Academia Open
Vol 9 No 1 (2024): June
DOI: 10.21070/acopen.9.2024.10283 . Article type: (Medicine)

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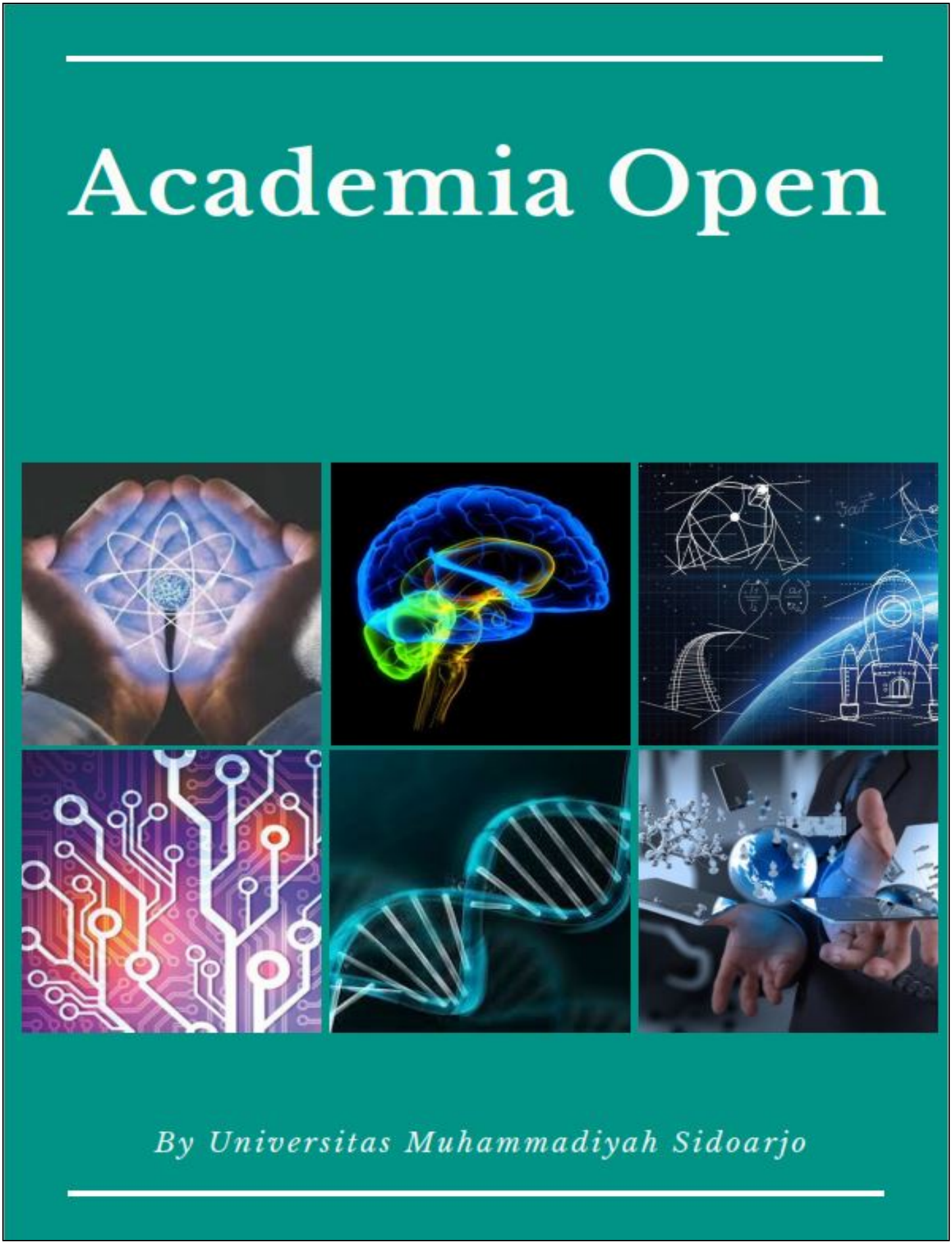
ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
DOI: 10.21070/acopen.9.2024.10283 . Article type: (Medicine)



ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
DOI: 10.21070/acopen.9.2024.10283 . Article type: (Medicine)

