form, the number of adolescent girls with anemia in the sample studied was 45 adolescents, or 21.8%, while the number of adolescent girls whose hemoglobin level was within the normal range was 162 adolescents, or 78.3%.

Table 3. Frequency and percentage of adolescent anemia

Severity of anemia	Frequency	percentage
Mild anemia (11.9−11g/dl)	30	14.5%
Moderate anemia (8−10.9g/dl)	13	6.3%
Severe anemia (Less than 8g/dl)	2	1%
Total	45	21.8%

The previous table shows the severity of anemia in the study sample, where it was found that 30 adolescents 14.5% had mild anemia (Mild anemia), and 13 adolescents 6.3% had moderate anemia, and only two adolescents 1% had severe anemia).

Table 4. The arithmetic average and standard deviation of the age variable,hemoglobin and body mass index

Variables	Mean	Frequency	*Std. Deviation*
Age	207	16.5	*0.825*
HGB	207	12.8793	*1.59037*
BMI	207	22.7500	*22.7500*

In this table we find that the average age of the sample was 16.5 and the standard deviation was 0.825 while the average hemoglobin of the sample as a whole is 12.8 and the standard deviation is 1.59, and that the average BMI of the sample as a whole is 22.7 and the standard deviation is 4.06.

Table 5. The arithmetic average and standard and level deviation of the menstrual pattern variable, dietary habits and diet

Factors	**Standard Deviation**	**Mean**	**Level**
Menstrual Pattern	2.08	1.1580	Low
Dietary Habits	2.89	0.796	Medium
Diet	3.49	0.783	High

The result showed that the weighted average weights for the first axis as a whole is 2.08, which is rarely matched by the weights of the Leckert pentagonal scale, meaning that the pattern of menstruation (bleeding and menstrual disorder) in the study sample is low.

The result showed that the average weight for the second axis is 2.89, which is equivalent to neutrality according to the weights of the Leckert pentagonal scale, that is, adherence to the dietary habits that can cause anemia in the study sample is considered average.

The result showed that the average weight for the third axis is 3.49, which is equivalent to the high according to the weights of the Leckert pentathlon

scale, meaning that adherence to an integrated healthy diet in the study sample is high

Table 6. Anemia by age group

Age	Normal (15−12)	Less than normal (12 Less)	Total
14−15 **Year**	62	11	**73**
16 −17 **Year**	58	14	72
18−19 Year	42	20	62
Total	45	162	**207**

From the previous table, we note that the age group (19-18) years is the most affected group with anemia, with 20 adolescent girls, followed by the age group (17-16) years, where about 14 girls were found to be anemic, while we find that the age group (15-14) years is the least affected group with anemia, with 11 adolescent girls.

Section II: Relationship Tests

Table 6. P-value values to find the relationship between anemia and variants

probability value	**P- value**
Variables	**Hemoglobin percentage**
Mass index	0.531
Menstrual Pattern	0.029
Dietary Habits	0.369
Diet	0.372
Monthly family income	0.77
Age	0.01

The test result shows that there is a statistically significant relationship between bleeding and menstrual disorder and anemia in the study sample, through the probability value of 0.029, which is a statistically significant value at the level of 0.05, which is a direct positive relationship in the sense

that the increase in one of the two variables leads to an increase in the other variable and vice versa, in other words, the increase in menstrual bleeding leads to an increased risk of anemia. The test result shows that there is a statistically significant relationship between age and anemia in the study sample, through the probability value of 0.01, which is a statistically significant value at 0.05, and therefore we accept the alternative hypothesis that there is a relationship between the two variables. The test result shows that there is no statistically significant relationship between BMI, dietary habits, monthly household income and anemia in the study sample, through a probability value of 0.531, 0.369, 0.372, 0.77 respectively and is not statistically significant at 0.05,

Discussion:

Maintaining a normal hemoglobin level is an important factor for ensuring adolescent health, as their lives and futures can be positively affected if anemia is identified and treated early. The results of this study indicated that the prevalence of adolescent anemia reached 21.8%, which is moderately dangerous according to the classification of the World Health Organization, and this is close to another study where a similar prevalence was found in a study in the city of Addis Ababa (4), where it reached 21.1%, while the rates varied in other studies. In a local study conducted in Brak al-Shati in southern Libya (3) the prevalence rate reached 13.1%, and in an Arab study conducted in Egypt (4) the prevalence rate reached 28.8%, and a study in Yemen (5) the prevalence of anemia reached 37.8%, and another in Amman the prevalence of anemia reached 37.8%, and another in Oman reached the prevalence of The prevalence is 54% (6), and this moderate percentage in the current study may be due to the marked improvement in the standard of living in recent years. As for the severity of anemia, the results of this study showed that mild anemia was present in (14.5%) of adolescent girls, which is the most prevalent, while (6.3%) and (1%) of adolescent girls had moderate and severe anemia, respectively. A study in Addis Ababa indicated that (18%) had mild anemia and (2.5%) had moderate anemia and there were no cases of severe anemia among adolescent girls (7). In an Indian study in Dahab, about 23.4%) were a

