



Knowledge about Anemia in Pregnancy among Females Attending Primary Health Care Centers in Baghdad

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Abstract

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BACKGROUND: In pregnancy, several physiological changes occur that lead to decrease in the level of hemoglobin. Anemia during pregnancy is a major public health concern in underdeveloped nations, with a high rate of morbidity and death among pregnant women. Inadequate prenatal care, a lack of information about the nutritional requirements of pregnant women, and general low socioeconomic circumstances all contribute to these high rates of morbidity and death. As pregnant women's and husbands' education levels increased, the frequency and severity of anemia decreased in the investigated community of pregnant women.

AIM: This study aims to find out the level of knowledge about anemia in pregnancy among adult females attending primary health care centers (PHCCs) and to find out if there is any association between sociodemographic characteristics of adult females and knowledge about anemia in pregnancy.

METHODS: A cross-sectional study with analytic component conducted in four PHCCs in Al-Adhamiya Health District during a period of 4 months from December 1, 2020, to April 1, 2021. It included 400 females aged between 18 and 45 years attending the selected PHCCs for any complaint. The data had been collected through the distribution of well-designed questionnaire including two parts: Participants' sociodemographic characteristics and knowledge parts.

RESULTS: In this study, overall knowledge score of the participants about anemia in pregnancy showed that 60% had fair knowledge. There were statistically significant associations between knowledge score and age of females, marital status, educational level, occupation, and parity.

CONCLUSION: The majority of Iraqi adult females have fair and acceptable levels of knowledge about anemia in pregnancy. Younger age, being single, low educational level, unemployed, and low parity were associated with worst level of knowledge.

Introduction

Anemia during pregnancy is a significant public health concern in underdeveloped nations, with a high rate of morbidity and death among pregnant women. According to 2011 study, around 800 million children and women worldwide suffer from anemia, including 32 million pregnant women, 496 million non-pregnant women, and 273 million children [1].

The frequency of anemia is particularly high in the developing nations (33–75%). In industrialized nations, around 15% of pregnant women are anemic. Anemia is reported to be prevalent in the UK at a rate of 24.4% prenatally and almost 30% of women are anemic postpartum [2]. In Asia, the average death rate attributable to anemia is estimated to be 7.26%. Africa had a frequency of 57.1%, South East Asia had a prevalence of 48.2%, Europe had a prevalence of 2.1%, and the Western Pacific had a prevalence of 30.7 and 41.8% [3]. According to an Iraqi research, 30.5% of pregnant women had anemia [4].

The education of the husband was discovered to have a considerable influence on women's anemia, much stronger than the education of the wife. In addition, they detected mild-to-severe anemia in the spouses of around 91% of non-educated husbands [5].

Definition of anemia in pregnancy

Anemia is defined by the WHO as a hemoglobin level of <110 g/dl during pregnancy and 100 g/dl postpartum. There are currently no WHO guidelines for the use of various Hb cutoff values for anemia according to trimester, however, it is documented that Hb concentrations decrease by roughly 50 g/dl during the second trimester of pregnancy [6]. On the other hand, the WHO is now conducting a review of the data about the Hb level below which anemia should be classified. Until then, the recommendation committee felt that the current limits of Hb 110 g/dl throughout the first trimester, 105 g/dl after 12 weeks, and 100 g/dl shortly postpartum were the most feasible, although further study is required to confirm them [7]. The high

incidence of anemia in certain areas of the globe may be attributable to pregnant women's lack of awareness about anemia prevention and management techniques. Knowledge may result in a better knowledge of the issue and a shift in behavior. On the contrary, a lack of understanding or misconception deprives the community of the bravery necessary to engage willingly and realistically in accessible initiatives [8].

According to studies, a lack of awareness regarding the causes, management, and prevention of anemia has a detrimental effect on anemic status. In the research region, there was a bivariable correlation between knowledge and anemic status, with informed individuals having fewer incidences of anemia. This association, however, was not seen in multivariable analysis, despite the fact that increased gravidity is a risk factor for anemia. High gravidity women are likely to have more experience and hence a better understanding of the causes and control mechanisms for anemia [9].

Pregnant women with adequate dietary knowledge have been proven to have a higher hemoglobin level. Thus, nutritional counseling and education during prenatal visits may increase mother knowledge of iron-rich meals. A research revealed a similar finding, indicating that after a nutrition education session, there was a substantial increase in the nutritional awareness score, which may help avoid anemia [10]. Provision of nutrition education and an iron-rich diet during pregnancy was shown to be connected with an increased hemoglobin level [11].

Objectives

The objectives of the study were as follows:

1. To find out level of knowledge about anemia in pregnancy among adult females attending PHC centers
2. To find out if there is any association between sociodemographic characteristics of adult females and knowledge about anemia in pregnancy.

Methods

This is a cross-sectional study with analytic component conducted in four primary health care centers (PHCCs) in Al-Rusafa side of Baghdad city/ Al-Adhamiya Primary Health Care District during a period of 4 months from December 1, 2020, to April 1, 2021. There are 10 PHCCs in Al-Adhamiya Primary Health Care District.

A simple random sample of four PHCCs (Al-Dhalik, Al-Adhamiya 2, Al-Suleikh 2, and

Al-Shammasiya PHCCs) were selected from Al-Adhamiya Primary Health Care District, then a simple random sampling technique was used to select 100 participants from each of the selected PHCCs.

The study population included 400 females aged between 18 and 45 years attending the selected PHCCs for any complaint. They informed about the purpose of the study and those who agree to participate were enrolled in the study.

The estimated sample size was allocated proportionately across the chosen PHCCs, and the projected data collection time for each PHCC was calculated based on the estimated number of participants to be gathered from the selected PHCCs.

Daily visits and 4 h/day, 3 days per week, for the assigned period for each PHCC were used to gather data.

Data collection tools

The data had been collected through distribution of well-designed questionnaire including two parts: Participants' sociodemographic characteristics and knowledge parts. The questionnaire was based on previous literatures and was modified according to national needs which were edited, reviewed, revised, and approved by three specialists in Community Medicine Dept.

Questionnaire Part 1: Sociodemographic characteristics included

- Age
- Marital status: Classified into single, married, divorced, and widow
- Educational level: Classified into primary school, secondary school, and higher education
- Occupation: Classified into employee or housewife
- Parity: Classified into nulliparous, primiparous, and multiparous
- Number of children and previous abortions.

Questionnaire Part 2: Females' knowledge about anemia in pregnancy

It included 20 questions (Appendix 1) that measure females' knowledge about anemia in pregnancy.

Females' Knowledge: The responses to questions demonstrating females' ability to comprehend anemia during pregnancy were classified as true, false, and do not know. Each correct answer received 1 point, while questions that were incorrectly answered or stated as "don't know" received no point. The total score may range between 0 and 20, with higher scores indicating a higher level of knowledge.

Likert scale score was used to scoring responses in the knowledge part which is also known as summative scale. It is type of ordinal scale and generally used to quantify knowledge with the use of quartile score of more than 75% considered good, 25–74% fair, and <25% was taken poor.

Pilot study

A pilot study was implemented in one of the selected PHCCs involving 10 participants before starting data collection, to test the clarity and applicability of the study tool, the time needed for filling the questionnaire, to address the difficulties that may be faced during the study, and to determine the reliability of questionnaire.

Ethical considerations and official approvals

Before collecting data, written permission was sought from each female, and all information were kept anonymous. Names have been obliterated in favor of identifying numbers. All information was kept safe on a password-protected laptop and it was utilized only for research reasons.

Administrative approvals were granted from the following

1. Al-Kindy Medical College Committee
2. AL-Rusafa Health Directorate (including approval by ethics review committees) which was handed to the manager of each selected PHCC accordingly.

Statistical analysis

The Statistical Package for the Social Sciences version 26 was used to analyze the data.

Means, standard deviations (SDs), and ranges are used to describe the data.

Frequencies and percentages are used to portray categorical data.

The Chi-square test was employed to determine the relationship between knowledge and specific pieces of information, however, the Fisher's exact test was utilized when the predicted frequency was <5.

$p < 0.05$ was deemed significant.

Results

A total of 400 adult females were recruited for this study.

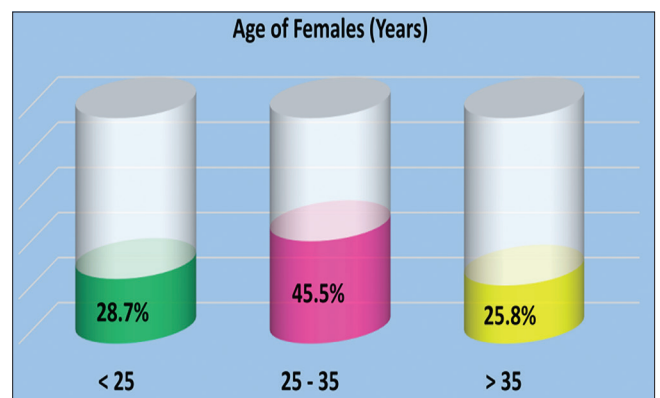


Figure 1: Distribution of the study participants by age

Age of the recruited females ranged from 18 to 45 years with a mean of 30.54 years and SD of ± 7.84 years. The highest proportion of the studied females (45.5%) was found in the age group of 25–35 years (Figure 1). In this study, 86% of females were married, 22.8% were pregnant, 54.5% had a higher level of education, and 81% were housewives. Less than three-quarters of the enrolled females (70.9%) were multiparous, and 27% of them had previous abortion (Table 1).

Table 1: Distribution of the participants by sociodemographic and clinical characteristics

Clinical characteristics	No. (n = 400)	Percentage
Marital status		
Single	56	14.0
Married	344	86.0
Pregnancy status		
Pregnant	91	22.8
Not pregnant	309	77.2
Educational level		
Primary school	94	23.5
Secondary school	88	22
College or higher education	218	54.5
Occupation		
Employee	76	19.0
Housewife	324	81.0
Parity	n=344	
Nulliparous	57	16.6
Primiparous	43	12.5
Multiparous	244	70.9
Abortion	n=344	
Yes	93	27.0
No	251	73.0

Knowledge responses

Results of the participants' responses about knowledge questions showed that the highest percentage of correct responses (95.5%) was to the question that says that iron supplement should be based on doctor prescription, followed by 89% toward the question about anemia does affect pregnancy outcome. The highest proportion of incorrect answers (64.8%) was recorded when the participants were asked about iron supplement should be stopped without doctor's consultation if women experienced side effects such as nausea, followed by 58.2% toward pregnant women should not take iron supplement if she is on healthy diet. About 58% of the recruited females were not sure that anemia is the hemoglobin level in the blood below normal, while 51% were not sure that it is better

Table 2: Distribution of the participants' responses about knowledge toward anemia

Knowledge questions	Responses		
	Correct no. (%)	Incorrect no. (%)	Not sure no. (%)
Anemia is the hemoglobin level in the blood below normal	168 (42.0)	0 (0)	232 (58.0)
Decreased iron intake in diet causes anemia	352 (88.0)	24 (6.0)	24 (6.0)
General weakness and palpitation are not symptoms of anemia	250 (62.5)	70 (17.5)	80 (20.0)
Green leafy vegetables are not a Source of Iron	270 (67.5)	68 (17.0)	62 (15.5)
Not eating red meats, fish, and poultry for long periods does not cause anemia	323 (80.8)	49 (12.3)	28 (7.0)
Drinking tea immediately after meal can cause anemia	187 (46.8)	94 (23.5)	119 (29.8)
Excessive tea consumption can cause anemia	185 (46.3)	94 (23.5)	121 (30.3)
Anemia does affect pregnancy outcome	356 (89.0)	22 (5.5)	22 (5.5)
Anemia can affect fetal growth	247 (61.8)	79 (19.8)	74 (18.4)
Birth spacing cannot contribute in prevention of anemia during pregnancies	68 (17.0)	177 (44.3)	155 (38.8)

to take iron supplement with orange juice to increase its absorption when asked about birth spacing cannot contribute in prevention of anemia during pregnancies (Tables 2 and 3).

Table 3: Distribution of the participants' responses about knowledge toward anemia

Knowledge questions	Responses		
	Correct no. (%)	Incorrect no. (%)	Not sure no. (%)
Ordinary local food is enough to prevent anemia in pregnancy	195 (48.8)	139 (34.8)	66 (16.5)
Pregnant women should not take iron supplement if she is on healthy diet	131 (32.8)	233 (58.2)	36 (9.0)
Iron supplement should be based on doctor prescription	382 (95.5)	10 (2.5)	8 (2.0)
Missing routine visits to PHC centers does not affect pregnancy outcome	321 (80.3)	61 (15.3)	18 (4.5)
Routine screening for anemia should be done at least 3 times during pregnancy	224 (56.0)	62 (15.5)	114 (28.5)
It is better to take iron supplement with orange juice to increase its absorption	83 (20.8)	113 (28.2)	204 (51.0)
Best time to take iron supplement is before meal	188 (47.0)	114 (28.5)	98 (24.5)
It is enough to consume iron rich food once a week to prevent anemia	213 (53.2)	99 (24.8)	88 (22.0)
Iron supplement should be stopped without doctor's consultation if you experienced side effects as nausea	123 (30.8)	259 (64.8)	18 (4.5)
Compliance to medication intake of iron supplement is not essential in anemia prevention	297 (74.3)	29 (7.2)	74 (18.5)

Total knowledge score

In this study, the mean total knowledge score was 11.40 ± 4.81. The overall knowledge score of the participants about anemia in pregnancy was as follows: 62 (15.5%) had poor knowledge, 240 (60%) had fair knowledge, while the remaining 98 (24.5%) had good knowledge score (Figure 2).

The distribution of recruited females by knowledge score and certain sociodemographic characteristics showed that there was a statistically significant association between knowledge score and age of females, marital status, educational level, occupation, and parity. The proportion of poor knowledge score was significantly higher among the females who aged <25 years (26.1%, p = 0.001), single (32.1%, p = 0.001), had lower educational level (35.1%, p = 0.001), housewife (18.8%, p = 0.001), and nulliparous (24.6%, p = 0.003). No significant association was found between knowledge score of the

respondents and each of pregnancy status (p = 0.112), and history of abortion (p = 0.174) (Table 4).

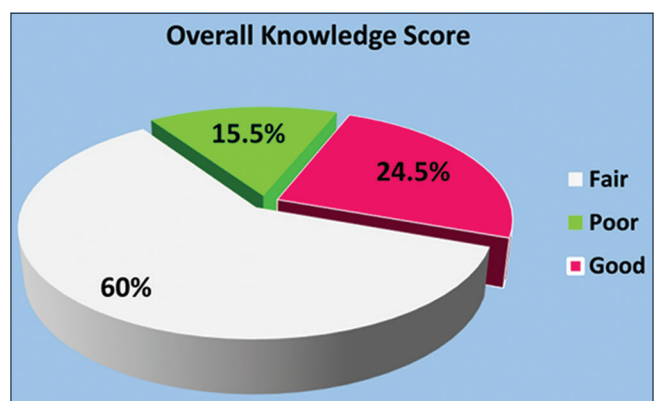


Figure 2: Distribution of the respondents by total knowledge score about anemia in pregnancy

Discussion

Knowledge responses

In regard to the participants' response about knowledge questions in our study, most of the participants believe that anemia does affect pregnancy outcome, also most of them believe that decreased iron intake in diet causes anemia. The highest percentage of participants believe that iron supplement should be stopped without doctor's consultation if you experienced side effects such as nausea, while more than half of them believe that pregnant women should not take iron supplement if she is on healthy diet.

In comparison to other studies, Senior and Najeeb in a study conducted on 100 Iraqi women in 2019, reported that the level of knowledge of pregnant women about anemia was poor about signs and symptoms

Table 4: Distribution of the participants by knowledge score and certain demographic and clinical characteristics

Variable	Knowledge score			Total (%) n = 400	p-value
	Poor (%) n = 62	Fair (%) n = 240	Good (%) n = 98		
Females' age (years)					
<25	30 (26.1)	73 (63.5)	12 (10.4)	115 (28.7)	0.001
25-35	28 (15.4)	114 (62.6)	40 (22)	182 (45.5)	
> 35					
Marital status					
Single	18 (32.1)	34 (60.7)	4 (7.1)	56 (14.0)	0.001
Married	44 (12.8)	206 (59.9)	94 (27.3)	344 (86.0)	
Pregnancy status					
Pregnant	12 (13.2)	63 (69.2)	16 (17.6)	91 (22.8)	0.112
Not pregnant	50 (16.2)	177 (57.3)	82 (26.5)	309 (77.2)	
Educational level					
Primary School	33 (35.1)	53 (56.4)	8 (8.5)	94 (23.5)	0.001
Secondary School	21 (23.9)	57 (64.8)	10 (11.4)	88 (22.0)	
College or higher edu.	8 (3.7)	130 (59.6)	80 (36.7)	218 (54.5)	
Mother's occupation					
Employee	1 (1.3)	35 (46.1)	40 (52.6)	76 (19.0)	0.001
Housewife	61 (18.8)	205 (63.3)	58 (17.9)	324 (81.0)	
Parity					
n=44		n=206	n=94	n=344	
Nulliparous	14 (24.6)	34 (59.6)	9 (15.8)	57 (16.6)	0.003
Primiparous	9 (20.9)	22 (51.2)	12 (27.9)	43 (12.5)	
Multiparous	21 (8.6)	150 (61.5)	73 (29.9)	244 (70.9)	
Abortion					
n=44		n=206	n=94	n=344	
No	37 (14.7)	149 (59.4)	65 (25.9)	251 (73.0)	0.174
Yes	7 (7.5)	57 (61.3)	29 (31.2)	93 (27.0)	

of anemia, reasons for taking supplements, food that prevents from anemia, and cause and consequence of anemia during pregnancy that represented 98%, 87%, 90%, and 100%, respectively, and overall awareness among study sample about anemia during pregnancy was poor [12]. In addition, Thabit, 2017's study (which included 200 mothers who attended selected PHCCs in Baghdad) reported that mothers' knowledge responses regarding the etiology of anemia were 75%, 64%, and 60.5% correct regarding insufficient iron-rich foods intake, frequent pregnancies and deliveries, and short birth spacing. While the lowest proportion of the right replies is 25%, 29.5%, and 41.55% for warm symptoms, some chronic conditions, and vegetarian diet, respectively [13]. In the Rizvi research (which included a sample of 400 pregnant women), two-thirds of respondents (66%) had heard of anemia as a health concern, while the remaining 34% were unaware of the illness. When questioned about the causes of anemia, 42% of respondents were unable to name any. Pregnancy was the most often cited reason by 36% of responders. Only 22% ascribed it to a deficiency of iron-rich items in the diet [14].

According to Ghimire *et al.* study (in which 197 pregnant women with IDA were participated), practically all mothers (98%) are aware that an insufficient iron-containing diet is the cause of anemia during pregnancy. When asked about sources of foods high in iron, more than two-thirds of moms (67.5%) mentioned green leafy vegetables, followed by meat, fish, and eggs (49.2%) [14].

Our study revealed that the majority of participants believe that iron supplement should be based on doctor prescription, anemia does affect pregnancy outcome. Furthermore, half of females were not sure that it is better to take iron supplement with orange juice to increase its absorption, while more than one-third was not sure when asked about birth spacing cannot contribute in prevention of anemia during pregnancies.

Differently in Saudi Arabia, Aboud *et al.* in 2019 reported that 69.3%, 55.3%, 63.7%, 59.0%, and 56.3% of the studied subjects had incorrect answer regarding food with high Vitamin C content, food that inhibits iron absorption, food that contains high iron content, ways of prevention, and causes of IDA, respectively [15]. In comparison to Thabit study in 2017 in Iraq, a different findings noticed, as they found that mothers knowledge responses regarding ways of prevention and treatment of anemia during pregnancy showed highest percent of correct responses 97% and 92% for intake of iron-rich foods such as meat and iron, while the lowest percent of correct responses 14% and 14.5% for intake of Vitamin C and blood transfusion if necessary [13]. In contrast, in the Ghimire and Pandey study, nearly three-quarters of mothers (76.7%) stated that iron-rich foods should be consumed, 72.1% affirmed the use of iron medication, 21.8% highlighted

increasing the birth interval, 10.2% stated treating worm infestation, and 9% pointed out the regular antenatal care (ANC) visits as preventive measures of anemia in pregnancies [16]. The reasons for this variation among above-mentioned studies might be due to different methods of data collection, different sample size, thoughts about the absence of free medical care for pregnant women in some countries, patients' concern about the safety of medicine, and high cost of medical care.

Anemia during pregnancy demands timely care through the use of comprehensive management techniques [17]. Numerous treatments, including iron supplements for select well-defined populations; dietary fortification; efficient deworming; education and awareness development; and provision of hygiene services and better water sanitation, are found to be beneficial when combined [18]. In addition, health education and awareness raising about sanitary behaviors, better sanitation, and adequate water supply all contribute to parasite infection reduction [19].

Total knowledge score

Our study reported that mean total knowledge score was 11.40 ± 4.81 . The overall knowledge score about anemia in pregnancy was as follows: Few percentages had poor knowledge, nearly two-third of them had fair knowledge, while the remaining quarter had good knowledge score. A comparable findings noticed in Appiah *et al.* study in 2020 (in which 598 participants were enrolled), as they observed that nearly 13.5% of the pregnant women had high knowledge, while 58.4% and 28.1% of them had fair and low knowledge, respectively [20]. On the other hand, a slightly higher results observed in Al-Abedi *et al.* study in 2020, in which 280 patients enrolled, the majority of women had a moderate level of knowledge (76.1%) and 19.2% had poor knowledge while only 4.7% had good knowledge (87). Differently, Thabit in a study done in 2017, found that overall percent score for the main domains was good 71% for etiology of disease, excellent 91% for signs and symptoms of anemia, good 75% for complications of anemia, and also 75% regarding ways of prevention and treatment [13]. The current finding is different from a study conducted among pregnant women by Sing *et al.* in 2014 (in which 406 persons were enrolled), which revealed that 56% of the women had insufficient knowledge of anemia [21]. Furthermore, Jiji and Rajagopal study in 2014 (including 50 women, included 30 pregnant women and 20 non-pregnant women as control group), which assesses the knowledge and risk factors of anemia among pregnant women in Libya revealed that all of the women had moderate knowledge about anemia [22]. Different sample size and educational level of parents with socioeconomic state were the most important determinants of differences observed.

Our study revealed a statistically significant association between knowledge score and age of females, marital status, educational level, occupation, and parity. The proportion of poor knowledge score was significantly higher among the females who aged <25 years, single, had lower educational level, housewife, and nulliparous women ($p = 0.001$, for each variable), while no significant association was found with pregnancy status ($p = 0.112$) and history of abortion ($p = 0.174$). In comparison to Appiah *et al.* study in 2020, they observed a significant association between knowledge about anemia and the subdistrict where the pregnant woman resides ($p = 0.003$), the woman's educational status ($p = 0.002$), and occupational status ($p \leq 0.001$), pregnant women who attained basic, secondary, and tertiary education were more likely to have high knowledge than women who never went to school ($p = 0.002$). Again, women who were engaged in non-formal and formal jobs were more likely to have high knowledge than those who were unemployed ($p < 0.05$) [20]. An agreement noticed in Rizvi study, when reported that as the level of education increased, awareness is increased, concluded that education had a profound impact on the level of awareness of the respondents, regarding anemia, its causes and prevention, as well as iron-rich foods and the benefits provided by the supplements ($p < 0.001$). No significant relationship ($p > 0.001$) between knowledge and the subsequent practices was observed [14]. Different findings noticed in Ghimire and Pandey study, in which found that there was a significant association between level of knowledge and educational status ($p = 0.002$), while found that there was no significant association between knowledge and sociodemographic characteristics such as maternal age, ethnicity, occupation, economic status, and parity [16].

A variety of factors can explain the differences observed among above studies, in addition to different sample size, age of the participant is one of factors, as explained by fact that increased age was an important factor to determine the association of anemia with pregnancy, which, in turn, related to the educational level, as those with higher education are more aware about anemia, its cause and prevention. Furthermore, parity is an important factor, since multiparous women with a history of anemia during pregnancy have more experience than nulliparous women in avoidance of anemia.

Sociodemographic data

In our study, the mean and SD of age was 30.54 ± 7.84 years, ranged from 18 to 45 years old with nearly half of them were found in the age group of 25–35 years old. About 86% of females were married, 22.8% were pregnant, half of them had a higher educational level, 81% housewives, and less than three-quarters were multiparous. In comparison to other studies, different

results observed in Al-Abedi *et al.* study in 2020 (in which 280 pregnant women enrolled), as reported that (25.5%) were within the age group (20–24 years), while 31.3% of them had their first pregnancy. Regarding the educational level, 50.3% were primary school graduate and the majority (56.8%) were housewives [23]. Senior and Najeeb study in 2019 (that included 100 women), the mean and SD of age was 28.18 ± 6.031 , in which 53% were within the age group of 21–30 years old, the highest percentage 33% of the study sample had secondary school level of education, the highest percentage 84% were housewives, and the majority of them were nulliparous that represents 39% [12].

Getahun *et al.* published a research in 2017 with 217 study participants. The mean and SD of the research participants' ages were 26.87 ± 5.703 years, respectively. The bulk, 213 (98.1%), was married; 94 (43.3%) were elementary school graduates; 99 (45.6%) were housewives; and 168 (77.4%) were urban dwellers [24]. Abdelgader *et al.* in their study (2014) observed a different result, as noticed that age distribution of the studied group was between 18 and 42 years old, nearly, 88.7% were housewives while 11.3% were governmental employees [25]. Finally, in a Turkish research done in 2010 by Karaoglu *et al.* (in which 823 pregnant women were involved), the average age was 26.5 ± 0.2 years. About 10.2% of females were illiterate, whereas 55.1% completed basic education. The majority (63.7%) were in their second trimester, 36.3% were in their third trimester, and 33.7% were primipara [26]. Differences observed in the results of the above studies are also attributed to socioeconomic status of the participants and its effect on attendance to ANC centers and the coexistence of comorbid conditions.

Limitations of study

The difficulty observed among pregnant women for attendance to the ANC center due to the health curfew applied by Iraqi government to control COVID-19. Some of participants were non-cooperative and neglect most of the dates for follow-up.

Conclusion

1. The majority of Iraqi adult females have fair and acceptable levels of knowledge about anemia in pregnancy
2. Younger age, being single, low educational level, unemployed, and low parity were associated with worst level of knowledge.

Recommendations

We need more efforts to educate the parents to improve their knowledge toward anemia in pregnancy as:

1. There is a need to encourage PHC physicians (especially those who are working in ANC units) to give advices to attendants toward the risk of anemia in pregnancy
They are better to be motivated to provide an advice to the population and how can this help preventing and controlling anemia in pregnancy.
2. We need to deliver messages that raising awareness of the community about anemia in pregnancy using television, radio, newspapers, and social media
3. Establishing well-planned, organized and structured health education program on nutrition styles during pregnancy
4. Females' lower level of education was strongly linked to a state of poor knowledge. Therefore, raising the awareness about the importance of education for females is essential
5. Same larger studies are recommended to be done in other regions of Iraq with larger participants to give researchers and policy-makers a general idea about females' knowledge about anemia in pregnancy and its consequences on mothers and their babies.

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