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Vol 9 No 1 (2024): June
DOI: 10.21070/acopen.9.2024.10283 . Article type: (Medicine)

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ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
DOI: 10.21070/acopen.9.2024.10283 . Article type: (Medicine)

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ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
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Bridging the Knowledge Gap on Iron Deficiency Anemia Among Nursing Students

Menjembatani Kesenjangan Pengetahuan tentang Anemia Defisiensi Besi di Kalangan Mahasiswa Keperawatan

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Abstract

Background: Iron deficiency anemia (IDA) is a prevalent nutritional disorder characterized by a significant reduction in the body's iron stores, affecting oxygen transport and leading to various health complications. **Specific Background:** The understanding of IDA among nursing students is underdeveloped, especially regarding the differences between morning and evening study cohorts. **Knowledge Gap:** Understanding nursing students' knowledge of IDA is critical for enhancing educational strategies and improving patient care, yet limited studies have assessed this demographic's awareness of the condition and its management. **Aims:** This study aims to evaluate nursing students' knowledge about IDA and to compare the levels of knowledge between morning and evening students at the College of Nursing, University of Basrah, over a six-month period from November 2023 to March 2024. **Results:** A descriptive cross-sectional study was conducted involving 145 students (72 morning and 73 evening) who completed a questionnaire. Results indicated that 40.2% of morning students and 53.4% of evening students suffered from iron deficiency. While 86.1% of morning students had prior knowledge of IDA compared to 67.1% of evening students, the mean knowledge levels were deemed good for both groups, with no significant statistical difference between them. **Novelty:** This research contributes to the existing literature by highlighting knowledge levels of IDA among nursing students in Iraq, revealing that both morning and evening cohorts possess substantial understanding yet exhibit slight discrepancies. **Implications:** The findings underscore the necessity for targeted educational interventions to bridge the knowledge gap regarding IDA, ultimately enhancing nursing students' competencies in managing this condition in clinical settings.

Highlights:

1. IDA Prevalence: 40.2% morning students and 53.4% evening students affected.
2. Knowledge Difference: 86.1% morning vs. 67.1% evening students aware of IDA.
3. Educational Need: Targeted interventions required for improved IDA management in nursing education.

Keywords: Iron deficiency anemia, nursing students, knowledge assessment, educational interventions, Iraq

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
DOI: 10.21070/acopen.9.2024.10283 . Article type: (Medicine)

Published date: 2024-06-09 00:00:00

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

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Vol 9 No 1 (2024): June
DOI: 10.21070/acopen.9.2024.10283 . Article type: (Medicine)

Introduction

Anemia is a medical disorder in which the quantity of red blood cells or their ability to carry oxygen is not enough to fulfill the body's requirements [1]. Anemia can be brought on by a number of things, including iron, vitamin B12, vitamin A, folate, and chronic inflammation. It can also be brought on by parasite infections and genetic disorders [2]. However, iron deficiency is considered the most prevalent type of anemia worldwide and occurs due to insufficient levels of iron that are needed to produce red blood cells [3]. The majority of anemia cases are estimated to be in women and children, with 40% of all children aged 6 to 59 months, 37% of pregnant women, and 30% of women aged 15 to 49 worldwide being afflicted [4].

Iron deficiency anemia (IDA) is a condition marked by a severe reduction in the body's iron reserves due to both internal and external sources. Pregnant and breastfeeding women, elderly adults, patients who have lost a significant quantity of blood, people who have poor diets, babies, women who are of reproductive age, and those from low socioeconomic backgrounds are high-risk categories for IDA [5].

Due to the importance of Iron for the health of individuals and its impact on many vital activities, so this topic was chosen for study. Iron has great importance in oxygen transmission, so any deficiency or imbalance of its metabolism inside the body leads to many problems in addition to other certain disorders. Early identification and treatment of iron deficiency anemia may result from increased knowledge of the condition's effects and prevalence. Serum ferritin and hemoglobin measurements are readily used for diagnosis; however, in diseases characterized by persistent inflammation, transferrin saturation measurements may be required [6].