teenage girl with mild anemia while (30%) and 0.8%) had moderate ,severeanemia respectively (8), while in another study in the western Ethiopian town of Ombo, moderate anemia was found to be the most prevalent (24.5%) while (11.7%) and (2.9%) had mild and severe anemia respectively (9), and in an Indonesian study about 31.4% were found to have mild anemia while no women were recorded with moderate and severe anemia (10). As for the body mass index (BMI), the results of this study showed that there is no statistically significant relationship between BMI and the incidence of anemia, where the value of P=0.531 was, and this is in line with other studies, including one in the Gaza Strip, where no statistically significant differences were found (P=0.520) (11), and in another study in Indonesia, where the value of P=0.462) was, indicating that there was no relationship between the two variables (12), otherwise, a study in Amman found a relationship between BMI and anemia, where the value of P<0.01) was (13), and another study conducted in Riyadh, Saudi Arabia. Anemia has been found to Be significantly associated with the overweight category in adolescents (P=0.002) (14). The study also reported that there is a statistically significant relationship between anemia and menstrual pattern at the study sample, where the value of (P=0.029), and this was confirmed by several studies conducted in several regions around the world, including a Yemeni study, where it was found that there is a relationship between anemia and menstrual pattern (P=0.001) (15), and also confirmed an Egyptian study conducted in Alexandria that there is a relationship between anemia and menstrual pattern (P=0.013 (16), and this is contrary to a study conducted in Indonesia where no statistically significant relationship was recorded P=0.397) (17), and a study in Amman, where no association was observed between Anemia and menstrual pattern (P>0.05) (13), due to this study, heavy blood loss during menstruation accompanied by irregular menstrual cycles can lead to more blood loss from the body, meaning that the more menstrual disorders in adolescents, the greater their risk of anemia. The results of this study also showed that the practice of some wrong eating habits such as consuming tea and coffee with or immediately after meals, missing meals, snacking

and snacking is not related to the incidence of anemia (P=0.369), which is in line with a Palestinian study conducted in the Gaza Strip where there was no statistically significant relationship between tea consumption and anemia (P=0.360) (6), and a study conducted in Indonesia in West Java indicated that there is no relationship between tea and coffee consumption and the incidence of anemia (P=0.395) (11), and a study indicated that The results of this study also showed that the practice of some wrong eating habits such as consuming tea and coffee with or immediately after meals, missing meals, snacking and snacking is not related to the incidence of anemia (P=0.369), which is in line with a Palestinian study conducted in the Gaza Strip where there was no statistically significant relationship between tea consumption and anemia (P=0.360) (11), while another study in Nepal that there was no relation between the consumption of fast food an anemia (8) whilea study conducted in Indonesia in West Java indicated that there is no relationship between tea and coffee consumption and the incidence of anemia (P=0.395) (11), and a study indicated that Indonesian woman showed that there is an association between fast food consumption and the incidence of anemia P=0.025.

The results of the current study showed that the diet followed had nothing to do with anemia, where the value was (P=0.372), this was similar to a study conducted in Bangladesh, Indonesia, where no relationship was found between the pattern of food consumption and the incidence of anemia P=0.908) (12), and another study in West Java in Indonesia confirmed that there was no relationship between the diet (meat consumption, vegetables/fruits) and anemia, where the value of P=0.335) (P=0.515) was found respectively (13), and otherwise a study conducted in the Gaza Strip in Palestine found a relationship. Between anemia and diet, it was found that low consumption of meat, vegetables and fruits was associated with anemia, with a value of P<0.001, P=0.011, P=0.036) respectively.

Finally, the results of this study showed that age is related to anemia, where the value of (P=0.010) was found that the age group 19-18) years was the most affected by anemia, and a study conducted in Ethiopia found that anemia is higher among adolescents in the age group 19-15 years than

in the age group of 14-10 years (15 years), and otherwise a study conducted in Riyadh, Saudi Arabia, where it was found that the age group (14-13) years is at risk of anemia compared to the older age groups P=0.04), and in a study conducted in Alexandria, Egypt, where it was found that the age group (14-13) years is at risk of anemia compared to the older age groups P=0.04), and in a study conducted in Alexandria, Egypt. It was found that age did not have a significant impact on anemia, as it was slightly higher in the age group of 15-14 years (16), and in an Indian study it was found that anemia is high in all age groups, where it was higher in the age group of (14-13) years (8), and the reason for the association of this group with anemia may be due to the practice of wrong eating habits and an unbalanced diet, which may cause anemia.

The results of this study also showed that there is no relationship between the monthly household income and the occurrence of anemia, where the value of P=0.77), where a study in West Java in Indonesia confirmed that there is no relationship between household income and anemia, where it found a value (11) (P=0.686), and otherwise the results of other studies indicated a relationship between monthly household income and anemia, as in a study in Yemen, where the value of P<0.001) (5), as well as a study in the Gaza Strip in Palestine, where it showed that the decrease in monthly income is linked to the occurrence of anemia, where the value of P=0.001) (11) and another study conducted in the city of Palestine. Mataram, Indonesia, has pointed to a relationship between household income and anemia (P=0.004) (17).

It may be because changes in income can directly record changes in household food consumption as increased income means increased opportunities to buy food with better quality and quantity. On the contrary, lower income will lead to a decrease in the quality and quantity of food intake, which may lead to the body's nutrient needs not being met, so it can have an impact on the occurrence of anemia.

Conclusion:

From this study, we conclude that the prevalence of adolescent anemia in the city of Nalut reached 21.8%, which is a moderately dangerous rate according to the World Health Organization. The severity of anemia varied between mild, moderate and severe, and the prevalence of anemia among adolescents in the age group of 18-19 years, so it is necessary to pay attention to this age group as the treatment of adolescent anemia requires a multifaceted approach, including health care professionals, teachers, parents and adolescents themselves, by raising awareness and providing intervention. Early and promote healthy lifestyles and awareness about menstrual bleeding where menstrual disorders can be a cause of anemia as shown in this study; encourage a healthy diet and avoid some wrong behaviors that may contribute to an increased risk of anemia.

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