Knowledge, Attitudes, and Nutrition Practices of Anemic College Females

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ABSTRACT

Context: The development of correct knowledge, appropriate practice and health-seeking behaviors, and acquiring a positive attitude towards anemia are essential for anemic' females to reach a healthy lifestyle and become free from serious complications secondary to anemia.
Aim: This study aimed to assess knowledge, attitudes, and nutrition practices among anemic' college' females.
Methods: A descriptive study was conducted in Medical Clinics, Students' University Hospital on a purposive non-probability sample of (370) college females included in this study. Data collection tools were self-administered questionnaires covered: knowledge, attitudes, health-seeking behavior, and nutrition practices regarding anemia.
Results: The current study revealed that most participants had incorrect knowledge regarding iron nutrition, incorrect knowledge about anemia as a disease, incorrect practice (94.1%, 65%, and 87.8%), respectively. The minority of them had a positive attitude regarding anemia (13.8%), while more than half have of them had a neutral attitude toward anemia (58.60%).
Conclusion: The study concluded that participants' knowledge and nutrition practices were incorrect while their attitudes regarding anemia were neutral. The study recommended that the necessity of conducting a comprehensive survey of anemic females at the university stage for providing an educational program about anemia. Besides, there is a need for conducting the study on a larger probability sample of college females in different geographical settings.

Keywords: Anemia, attitude, females, knowledge, nutrition practice

1. Introduction

Anemia is documented as the most significant world's widespread dietary disorder, affecting 2.15 billion people, constitute about 25% of the worldwide population *(Habib et al., 2020)*. In developing countries, anemia plays an important role in increased morbidity and mortality among females *(Khaskheli et al., 2016)*. Anemia is frequently occurring due to chronic blood loss or hemorrhagic disease, malabsorption, parasitic hookworm infection, menstrual disorders. Additionally, hemodialysis, poor dietary habits, continuous eating of unhealthy junk food, social class, or a grouping of all these factors might be causes of it. Anemia mostly affects all age and sex groups, especially females at reproductive ages between 15 and 49 *(Harika et al., 2017)*. Also, females with body mass index (BMI) below 19, lack intake of leafy green vegetables, citrus fruits, and protein from animal sources, and having intestinal parasites were indeed at significant risk for anemia *(Shill et al., 2014)*.

Moreover, the foremost cause of nutritional deficiency anemia is the intake of cereal-based diets, which provide non-haem iron of deprived bioavailability, inequality between females' dietetic intake of iron, and their body's physiological demand. Deficiency of micro-nutrients, such as vitamins A, C, B2, B12, and folic acid, may also cause anemia *(Fairweather-Tait & de Sesmaisons, 2019)*. Anemic people commonly report a feeling of weakness, fatigue, general malaise, low concentration, dyspnea with exertion, pallor, depression, fainting, emotional variability, palpitation, headaches, and hair loss—these features related to lowered oxygen delivery to the tissues secondary to Iron deficiency. Besides, chronic iron deficiency anemia (IDA) weakens life quality (QoL), activity tolerance, cognitive and motor development, learning capacity, shortened attention span, and females' productivity. Moreover, anemia results in cardiovascular problems, reduce immune function, and tiredness *(Abbaspour et al., 2014)*.

WHO defines anemia as blood hemoglobin values of less than 13 g/dl in men and 12 g/dl in women. The evaluation of anemia includes complete health history, physical examination, a total blood cell count, peripheral smear, reticulocyte count, serum iron indices, and other diagnostic tests to detect the underlying causes of anemia as screening for celiac disease, Helicobacter pylori infection, autoimmune atrophic gastritis, and fecal occult blood testing *(Bermejo & García-López, 2009)*.

Inappropriate and lack of knowledge and indifferent attitude regarding healthy eating among females and consequent unhealthy eating behavior result in deterioration of their anemic state. That behavior required intense modification. Achieving the desired changes in health and nutrition behavior depends on gaining sufficient knowledge, proper attitudes, healthy practice, and adequate self-efficacy *(Ghosh et al., 2020)*.

Proper awareness and education regarding anemia as a severe disease, diet, and maintaining a healthy lifestyle

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pattern during the females' premarital stage can reduce anemia's prevalence rate *(Ahmed et al., 2018)*.