Common medical conditions found in everyday clinical practice and global health challenges are iron deficiency and iron deficiency anemia. Even if the frequency of iron deficiency has somewhat decreased recently, it is still the primary cause of anemia worldwide. In both industrialized and developing countries, premenopausal women and young children are greatly impacted by iron-deficiency anemia [7].

According to estimates from the World Health Organization (WHO) from 1992, 37% of women were iron deficient [8]. Kassebaum et al. concluded that over 30% of the world's population is anemic [9], with the majority of cases being attributed to iron deficiency [9]. Their investigation of the worldwide anemia burden was conducted 13 years after the WHO report and remained substantially unchanged. Iron deficiency results in reductions in energy, activity, quality of life, sexual function, cognitive function, and job productivity in addition to anemia [10-14]. Iron deficiency in newborns is linked to delayed growth and development, a statistically significant decline in cognitive function, and aberrant behaviors that last for up to ten years following iron replacement [15]. This study aimed to assess Students' Knowledge about Iron deficiency Anemia.

Methods

A descriptive cross-sectional study design is carried out throughout the present study about the knowledge of Nursing College Students About Iron Deficiency Anemia) from the period of the beginning of November 2023 to the 20th of March 2024. The research included about 145 random samples of students (72 of the morning study and 73 of the evening study) who answered the questionnaire from a college of nursing at the University of Basrah, the site of Bab Al-Zubayr.

The researchers employ a questionnaire with two sections to meet the study's objectives: Section 1 (Data on Sociodemographics) consists of four variables, student age, social state, type of study, and stage of the study.

Part two is Students' knowledge about iron deficiency anemia: It consists of 19 questions that assess the students' knowledge about iron deficiency anemia, the importance of hemoglobin in iron synthesis, the normal range of hemoglobin, causes and symptoms of iron deficiency anemia, and its effects, the source of Iron, and how to manage IDA.

Result and Discussion

The current study included 72 of morning study and 73 of evening study students from the College of Nursing. Table (1) shows that in the morning study, 61.1% were stage four and 38.8% were stage three students and All of them were 20-29 of age. The result also showed that 94.4% of students were single and just 5.5% were married. In the evening study, 39.7% were Stage four 60.2% were Stage three, 80.8% were at the 20-29 age range, and 19.2% were at the 30-50 age range.

The results also showed that 24.6% were married and 75.3% were single. Table (2) reported that about (40.2%) of the morning study and (53.4%) of the evening study suffered from ID, regarding how this type of anemia occurs (91.5%) of the morning study and (71.2%) of the evening study answered correctly, and (86.1%) of MS and (67.1%) from ES had prior knowledge about IDA, the table also showed that (90.2%) of MS and (50.6%) of ES answered no

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to the question that iron is not important in hemoglobin production which considered incorrect answer.

Sociodemographic Data		morning study		evening study	
	Groups	Frequency	Percent	Frequency	Percent
Stage of study	Stage four	44	61.1%	29	39.7%
	Stage three	28	38.8%	44	60.2%
	Total	72	100%	73	100%
Age	20-29	72	100%	59	80.8%
	30-50	-	-	14	19.2%
	total	72	100%	73	100%
Social state	Married	4	5.5%	18	24.6%
	Single	68	94.4%	55	75.3%
	Total	72	100%	73	100%

Table 1. *Characteristics Variables of the students'*

Questions	Morning study							Evening study						
	Correct		Incorrect		unknown		mean	Correct		incorrect		unknown		mean
1. Do you suffer from iron deficiency?	29	40.2%	28	38.8%	15	20.8%	-	39	53.4%	21	28.7%	13	17.8%	-
2. this type of anemia occurs when the body doesn't have enough iron to produce hemoglobin	66	91.5%	4	5.5%	2	2.7%	2.86	52	71.2%	18	24.6%	3	4.1%	2.47
3. do you know about IDA?	62	86.1%	3	4.16%	7	9.7%	-	49	67.1%	18	24.6%	6	8.2%	-
4. iron is not necessary for hemoglobin production	2	2.7%	65	90.2%	5	6.9%	1.13	28	38.3%	37	50.6%	8	10,9%	1.73

Table 2. *student knowledge about Iron deficiency anemia*

In Table (3) about causes of iron deficiency (100%) of MS said correct Malnutrition (94.4%) to Inability to absorb iron, (68%) to the menstrual cycle, (97.2%) to blood loss and (84.7%) said correct to Pregnancy without taking supplements. And (50%) answered no to obesity and only (41.6%) answered no to diabetes which is considered the correct answer. On the other side we have an evening study of those (91.7%) answered yes to Malnutrition, (91.7%) to Inability to absorb iron, (65.7%) to the menstrual cycle, (76.7%) to blood loss, and (65.7%) said correct to Pregnancy without taking supplements. Also (57.5%) answered no to obesity and only (53.4%) answered no to diabetes which is considered the correct answer.

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What are the causes of Iron deficiency	Morning study							Evening study						
	correct		incorrect		Unknown		mean	correct		incorrect		Unknown		mean
1. Malnutrition	72	100%	0	0	0	0	-	67	91.7%	6	8.2%	1	1.36%	2.86
2. Inability to absorb iron	68	94.4%	0	0	4	5.5%	2.94	67	91.7%	4	5.5%	2	2.7%	2.86
3. menstrual cycle	49	68%	12	16.6%	11	15.2%	2.51	48	65.7%	17	23.3%	8	10.9%	2.42
4. blood loss	70	97.2%	0	0	2	2.7%	2.97	56	76.7%	13	17.8%	4	5.5%	2.59
5. obesity	8	11.1%	36	50%	28	38.8%	2.39	17	23.3%	42	57.5%	14	19.2%	2.34
6. Pregnancy without taking supplements	61	84.7%	6	8.3%	5	6.9%	2.76	48	65.7%	13	17.8%	12	16.4%	2.48
7. diabetic	14	19.4%	30	41.6%	28	38.8%	2.22	16	21.9%	39	53.4%	18	24.6%	2.32

Table 3. *the causes of iron deficiency*

In Table (4) we asked about the symptoms of IDA and for the morning study, more than half (98.6%) answered correctly to Fatigue and exhausting, and (62.5%) to difficulty breathing, (95.8%) to general weakness, also (87.5%) to loss of appetite, (94.4%) to headache and dizziness, (94.4%) to paleness. And for the evening study also (95.9%) answered correctly about Fatigue and exhaustion, and also (86.3%) about difficulty breathing, (82.2%) about general weakness, (91.8%) about loss of appetite, (90.4%) about headache and dizziness, and (83.6%) about paleness, and we have noticed that the answers are very good.

There were (93%) of the morning study answered correctly that the normal range of hemoglobin in Males is (14-16) g/dL and about (80.5%) also answered correctly that female normal range of hemoglobin is (10-12) g/dL. For the evening study also most of them (89%) saw that the normal range in Males was correct and (80.8%) said correct in the female normal range (table 5).

What are the symptoms of IDA	Morning study							Evening study						
	correct		incorrect		unknown		mean	correct		incorrect		unknown		mean
1. Fatigue and exhausting	71	98.6%	1	1.38%	0	0	2.93	70	95.9%	1	1.36%	2	2.73%	2.95
2. difficulty breathing	45	62.5%	19	26.3%	8	11.1%	2.33	63	86.3%	5	6.84%	5	6.84%	2.79
3. gen	69	95.8%	1	1.38%	2	2.7%	2.90	60	82.2%	8	10.9%	5	6.84%	2.71

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eral weaknes s														
4. loss of appetite	63	87.5%	6	8.3%	3	4.1%	2.75	67	91.8%	3	4.10%	3	4.10%	2.88

Table 4. *we asked about the symptoms of IDA*

Normal range of hemoglobin	Morning study							Evening study						
	correct		incorrect		unknown		mean	correct		incorrect		unknown		mean
Male (14-16) g/dL	67	93%	1	1.38%	0	0	2.93	70	95.9%	1	1.36%	2	2.73%	2.95
Female (10-12) g/dL	58	80.5%	19	26.3%	8	11.1%	2.33	63	86.3%	5	6.84%	5	6.84%	2.79

Table 5. *the normal range of hemoglobin*

Here we asked about the negative effect of iron deficiency (table 6) and most of MS (84.7%) answered correct to heart problems. Also (80.5%) to problems during pregnancy: premature birth and low-weight children. (75%) to developmental problems with children and infants, half of them (56.9%) have an increased susceptibility to infection in children, and only (47.2%) answered yes to miscarriage. On the other side, we have ES where most of them (89%) answered correctly to heart problems. Also (72.6%) to problems during pregnancy: premature birth and low-weight children, more than half (64.4%) to developmental problems with children and infants, and only (39.7%) had an increased susceptibility to infection in children, only (43.8%) answered yes to miscarriage and saw it related.