Nutritional knowledge, practice, health habits, and health-seeking behavior are essential for an anemic female to acquire a healthy lifestyle and become free from serious complications secondary to anemia. Anemic females should follow a balanced, nutrient-rich diet. A particular concern is focused on nutritional inadequacy in collegian females because they may become pregnant and need to cope with the additional dietary, physical, and emotional demands of pregnancy, childbirth, and lactation *(Jalambo et al., 2017)*. The dietary modification included increases iron-containing meals, adding iron absorption enhancers, such as ascorbic acid-rich food (e.g., citrus fruit). Besides, eliminating iron absorption inhibitors, such as tea and coffee, are highly recommended *(Nivedita & Hanthini, 2016)*.

The chief treatment of anemia is to treat the underlying causes of stopping gastrointestinal bleeding, supplements for vitamin deficiency, oral and intravenous administration of iron supplementation, deworming for treatment of parasitic disease like malaria, and providing antenatal care for women. This treatment will help in eradicating the severe anemic problem *(Høivik et al., 2013)*. Health authorities can take proactive steps to eliminate anemia among university females at a specific and communal level as the women's education about anemia, its causes, and health consequence. They should incorporate nutritional training practice between health staff (physician, nurses, and nutritionist) to achieve that *(Bilkis, 2015)*.

Previous studies have shown that unhealthy diets may be due to insufficient knowledge and attitudes regarding anemia. So, in more recent research, knowledge, attitude, and practice form (KAP) were used to evaluate the management of anemia among adolescent females in developed countries *(Hiew et al., 2015)*.

2. Significance of the Study

Anemia is a significant health problem. The prevalence of anemia among women of reproductive age (% of women ages 15-49) in Egypt was 28.50 as of 2016. Its highest value over the past 26 years was 46.20 in 1990, while its lowest value was 28.50 in 2015. Moreover, the prevalence of anemia among Saudi Arabia's women was 42.90 as of 2016. Its highest value over the past 26 years was 55.50 in 1990, while its lowest value was 41.40 in 2011 *(WHO, 2016)*. Very few studies have been conducted on anemia among female college students. There is a need for improving knowledge about anemia, attitudes toward it, and related nutrition practices in adolescents and young women to build healthy generations. Anemia is a preventable health problem. This study aimed to raise awareness, encourage positive attitudes, and follow the right eating habits.

3. Aim of the study

The present study aimed to assess knowledge, attitudes, and nutrition practices among anemic' college' females.

3.1. Research' specific objectives

Specific objectives of this research are to:
- Determine the knowledge of college females regarding anemia.
- Determine the attitudes and health-seeking behavior of the participants.
- Determine the nutrition practices of college females regarding anemia.
- Explore the relation between knowledge, attitude, and nutrition practices of the participants.

3.2. Operational definitions

Nutrition Practice is the evidence-informed delivery of dietary facilities through the use of tailored/accurate diet interventions based on clinical perception derived from case-history, dietary recall, and clinical testing.

Health-seeking behavior is a state in which an individual with a stable health condition is actively seeking ways to alter their habits to move toward a higher level of health. Sound health is the achievement of age-appropriate illness prevention measures, reporting of good or excellent health, and signs or symptoms of the disease, when present, being controlled.

Attitudes are the mature way of thinking or feeling about something or someone. It divides into positive, neutral, or negative.

The anemic female is a female with a pathological condition in which hemoglobin concentration (the oxygen-carrying pigment of the cells) in the circulating blood is below 12g/dl with symptoms of a pallor of the skin and mucous membranes, weakness, dizziness, easy fatigability, and drowsiness.

4. Subjects & Methods

4.1. Research design

The researcher used a descriptive design in this study to describe the participants' knowledge, attitude, health-seeking behavior, and nutrition practices among college' females about anemia. Descriptive research is designed to define the distribution of one or more variables, without affection to any causal *(Hayes, 2017)*.

4.2. Research setting

The study was carried out in Medical Clinics, Hail University Student Hospital. These clinics serve more than 14,000 students and more than 3,000 faculty and staff members. It opens five days weekly from 8 am to 2 pm.

4.3. Subjects

A purposive non-probability sample was consisting of all available college females diagnosed with anemia and attending medical clinics for follow-up. The study consisted of 370 anemic cases. They were selected from a total of 1,480 female college students. The sample size was calculated using free software G* power version 3.1.2. Taking a confidence interval of 95%, Significance level (alpha) at 0.05% power of the study (1-beta) of 8o%, and

effect size of 0.56, the required sample was 370 participants.

Inclusion criteria

The study samples include anemic females aged 18-26 years; selected from all studying levels and different non-medical colleges, without any severe complications such as difficulty breathing, heart abnormalities, and digestive complaints, accepted to participate, and communicated verbally.

Exclusion criteria

The study excluded medical college females (nursing, medicine, pharmacy, physiotherapy) and females with hereditary anemia (such as sickle cell anemia or thalassemia) diagnosed by physicians.

4.4. Tools of the study

4.4.1. Self-administered Questionnaire

It was used for data collection. The researcher prepared tools after reviewing related literature. It was professionally translated to Arabic and translated back to English by a different translator. It consisted of 2 sections.

Section one had three parts:

Part 1 included the demographic data age, residence, marital status, and Body Mass Index (BMI). The researcher calculated BMI by dividing the weight in kg by the square of height in meters. BMI is used to categorize the female into underweight, normal, overweight, and obese (*Nuttall, 2015*).

Part 2 included the assessment of past medical and obstetric history. It included the regularity, frequency, duration of menstruation, heaviness, blood clotting with menstruation, number of children for married and divorced females, contraceptive pills, and intrauterine device (IUD). Besides, the history of chronic disease, blood disorders, blood transfusion, and family history of iron deficiency anemia.

Part 3 encompassed the assessment of health-seeking behavior data about consuming iron and deworming tablets and testing CBC/3months to record Hb level *(Maneze et al., 2016).*

Section 2 included assessing knowledge, attitude, and practice (KAP) sheet regarding anemia adopted from *Macias and Glasauer (2014).* All questions of the KAP questionnaire were in a closed-end format. It involved three parts.

Part I covered knowledge about anemia and iron-containing foods. It asked about causes, manifestations, diagnosis, prevention, treatment, complications, anemia consequences in females. Additionally, the questionnaire asked about the frequency and consumed quantities of food rich in iron, foods that enhance and inhibit iron absorption, the role of tea and coffee in anemia, time of drinking and eating fruits.

Scoring system

The scoring system for knowledge was calculated for each item. The correct answer was scored (one point), while the incorrect answer was scored (zero). The total score for all questions related to knowledge was considered correct if ≥60 %, and incorrect less than 60%.

Part II included the practical part to assess females' hygienic and nutrition practices regarding anemia. It had such questions as "Do you wash your hands with soap after defecation? Do you eat organ meet weekly or regularly? Do you usually or daily eat fresh citrus fruits?"

Scoring system

The answer with yes took one grade, and the answer with no took zero. The total score for all questions related to practice was considered correct if ≥60 %, and incorrect less than 60%.

Part III was a Likert scale to assess female attitudes regarding anemia. It contained (5 statements) about several issues related to anemia. It includes such questions as "Do you think checking Hb every six months is necessary? Is anemia a health problem? Is IDA is a serious problem? Can anemia be corrected? And do you like the taste of iron-rich foods?.

scoring system

The items were rated on a three-point Likert scale. It ranged from 0 (disagree), 1 (partially agree), 2 (agree). The weights for the responses were calculated and changed into a percentage with ≥60% indicating a positive attitude, neutral attitude if a percentage 50-60 while <50% indicating a negative attitude.

4.5. Procedures

The operational design included the preparatory phase, content validity and reliability, pilot study, the procedure, and study limitations. The preparatory phase included developing a structured questionnaire. A period of 2 months was used to establish the research' tools and reviewing the literature from January 2020 to February 2020.

The tools were checked for their content validity by a panel of five experts from the Medical-Surgical Nursing specialty, and modifications were done based on their opinions. KAP Questionnaire's reliability was estimated using Cronbach's Alpha coefficient test, which revealed that each of the three parts of KAP consisted of relatively homogenous items as indicated by the high reliability. An internal consistency for section two-part I = 0.81, part II = 0.85, and Part III =0.73 was obtained.

A pilot study was carried out with 10% of the sample (37 females) to test the tools' applicability, the feasibility of the research process, stability of the tools in different situations, and over some time. The pilot study was also used to estimate the time needed for each subject to fill in the questions. Modifications were done based on the results of the pilot study. Those who shared in the pilot study were excluded from the primary study sample.

The actual fieldwork started from March 2020 to July 2020. The researcher visited Hail University Medical clinics three days/week and interviewed each participant after reviewing her health status from their medical records according to the inclusion criteria. The average time for the completion of questionnaires was 25-30 minutes.

Ethical Considerations: During interviews, the researcher explained the study's aim to the participants and asked for her participation. Moreover, written consent to

participate was taken. The participants were reassured that all the obtained data are confidential and used only for the research. They were also informed of their right to refuse participation or withdraw at any time without giving any explanation. The study will not have any physical, social, or psychological risks. Confidentiality, safety, and privacy were assured for all participants.

Administrative consideration: The researcher fulfilled all the required official approvals. Written official approval to conduct this research was obtained from Hail University Medical clinics' responsible authorities, and ethical approval was received from the Ethics Committee of the College of Nursing.

4.6. Limitations and strength

The study targeted specific females from a non-medical college, and self-report questionnaire responses make possible bias, and the results could not be generalized.

4.7. Statistical analysis

Data was collected throughout history, basic clinical examination, laboratory investigations, and outcome measures. Data coded, entered, analyzed, and tabulated using Microsoft Excel software imported into Statistical Package for the Social Sciences (SPSS version 20.0) software for analysis. Appropriate descriptive statistics were used as percentages, frequencies, mean and standard deviation, and one-way ANOVA test. Regarding P-value, it was considered that non-significant (NS) if P>0.05, significant (S) if P< 0.05.

5. Results

Table 1 represents that 50.3% of the participants were aged 21-23 years, with a mean age of 21.69± 1.69. Besides, 74.3% were from a rural residence. Furthermore, 61.9% of them were singles. Additionally, 66.5% were within average weight with a mean BMI of 23.43 ± 3. 95.

Table 2 shows that 58.4% of the participants had an irregular menstrual period at an average of once a month (61.9%); and a menstrual period of 7 days 71.1%. Their menstruation had blood clotting and abundant flow (56.8% and 56.2%), respectively. The married and divorced females were without children 82.9%. They were also using hormonal pills and IUDs as a means of family planning (57.4%, 33.3%).

Table 3 illustrates that 71.1% of the participants were without chronic diseases and 87.6% without blood disorders and had not received a blood transfusion 70.5% before. At the same time, 36.45 % of those suffering from chronic diseases had kidney disease. Also, 52.7% of them were without a history of familial anemia.

Table 4 shows that 71.9% of the participants have not consumed iron tablets or deworming tablets (85.4%). Also, 76.8% of them were checked the blood picture/3 months, and the mean Hb level of those who have examined the blood picture was 9.16±1.14.

Table 5 clarifies that the participants had incorrect knowledge about the causes, manifestations, diagnosis, preventive measures, and treatment plan of anemia (85.4%, 85.4%, 87.3%, 84.3%, 78.4%), respectively. Also, 67.3% of them had incorrect knowledge about complications of anemia. Only 2.7% of them had the correct knowledge regarding how dangerous anemia was for women.

Figure 1 shows that 94.9% of the study's participants had incorrect knowledge scores about anemia.

Table 6 shows that only 44.8% had correct knowledge regarding frequency and consumed quantities of foods rich in fibers. On the other hand, 87.3% of the participants had incorrect knowledge regarding drinking tea, and coffee within a meal will decrease iron absorption.

Table 7 highlights that the participants had a correct hygienic practice toward handwashing with soap before consuming food, washing vegetables and fruits before eating 68.4%, 82.7% respectively while 31.1% of them walk barefoot outside the home. Only 55.1% of the participants had a correct nutrition practice regarding consuming milk and its products. Besides, 39.2% of them were taking breakfast at home, and 49.7% had taken delivery meals.

Figure 2 show that 87.8 % of the study's participants had incorrect practice about anemia.

Table 8 clarifies that 17.8% of the participants agreed to the necessity of checking Hb/6 months. Also, 58.4% of them partially agreed toward acceptance of the taste of iron-rich food. Only 33.2% of them disagreed that anemia is a health problem.

Figure 3 illustrates that 58.6% of the participants had a neutral attitude score, and only 13.8 % had a positive attitude regarding anemia.

Table 9 shows a statistically significant relationship between the participants' knowledge and their attitude score regarding anemia at p-value (0.034).

Table (1): Frequency and percentage distribution of participants' demographic characteristics (n=370).

Characteristics	No	%
Age		
18-20	88	23.8
21-23	186	50.3
24-26	96	25.9
Mean ±SD of age	21.69±1.69	
Residence		
Urban	95	25.7
Rural	275	74.3
Marital status		
Single	229	61.9
Married	140	37.8
Divorced	1	0.3
BMI		
Underweight	26	7.0
Normal	246	66.5
Overweight	69	18.6
Obese and morbid obese	29	7.8
BMI mean and SD	23.43±3.95	

Table (2): Frequency and percentage distribution of the participants' obstetric history (n=370).

Variables	No	%
Menstrual period regularity		
Regular	154	41.6
Irregular	216	58.4
Menstrual frequency		
Once/month	229	61.9
Twice/Month	139	37.6
>Twice monthly	2	0.5
Duration of period		
1-3 days	21	5.7
7 days	263	71.1
>7 days	86	23.2
Blood clotting during menstruation		
No	160	43.2
Yes	210	56.8
Heavy flow menstruation		
No	162	43.8
Yes	208	56.2
Number of children (n=141)		
No children	117	82.9
≤ 2	24	17.1
Using contraceptive pills (n=141)		
No	81	57.4
Yes	60	42.6
Using IUD (n=141)		
No	94	66.7
Yes	47	33.3

Table (3): Frequency and percentage distribution of participants' health history (n=370).

Variables	No	%
Chronic disease		
No	263	71.1
Yes	107	28.9
Types of chronic diseases (n=107)		
Kidney diseases	39	36.45
Asthma	13	12.15
Heart diseases	17	15.89
GIT problems	19	17.76
Hypothyroidism	3	2.80
Diabetes	16	14.95
Blood disorders		
No	324	87.6
Yes	46	12.4
Blood transfusion		
No	261	70.5
Yes	109	29.5
Family history of (IDA)		
No	195	52.7
Yes	175	47.3

Table (4): Frequency and percentage distribution of participants' health-seeking behavior towards anemia (n=370).

Variables	No	%
Consumption of iron tablets		
No	266	71.9
Yes	104	28.1
Treatment with deworming tablets within the last six months		
No	316	85.4
Yes	54	14.6
Checking CBC every three months		
No	86	23.2
Yes	284	76.8
Mean ± SD of Hb level within three months	9.16±1.14	

Table (5): Frequency and percentage distribution of participants' knowledge about anemia (N= 370).

| Variables	Incorrect		Correct	
	No	%	N	%
Causes	316	85.4	54	14.6
Manifestations	316	85.4	54	14.6
Diagnosis	323	87.3	47	12.7
Prevention	312	84.3	58	15.7
Treatment	290	78.4	80	21.6
Complications	249	67.3	121	32.7
Anemia consequences in females	360	97.3	10	2.7
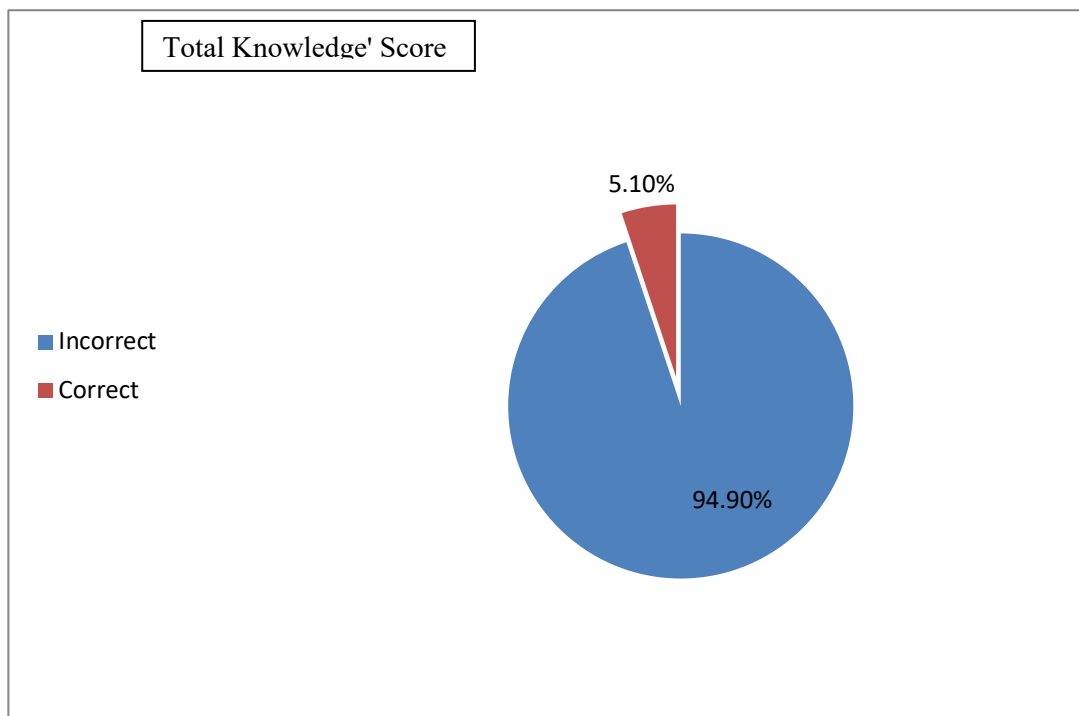
Figure (1): Percentage distribution of studied sample's total knowledge (N= 370).

Table (6): Frequency and percentage distribution of participants' knowledge about iron's nutrition for anemia (N= 370).

Variables	Incorrect		Correct	
	N	%	N	%
Frequency and quantities of organ meat	245	66.2	125	33.8
Frequency and consumed quantities of fresh meat	321	86.8	49	13.2
Frequency and quantities of fish and seafood	311	84.1	59	15.9
Frequency and consumed quantities of foods that rich in fibers	204	55.2	166	44.8
Foods that increase iron absorption	231	62.4	139	37.6
Foods that decrease iron absorption	249	67.3	121	32.7
Preparing meals with iron-rich foods as beef and liver	225	60.8	145	39.2
Make tea, coffee with meals decrease absorption of iron?	323	87.3	47	12.7
Time of eating fruits	217	58.6	153	41.4
Time of drinking tea, coffee.	229	61.8	141	38.1

Table (7): Frequency and percentage distribution of participants' nutrition and hygienic' practices toward anemia (n=370).

Variables	Correct answer	
	N	**%**
Hygienic practices		
Washing hands with soap after defecation	203	54.9
Washing hands with soap before consuming food	253	68.4
Trimming nails regularly (Weekly)	184	49.7
Walking barefoot outside the home	115	31.1
Washing fruits and vegetables before eating	306	82.7
Nutrition Practices		
Consuming cereals regularly	84	22.7
Drinking milk and milk products daily	204	55.1
Taking leafy green vegetables regularly	143	38.6
Taking dry fruits regularly	76	20.5
Eating meats weekly or regularly	92	24.9
Eating fresh meats weekly or regularly	165	44.6
Eating fish and seafood weekly or regularly	112	30.3
Eating usually or daily, fresh citrus fruits?	179	48.4
Drinking usually or daily fresh citrus fruit juice	143	38.6
Drinking daily coffee or tea	133	35.9
Having a regular meal	133	35.9
having a regular breakfast	102	27.6
Where do you have breakfast?		
Workplace	225	60.8
Home	145	39.2
Who prepares your meals?		
From street vendors.	69	18.6
Delivery	184	49.7
Cafeteria.	44	11.9
Parents at home.	39	10.5
Yourself.	34	9.2
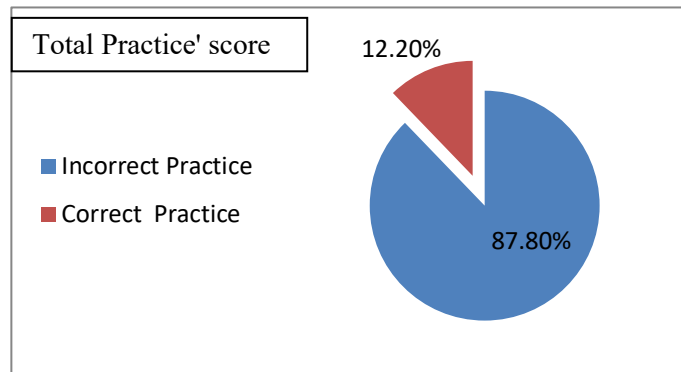
Figure (2): Percentage distribution of the studied sample's total practice' score (N= 370).

Table (8): Frequency and percentage distribution of participants' attitudes toward anemia (N= 370).

| Variables	Disagree		Partially agree		Agree	
	No	**%**	**No**	**%**	**No**	**%**
Do you think checking Hb every six months is necessary?	96	25.9	208	56.2	66	17.8
Is anemia a health problem?	123	33.2	177	47.8	70	18.9
Do you think iron-deficiency anemia is a serious health problem?	108	29.2	189	51.1	73	19.7
Do you think anemia can be corrected?	107	28.9	194	52.4	69	18.6
Do you like the taste of iron-rich food?	86	23.2	216	58.4	68	18.4
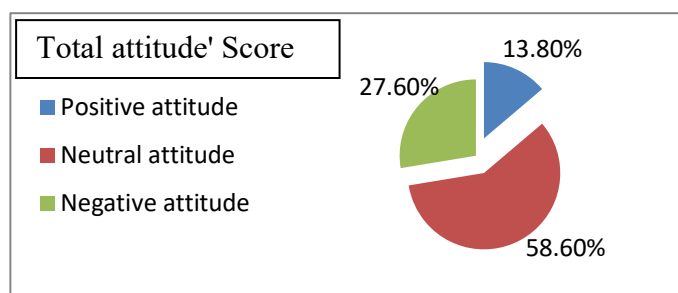
Figure (3): Percentage distribution of participants' total attitudes score toward anemia. (N= 370).

Table (9): The relation between knowledge, nutrition practices, and attitudes (N= 370).

Parameter	Knowledge of anemia		
	Mean±SD	F	P. value
Practice	10.78±2.98	1.441	0.1
Attitude	1.90±0.37	1.982	0.034

F= one-way ANOVA test.

6. Discussion

Different studies discussed the prevalence of anemia among females in reproductive stages. They concluded that anemia affects one-fourth of the world's population, and iron deficiency is the chief cause. A recent study reported the prevalence rate of anemia among Saudi Arabian' women 58.9% (*World Health Organization, 200; Salih et al., 2015*). Therefore, increasing awareness about anemia, healthy nutrition practices, and change attitudes are required to eliminate this disease complication. Studies that assess and analyze patients' performance and attitudes regarding nutrition-related KAP are useful for correcting the misunderstanding. Accordingly, the present study aimed to assess knowledge, attitudes, and nutrition practices among anemic' college' females.

Concerning the demographic characteristics, the present study results show that the participants' mean age was 21.69±1.69. The majority of them were from rural residences. More than half of them were within average weight. The mean of their BMI was 23.4 ± 3.95. These results are similar to the study results conducted on 150 females in Pakistan by *Shahzad et al. (2017)*. They found that the female aged 20-21 years with mean age 20.9±7.13. While these results contrast with *Bhandari*'s (*2014*) results, who reported that 3.3% of the participants' girls were overweight, 76% were anemic. This difference may be due to the difference in the study's sample and place of study.

Regarding the obstetric and health history, the present study's results clear that more than half of the participants were suffering from irregular, heavy menstruation with blood clotting. The majority of them were without a history of chronic disease, and more than half had no past family history of anemia. From the researcher's perspective, continued blood loss with clotting and poor nutrition habits within a family may result in anemia. These results agree with the study that reported 8.8% of females had a heavy period, and 27.5% have clots with menstruation (*Al-Sayes et al., 2011*). These results contrasted with the study conducted in the Saudi context reported that IDA has no significant relationship with the past personal, medical, and gynecological history of the participants (*AlSheikh, 2018*).

Regarding health-seeking behavior, the present results show that most participants ignore consuming iron & deworming tablets despite the majority of them measuring CBC regularly. Also, the mean Hb level of the participants was 9.16±1.14. These results pointed to the participants were not adhering to the medication regimen. Similar results were noticed in the study conducted in India (*Singh et al., 2019*). It reported that only 2.8% of the girls had taken a deworming tablet and iron tablets. Also, *Bhandari (2014)* reported that the mean Hb level among his study's participants was 10.96 gm%.

Regarding general knowledge and iron nutrition for anemia, the present study results show that most participants have incorrect knowledge about anemia (causes, manifestations, diagnosis, prevention, complications, and consequences). Besides, most of their knowledge was incorrect regarding iron's nutrition (consumed organ meat, seafood, drinking tea, and coffee). From the researcher's perspective, this result may be due to incorrect nutrition knowledge, bad diet habits, and widespread junk food consumption. Similar observations were noticed in other studies *Angadi and Ranjitha (2016); Al-Alimi et al. (2018); Aboud et al. (2019)*. Also, *AlSheikh (2018)* found that anemic female students reported lower meat consumption, which is the heme form of iron with an absorption rate of 50%. On the contrary, a study conducted in India showed that 90.7% of Indian adolescents had correct knowledge concerning the cause of iron deficiency anemia (*Kapil et al., 1991*). The discrepancy in the outcomes may be due to the difference in the target population's education, family income, and lifestyle.

The present study results show that most participants had a good hygiene practice toward nutrition and hygienic practice. They washed their hands with soap before eating while the minority was walking barefoot. Also, the majority of them wash fruits and vegetables before consuming them. From the researcher's perspective, this behavior is related to our study's participants' social and Islamic culture. On the

contrary, the contrasted behavior reported in different studies revealed that more than two-thirds of the respondents showed poor hygiene practice; they were not washing their hands with soap and water, neither before eating nor after defecation *(Midzi et al., 2011; Al-Alimi et al., 2018).*

The present study showed that only half of the participants had a correct nutrition practice regarding consuming milk and its products. Besides, nearly one-third of them were taking breakfast at home, and less than half had taken delivery meals. From the researcher's perspective, these results reflect that the participants had bad nutrition habits as inappropriate dietary choices and frequent tea consumption, coffee, and cola with meals. Similar results were found in other studies. They reported that most IDA cases had an inadequate intake of Vit C from fruits and vegetables and infrequently consuming red meat and vegetables less than two servings per week *(Kapil et al., 1991; Midzi et al., 2011; Shahzad et al., 2017).* Besides, the results of the study applied in the Hodeidah region, Yemen. It showed that more than half of the female students were found to be IDA. Most of them were having insufficient healthy iron-rich foods, drinking tea, and irregular breakfast *(Al-Alimi et al., 2018).*

It was clear from the current study that the minority of the participants agree with the necessity of checking Hb/6 months. Also, more than half of them partially agree toward acceptance of the tastes of iron-rich foods. Above half of them had a neutral attitude' score toward anemia. Similar results were found in other studies. Their studied women had a neutral attitude toward anemia *(Aboud et al., 2019; Jalambo et al., 2017).* On the contrary, another study had documented that more than three-quarters of their studied subjects had a positive attitude toward anemia *(Shahzad et al., 2017).*

The present study shows a statistically significant relationship between participants' knowledge about anemia and their attitude. According to the researcher's view, this result reflects that acquiring correct knowledge about the disease may adopt a positive attitude. This result agrees with a study conducted in Tanzania, which concluded that insufficient knowledge and unfavorable attitude were associated with anemia (p-value<0.001) *(Margwe & Lupindu, 2018).*

7. Conclusion

Based on the results, the study concluded that participates' knowledge and nutrition practices were incorrect while their attitudes regarding anemia were neutral. Also, a statistically significant relation was found between the participants' knowledge and their attitudes toward anemia.

8. Recommendations

The study recommended the necessity of conducting a comprehensive survey of anemic females at the university stage for providing an educational program for them about anemia. Additionally, there is a need for conducting the

study on a larger probability sample of college females in different geographical settings.

9. References

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