The negative effect of iron deficiency	Morning study							Evening study						
	correct		incorrect		unknown		mean	correct		incorrect		unknown		mean
1. Heart problems: rapid and irregular heartbeat	61	84.7%	5	6.9%	6	8.3%	2.78	65	89%	6	8.2%	2	2.73%	2.81
2. Problems during pregnancy: premature birth and low-weight children	58	80.5%	6	8.3%	8	11.1%	2.72	53	72.6%	13	17.8%	7	9.58%	2.55
3. Developmental problems with c	54	75%	7	9.7%	11	15.27 %	2.65	47	64.4%	13	17.8%	13	17.8%	2.47

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hildren and Infants														
4. have an increased susceptibility to infection	41	56.9%	15	20.8%	16	22.2%	2.36	29	39.7%	30	41%	14	19.2%	1.99
5. miscarriage	34	47.2%	13	18%	25	34.7%	2.29	32	43.8%	18	24.6%	23	32.5%	2.19

Table 6. *the negative effect of iron deficiency*

In the last question, we took into consideration how to treat iron deficiency anemia (table 7) and the MS students who answered correctly to oral iron supplements (94.4%), and also answered no to the use of antibiotics (59.7%) which is the correct answer. They also answered correctly (79.16%) about taking iron intravenously (87.5%) about blood transfusions for those with active bleeding or low hemoglobin levels, and most of them (95.8%) for following healthy eating habits and choosing foods rich in iron. Most ES (93.1%) answered correctly about oral iron supplements, and only (42.5%) answered no to the use of antibiotics which is the correct answer. They also answered correctly (72.6%) about taking iron intravenously (72.6%) during blood transfusions for those with active bleeding or low hemoglobin levels, and most of them (79.4%) for following healthy eating habits and choosing foods rich in iron.

How to treat iron deficiency anemia	Morning study							Evening study						
	correct		incorrect		unknown		mean	correct		incorrect		unknown		mean
1. Oral iron supplements	68	94.4%	5	6.9%	6	8.3%	2.78	65	89%	6	8.2%	2	2.73%	2.81
2. Use of antibiotics	14	19.4%	6	8.3%	8	11.1%	2.72	53	72.6%	13	17.8%	7	9.58%	2.55
3. Taking iron intravenously	57	79.16 %	7	9.7%	11	15.27 %	2.65	47	64.4%	13	17.8%	13	17.8%	2.47
4. Blood transfusions for those with active bleeding or low hemoglobin levels	63	87.5%	15	20.8%	16	22.2%	2.36	29	39.7%	30	41%	14	19.2%	1.99
5. Follow health	69	95.8%	13	18%	25	34.7%	2.29	32	43.8%	18	24.6%	23	32.5%	2.19

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y eating habits and choose foods rich in iron															

Table 7. *the negative effect of iron deficiency*

Also, this study shows most MS students (98.6%) agreed that women are at risk of developing and (86.3%) from ES answered like that too. Also, most MS (94.4%) think women are at risk of developing IDA during pregnancy, and most ES (87.6%) answer correctly. Regarding the increased demand for iron during pregnancy (90.2%) of MS thought that was certain and (75.3%) of ES also saw it correct.

As well as nutritional sources of iron, the food rich in iron (Red meat, liver, legumes) (87.5%) of MS say correct, and (80.8%) of ES say correct too. From food rich in iron (Cocoa) only (37.5%) of MS answered no which is the correct answer as most of them did not know about this (41.6%), and for ES also only (32.9%) answered correctly and most of them answer yes (46.6%) which is incorrect. Also, for food rich in iron (dried fruit and seeds and nuts) more than half of MS students (61.1%) answered correctly and more than half of ES (58.9%) said correctly too. In the Foods that prevent iron absorption (parsley, eggs, fish) question only (47.2%) of MS and (31.5%) of ES students answered no which is the correct answer. And for Foods that prevent iron absorption (cereals, dairy products, tea, and coffee more than half of MS (66.6%) said correct, and (78%) of ES students also answered correctly.

In a question Iron deficiency anemia cannot be treated with iron supplements (84.7%) of MS and (61.6%) of ES answered no which is the correct answer to this question. Most MS students (86.1%) and also (65.7%) saw that intestinal disorders affect their ability to absorb iron and that is true definitely.

In the next question (Iron is not considered necessary for fetal growth during pregnancy) most of MS (94.4%) and more than half of ES students (58.9%) answered no which is correct. When we asked about Frequent blood donors and said they are not at risk of developing iron deficiency anemia only (47.2%) of MS and only (43.8%) answered correctly (the correct answer is No).

And there are large number of MS (76.4%) also ES (78%) agreed that Foods rich in vitamin C increase the ability to absorb iron.

Discussion

Anemia caused by a lack of iron is a major problem worldwide. A proper iron level in the body is crucial for good health, and low iron levels have been linked to a number of illnesses. The availability of iron in food is correlated with knowledge about its source. Additionally, there are no health guidelines for obtaining it, and this topic is not given enough emphasis in health education.

The current study reported that about (86.1%) of MS and (67.1%) of ES had prior knowledge about IDA, this result is close to a result conducted in [16] this study finds that (59.0%) of respondents have a sufficient knowledge level. Furthermore, the study asked about the symptoms of IDA, and for the morning study, more than half (98.6%) answered correctly about Fatigue and exhaustion, (62.5%) about difficulty breathing, loss of appetite, (94.4%) paleness, and for evening study also (95.9%) answered correctly to Fatigue and exhausting, (86.3%) to difficulty breathing, (91.8%) to loss of appetite, and (83.6%) to paleness. This is a close result conducted in [17] where the majority of students were aware that anemia is indicated by pale skin (78.5%, n =157), weariness (63.5%, n =127), shortness of breath (57%, n =114), and decreased appetite (47.5%, n = 95) [18, 19].

Moreover, close to another study [20] where (56.3%) of the participants suffered from breathing difficulty. Also, it shows that (79.4%), (73.1%) and (66.5%) of them complained of tiredness, constant fatigue, and persistent headaches. In addition (61.9%), (55%) and (65%) of student nurses complained of an inability to concentrate and dizziness [21]. Furthermore, for foods that prevent iron absorption (cereals, dairy products, tea, and coffee more than half of MS (66.6%) said correct, and (78%) of ES students also answered correctly. It is close to other conducted results. [22] Where (96.6%) of participants answered that tea and coffee are one of the reasons for preventing iron absorption [23].

Also, foods rich in iron are (dried fruit seeds, and nuts) MS students (61.1%) answered correctly and ES (58.9%) said correctly too. As well as nutritional sources of iron, the food rich in iron (Red meat, liver, legumes) (87.5%) of MS say correct, and (80.8%) of ES say correct too. This result is close to a result conducted in [20] demonstrates that the respondents fell into an excellent category for eating food derived from plant, animal, and plant-based sources of protein (51.77%, 53.80%, and 61.92%, respectively) [24].

Regarding the role of vitamin C in iron absorption a large number of MS (76.4%) also ES (78%) agreed that Foods

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

rich in vitamin C increase the ability to absorb iron also close to another result of research [25] to evaluate the respondents' awareness and understanding of IDA. 3.3% of anemic respondents and 11.5% of non-anemic respondents were unaware of the function vitamin C plays in iron absorption. The remaining respondents were either very aware or highly aware of the role of vitamin C in iron absorption, compared to 21.9% (n=13) of anemic respondents and 21.3% (n=76) of non-anemic respondents who were just marginally aware of it [26].

Conclusion

The study found that the level of knowledge of morning study is good and that of evening study is slightly lower. Depending on the mean there is no significant statistical relationship in the type of study between morning and evening study. There is a slight discrepancy in the answers between the morning and evening students, but in general, their answers are good

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ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo