

Assessment of pregnant women's knowledge and preventive practices about iron deficiency anemia at Assiut city

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Abstract:

Background: The most common single deficiency condition worldwide is iron insufficiency. By raising pregnant women's awareness of anemia and related preventive measures, efforts have been undertaken to lessen pregnancy-related iron shortage anemia. **Aim:** To assess pregnant women's knowledge and preventive practices about iron deficiency anemia **Methods:** This study used a descriptive cross-sectional research. **Setting:** The investigation took place in prenatal outpatient clinics, in three key locations to encompass Assiut City (women's health hospital university, Al Muteaa Family Medicine Center, and Qolta MCH Center). **Sample:** about 350 pregnant women in their second and third trimesters who were attending antenatal outpatient clinics for follow-up. **Tools:** Structured interview questionnaire and preventive practices tool were used. **Results:** Poor level of knowledge and unsatisfactory preventative actions related IDA were found in 59.4% and 58.9%, respectively, of the studied women. **Conclusion:** Most of the studied women had poor knowledge about Iron Deficiency Anemia and unsatisfactory practices. **Recommendations:** Pregnant women should receive counseling and health education to improve their awareness and preventive practices regarding iron deficiency anemia.

Keywords: Iron deficiency anemia, Knowledge, Pregnant women & Preventive practices.

Introduction:

Under nutrition and public health issues are frequently associated with iron deficiency anemia (IDA), which is particularly prevalent in underdeveloped nations. Without enough iron in the blood, the body is unable to make enough hemoglobin, which is required to carry oxygen, resulting in anemia of iron (Alabedi et al., 2020).

A condition known as IDA is defined by a considerable loss in the body's ability to store iron as a result of both extrinsic and intrinsic factors. Types involved microcytic and hypochromic anemia. Pregnant and nursing women, elderly adults, people who have lost a lot of blood, people who eat poorly nourishing foods, infants, women who are childbearing age, and those from low socioeconomic backgrounds are high risk categories for IDA (Abd Elhakeem, 2019).

Due to the progression of pregnancy, the need for iron increases quickly during pregnancy. For a woman weighing an average of 55 kg, the physiological requirement for iron is roughly 1000–1200 mg. These levels consist of about 250 mg for blood loss after delivery, about 500 mg for an expansion of red blood cell mass, and about 350 mg for fetal and placental growth (Hidayana et al., 2022).

The World Health Organization (WHO) defines IDA during pregnancy as hemoglobin less than 11 g/dl, regardless of the gestational trimester. According to

Elzeiny et al. (2019), in Egypt, the prevalence of iron deficiency anemia during pregnancy varied from 45.5% to 73.8% in the years 2008, 2015, 2018, and 2019. The three severity classifications for anemia in pregnancy are severe anemia (Hb level 7-4.5 g/dl), moderate anemia (Hb level 7-8.9 g/dl), and light anemia (Hb level 9-10.9 g/dl). (Serbesa & Tefera, 2019).

Deficit in iron can happen during pregnancy for a variety of reasons, including inadequate intake of foods high in iron, poor iron absorption, increased need (27g/day), and insufficient iron stores in the body, which causes a drop in hemoglobin levels. A low level of hemoglobin limits the amount of oxygen that can be transported through the blood. This could result in symptoms including general weakness, headaches, exertional dyspnea, easy fatigue, palpitations, disorientation, pallor, and irritability (Sabra et al., 2020).

Iron deficiency anemia was linked to a number of maternal side effects, including placental insufficiency, elevated risks for postpartum hemorrhage, a major cause of maternal mortality, a strong relationship with cardiac failure in women, and an inability to engage in physical activity. From decreased milk production to an increased risk of postpartum depression, postpartum problems can occur (Serbesa & Tefera, 2019). Additionally, it raises the risk of morbidity and death in the perinatal

and neonatal period as well as among pregnant women. It may also result in premature birth, low birth weight kids, insufficient iron storage in the newborn, and premature delivery (Ayidh et al., 2020).

How iron deficiency anemia is treated during pregnancy depends on its severity and underlying causes. To prevent and treat mild and severe iron deficiency anemia, dietary modifications and oral iron supplements can be employed. While severe, unresponsive, or urgent cases of iron deficiency anemia (less than 7g/dl) necessitate blood transfusions or parenteral iron preparations (intravenous and intramuscular) (Sayad et al., 2022). Anemia is a major health problem that can be fought with better knowledge and adherence to healthy eating habits. Consuming iron-rich foods when cooking at home and having appropriate information are two strategies to prevent iron insufficiency, depending on the culture and awareness of women. While low maternal education is associated with low birth weight, premature neonatal mortality, and preterm in women with significant iron deficiency (Alabedi et al., 2020).

A nurse significantly contributes to promote and maintain the health of women through her employment in various healthcare settings. The basic goals of prenatal care are to keep an eye on the expectant mother and the fetus during the pregnancy and to look for anything that might make the pregnancy dangerous rather than risk-free. The provision of accurate information about daily nutritional requirements throughout pregnancy, common complaints that may arise during pregnancy and methods to manage them through nursing nutritional education about IDA during pregnancy—ideally without the use of medications to prevent their side effects—is another focus of prenatal care (Beulen et al., 2020).

Significance of the study:

Pregnancy anemia is a frequent medical condition that has negative effects on both the mother and the developing baby. It is one of the most significant health issues affecting women worldwide between the ages of 18 and 45. Anemia during pregnancy is one of the major risk factors thought to be responsible for 20–40% of maternal deaths, either directly or indirectly through preeclampsia, cardiac failure, antepartum hemorrhage, postpartum hemorrhage, and puerperal sepsis. It is also thought to be responsible for low birth weight, which raises the percentage of infant mortality in developing nations (Shi et al., 2022).

Severe occurrences of iron deficiency in pregnant women lead to bad outcomes for the unborn children,

including low birth weight, intrauterine growth retardation, preterm, birth asphyxia, and intrauterine mortality. About 30% of people in the third world have anemia, and IDA accounts for 75% of all forms (Abd Elhakeem et al., 2019).

Pregnant Egyptian women had limited awareness of iron deficiency anemia. Hemoglobin level monitoring is used as a cheap and easy test to determine the iron status of an individual. Pregnant women's understanding and preventive practices of Anemia are notably low and can be a key contributor to pregnancy-related issues (Figueiredo et al., 2018), so the researcher interested in assess pregnant women's knowledge and preventive practices about iron deficiency anemia.

Aim of the study:

This study aimed to assess knowledge and preventive practices of pregnant women about iron deficiency anemia at Assiut city

Research Questions:

- What is the level of the pregnant women's knowledge about IDA?
- What is the level of the pregnant women's practices regarding prevention of IDA?

Subjects & Methods:

Four designs (technical, operational, administrative, and statistical design) were used to discuss the topic and methodologies of the current study.

Technical design:

Research design:

Descriptive cross sectional was hold for this study.

Setting

The investigation was carried out in prenatal outpatient clinics, at three main areas to cover Assiut city (women's health Hospital University, Al Muteaa Family Medicine Center, and Qolta Maternal and Child Health (MCH) Center).

Subjects:

Sample Type: A convenience sample was used.

Sample size: 350 pregnant women in their second and third trimesters were involved in the study. The population totals for the sample derived using the Robert Mason formula were (5622), the level of significance was 1,96%, the availability rate was 0, and the remaining property was 0.05.

Inclusion criteria:

- All pregnant women undergoing follow-up care.
- Second and third trimester of pregnancy.

Exclusion criteria:

- Women refused participation in the study

Tools of data collection:

The following tools were used to collect data:

Tool (I): A systematic questionnaire for interviews was used in this study:

This tool was designed and utilized by the researcher based on a survey of the literature and consulting expertise in this area, it was structured to include the following parts:

Part 1: Socio-demographic characteristics as: Name, age, residence qualifications, working status, year of marriage, BMI and family's income.

Part 2: obstetrical history as gravidity, parity, history of abortion, number of still births, and number of living children, mode and place of last delivery.

Part 3: Current pregnancy data as: Hemoglobin level and iron supplementation during current pregnancy.

Part 4: assessment of pregnant women knowledge regarding IDA, as definition, types, causes, risk factors, signs and symptoms, diagnostic procedure, prevention, sources of iron rich foods, food that help or hinder Iron absorption, iron deficiency anemia problems and their consequences on a mother's and a fetus's health (Ahamed et al., 2018).

Knowledge's scoring system:

Twelve questions made up the knowledge score in its entirety. That had 58 items because there were multiple responses to 8 of the questions. Each correct answer received a score of 1, while incorrect and do not know responses received a score of 0. The total score (58) fell into the following categories:

- **Poor** <50% (<29 score).
- **Fair** 50-75 (29-43 score).
- **Good** > 75% (>43 score).

(Abd Elhakeem, 2019) & (Dhaher, 2019)

Tool (II): Preventive practices of pregnant women toward IDA: Regular antenatal visits, avoiding tea with meals, regular Hb monitoring during pregnancy, taking iron supplements daily, taking iron supplements with orange juice, and avoiding smoking were among the 12 questions used to gauge how pregnant women prevent IDA. Having a habit of eating red meat, chicken, or fish, eating three regular meals every day, taking folic acid supplements if woman is currently pregnant, and finally including green leafy vegetables in diet when taking iron supplements.

Practice scoring system:

Each question received two points if the response was "done" and one point if it wasn't. When the percent score was below 70% (17) considered unsatisfactory and above 70% (17), the total practices score (24) was deemed satisfactory (Serbesa & Iffa, 2018) & (Ayidh et al., 2020)

Tools Validity:

The study's instruments were evaluated by three experts from Assiut University's faculty of nursing and department of obstetrics and gynecological

nursing to ensure that they accurately measured the variables they were designed to. The tools were modified in accordance with the panel's assessment of the instruments' language clarity, content appropriateness, and item sequencing.

Tools Reliability:

The researcher used reliability for tools to examine the internal consistency of the tools. Cranach's alpha test was used to evaluate reliability. It was assessed using a reliability item taken out of the SPSS program's scale and analysis. For the structured interviewing questionnaire it was 0.788, and for the preventative practices tool it was 0.844.

Operational design:

A description of the preliminary phase, a pilot study, and file work were all included in the design.

Pilot study:

After questionnaire was prepared, it was pre tested on 10% of cases that took into account 35 pregnant women to determine the validity and reliability of the research tools. The subjects who took part in the pilot study were also included in the study because there were no substantial alterations made to the research instruments.

Field work:

The procedure of gathering the study's data took place over a period of about six months, beginning at the beginning of December 2022 and concluding at the end of May 2023. There were the following parties:

Preparatory phase:

Based on review of literature, the instruments were developed and a standard scale, also they were verified for validity by experts in obstetrics & gynecology. The researcher reviewed the associated literature of the current study locally and internationally utilizing text books, journals, and key publications.

Procedures:

- The authorized individual provided the study with formal clearance to proceed.
- The investigator met each woman separately (who visits antenatal clinics).
- After explaining the nature and goal of the study to the participant, she gave her verbal consent to participate voluntarily.
- The researcher spoke with each woman separately and gathered information on socio-demographic characteristics, including age, educational attainment, occupation, etc.
- Information about the woman's reproductive history, such as gravidity, parity, history of abortion, number of stillbirths, etc., was gathered.
- Also current pregnancy information, such as recent hemoglobin level and iron supplementation, were also collected from the study women.

- The woman was questioned by the researcher about her knowledge of IDA, including its definition, types, causes, risk factors, signs and symptoms, diagnostic process, preventive, sources of foods high in iron, etc.
- Information on preventive measures taken by pregnant women against IDA was also tracked.

Administrative design:

Permission was gained from the manger of Woman Health Hospital at Assiut University, Al Muteaa Family Medicine Center, and Qolta MCH Center.

Ethical considerations:

- The Qolta MCH Center, Al Muteaa Family Medicine Center, and Woman Health Hospital at Assiut University all provided official approval.
- As well as clearance from the nursing school's ethical committee at Assiut University.

Results:

Table (1): Frequency distribution of the studied women according to their socio demographic data (n=350)

Socio demographic data	N	%
Age/years		
Less than 25 year	98	28.0
25-34 year	185	52.9
35 or more	67	19.1
Age/years (Mean±SD)	30.25±7.89	
Residence		
Urban area	144	41.1
Rural area	206	58.9
Qualifications:		
Illiterate& read and write	63	18.0
Elementary & preparatory certificate	77	22.0
Secondary certificate	121	34.6
University or higher certificate	89	25.4
Working status		
Housewives	241	68.9
Employed	109	31.1
Years of marriage		
Less than 2 years	63	18.0
2-5 year	161	46.0
5 years or more	126	36.0
BMI:		
Underweight	19	5.4
Normal	265	75.8
Overweight	39	11.1
Obese	27	7.7
Family income		
Less than 2000 pound	47	13.4
2000-<5000 pound	250	71.5
5000 pound or more	53	15.1

- Before include each woman in the study sample and after clearly and simply explaining the purpose of the study, an informed oral consent was obtained from each woman.
- They ensured the secrecy and anonymity of all data collected.
- All of the pregnant women who were studied had the option to discontinue the research at any point.

Statistical analysis:

Statistical Package for Social Sciences (SPSS) version 26 was used to organize, categorize, code, tabulate, and analyze the data that had been obtained. To determine whether there is a relations between two qualitative variables, data were presented through tables and figures utilizing numbers, percentages, means& SD along with the Pearson test. At a P-value of 0.05, statistical significance was deemed to exist.

Table (2): Frequency distribution of the studied women according to their reproductive history (n=350)

Items	N	%
Number of gravidity		
Primigravida	115	32.9
Multigravida	235	67.1
Number of Parity		
Non	120	34.3
Primipara	56	16.0
Multipara	174	49.7
History of abortion		
Yes	119	34.0
No	231	66.0
Number of living children		
Not present	124	35.5
1-2	97	27.7
3-4	95	27.1
> 4	34	9.7
Number of still birth		
Not present	315	78.5
1-2	31	14.6
> 2	4	6.9
Mode of last delivery		
Primigravida	115	32.9
Normal vaginal delivery	199	10.3
Cesarean section	36	56.8
Place of last delivery		
Primigravida	115	32.9
Women health hospital	81	23.1
Private clinic or hospital	154	44.0

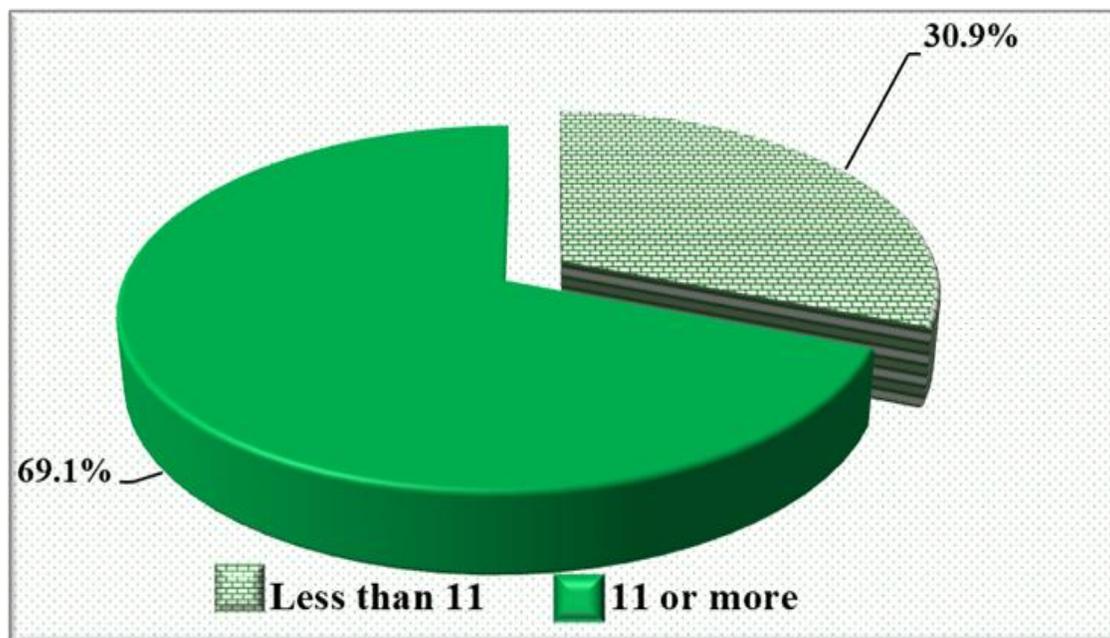


Figure (1): Frequency distribution of the studied women according to hemoglobin level: (n=350)

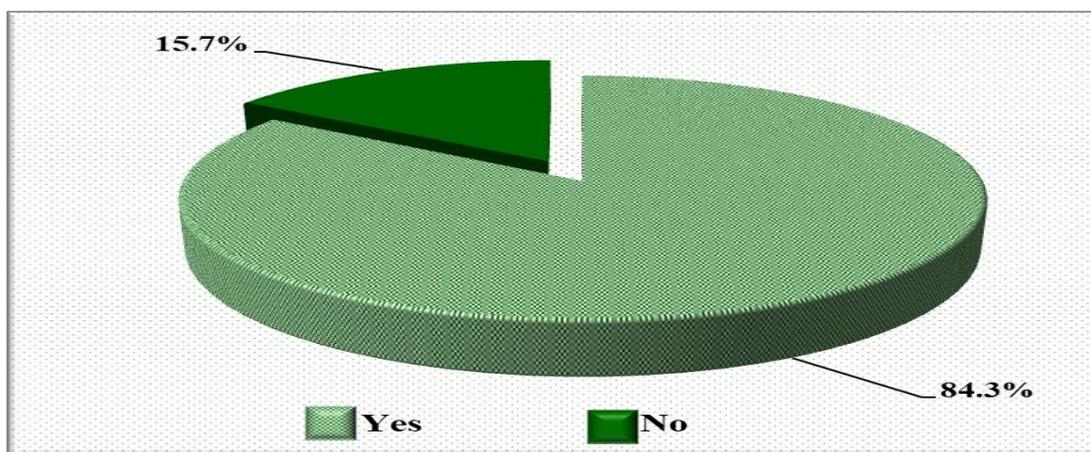


Figure (2): Frequency distribution of the studied women according to iron supplementation during current pregnancy (n=350):

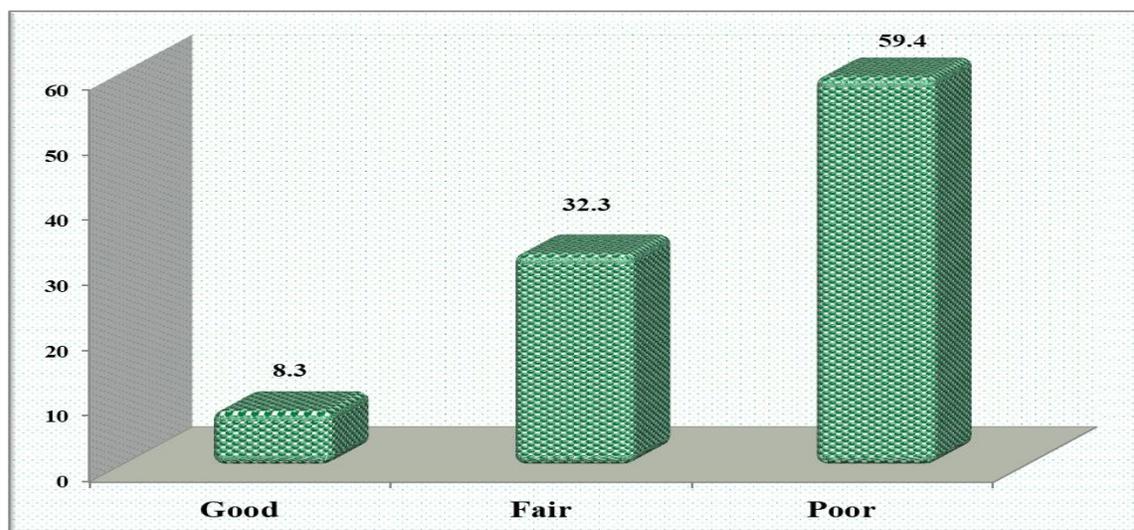


Figure (3): Total knowledge score level of the studied women about IDA (n=350)

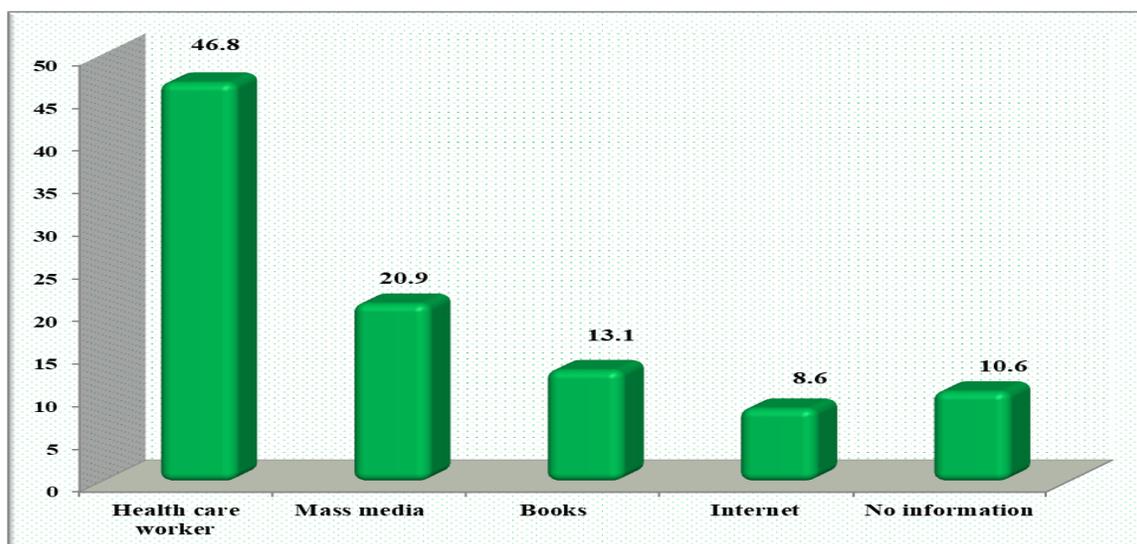


Figure (4): Source of the studied women information regarding knowledge about IDA (n=350)

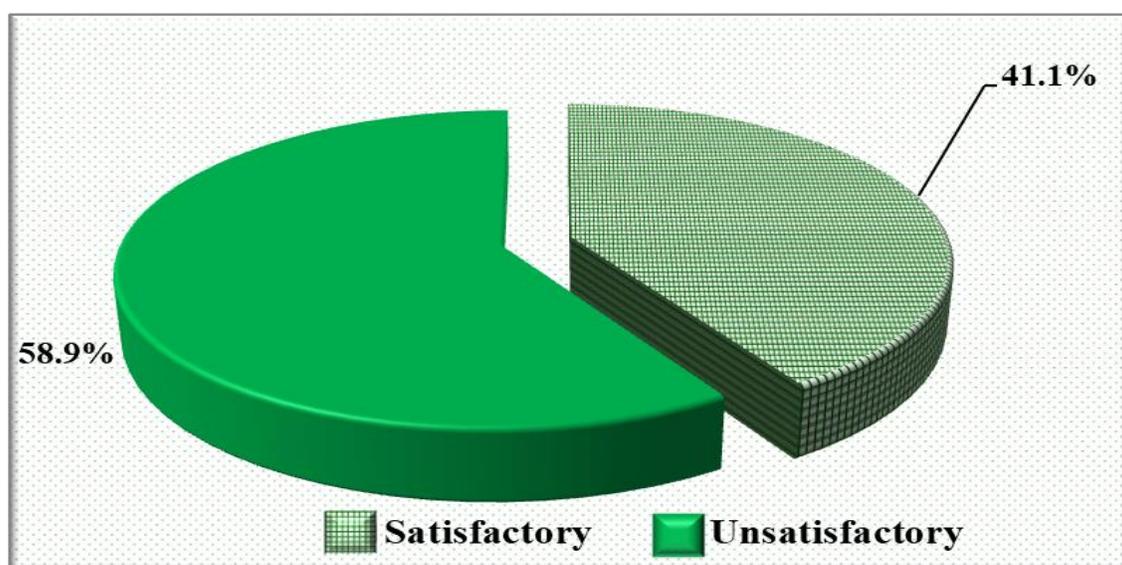


Figure (5): Total preventive practices level of the studied women about IDA (n=350)

Table (3): Relation between total knowledge about IDA and socio demographic data (n=350)

Socio demographic data	Total knowledge about IDA						P-value
	Good (29)		Fair (113)		Poor (208)		
	N	%	N	%	N	%	
Age/years							0.021*
Less than 25 year	6	20.7	22	19.5	70	33.7	
25-34 year	18	62.1	72	63.7	95	45.6	
35 or more	5	17.2	19	16.8	43	20.7	
Residence							0.003**
Urban area	15	51.7	32	28.3	97	46.6	
Rural area	14	48.3	81	71.7	111	53.4	
Working status							0.011*
Housewives	18	62.1	67	59.3	156	75.0	
Employed	11	37.9	46	40.7	52	25.0	
Qualifications:							0.001**
Illiterate& read and write	1	3.4	13	11.5	49	23.6	
Elementary & preparatory	7	24.1	15	13.3	55	26.4	
Secondary certificate	13	44.9	41	36.3	67	32.2	
University or higher	8	27.6	44	38.9	37	17.8	
Years of marriage							0.001**
Less than 2 years	8	27.6	13	11.5	42	20.2	
2-5 year	12	41.4	37	32.7	112	53.8	
5 years or more	9	31.0	63	55.8	54	26.0	
BMI:							0.081
Underweight	4	13.8	2	1.8	13	6.3	
Normal	19	65.6	87	77.0	159	76.3	
Overweight	5	17.2	16	14.1	18	8.7	
Obese	1	3.4	8	7.1	18	8.7	
Family income							0.168
Less than 2000 pound	1	3.4	14	12.4	32	15.4	
2000-<5000 year	22	75.9	77	68.1	151	72.6	
5000 years or more	6	20.7	22	19.5	25	12.0	

(**) Highly statistical significant difference

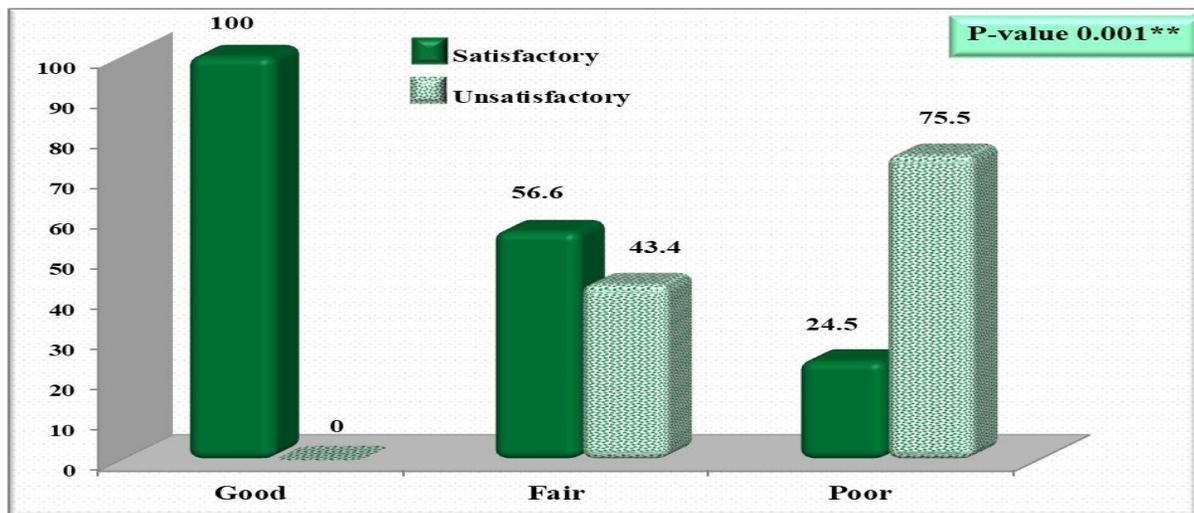
(*) Statistical significant difference

Table (4): Relations between total preventive practices level regarding IDA and socio demographic data (n=350)

Socio demographic data	Preventive practices regarding IDA				P-value
	Satisfactory (144)		Unsatisfactory (206)		
	N	%	N	%	
Age/years					
Less than 25 year	35	24.3	63	30.6	0.154
25-34 year	85	59.0	100	48.5	
35 or more	24	16.7	43	20.9	
Residence					
Urban area	47	32.6	97	47.1	0.007**
Rural area	97	67.4	109	52.9	
Working status					
Housewives	94	65.3	147	71.4	0.227
Employed	50	34.7	59	28.6	
Qualifications:					
Illiterate& read and write	14	9.7	49	23.8	0.001**
Elementary & preparatory	28	19.4	49	23.8	
Secondary certificate	53	36.9	68	33.0	
University or higher	49	34.0	40	19.4	
Years of marriage					
Less than 2 years	29	20.1	34	16.5	0.477
2-5 year	61	42.4	100	48.5	
5 years or more	54	37.5	72	35.0	
BMI:					
Underweight	8	5.6	11	5.3	0.146
Normal	106	73.5	159	77.2	
Overweight	22	15.3	17	8.3	
Obese	8	5.6	19	9.2	
Family income					
Less than 2000 pound	18	12.5	29	14.1	0.762
2000-<5000 year	102	70.8	148	71.8	
5000 years or more	24	16.7	29	14.1	

(**) Highly statistical significant difference

(*) Statistical significant difference



(**) Highly statistical significant difference

(*) Statistical significant difference

Figure (6): Relation between total knowledge and preventive practices level regarding IDA (n=350)

Table (1): Illustrates that 52.9% of studied women their age from 25-34 years with a mean± SD of 30.25±7.89, about 58.9% of them lived at rural area. Pointed to qualifications, it was illustrated that 34.6% and 25.4% of the women had a secondary and university or higher certificate respectively. Regarding working status 68.9% of them were housewives. Concerning years of marriage, 46.0% of the studied women had a year of marriage from 2-5 year. Related to BMI, 75.8% of them were normal. About 71.5% of the studied women had a family income ranged from 2000-<5000 pound.

Table (2): Illustrates reproductive history of the studied women, and reported that 67.1% and 49.7% of the studied women were multigravida and multipara, about 34.0% of them had a history of abortion. About 27.7% and 14.6% of them had from 1-2 living children and still birth respectively. About 56.8% of the studied women had CS delivery, about 44.0% of them delivered at private clinic or hospital.

Table (3): Clarifies relations between total knowledge level about IDA and socio demographic data, and found that there were highly statistical significant relations between total knowledge level and residence, qualifications and years of marriage at PV <0.01. And there were statistical significant relations between total knowledge level and age and working status at PV <0.05. Also there were no statistical significant relations between total knowledge level and BMI and family income at PV >0.05

Table (4): Reports relations between total preventive practices level regarding IDA and socio demographic data, and showed that there were highly statistical significant relations between total preventive practices level and residence and qualifications at PV <0.01. And there were no statistical significant relations between total preventive practices level and age, working status, years of marriage, BMI and family income at PV >0.05

Figure (1): Demonstrates that 30.9% of the studied women had a last hemoglobin level of <11 and 69.1% of them had last hemoglobin level of ≥ 11.

Figure (2): Clarifies that 84.3% of the studied women received iron supplementation during current pregnancy and 15.7% of them hadn't iron supplementation during current pregnancy.

Figure (3): Demonstrates that 8.3%, 32.3% and 59.4% of the studied women had good, fair and poor level of knowledge about IDA respectively.

Figure (4): Clarifies that 46.8%, 20.9% and 13.1% of the studied women gained their information from health care workers, mass media and books respectively and 10.6% of them hadn't any information.

Figure (5): Revels that 41.1% and 58.9% of women

had satisfactory and unsatisfactory preventive practices level regarding IDA respectively.

Figure (6): Demonstrates that there was highly statistical significant relation between total knowledge and preventive practices level regarding IDA at p-value <0.01.

Discussion:

Under-nutrition and public health issues are frequently associated with iron deficiency anemia (IDA), which is particularly prevalent in underdeveloped nations. Due to the increased blood volume during pregnancy as a result of the greater support to the embryo and placenta, pregnant women are at an elevated risk for IDA (Alabedi et al., 2020). Because of a lack of understanding, poor socioeconomic conditions, and a lack of prenatal treatment, women in the developing nation frequently become pregnant while having preexisting anemia. (Sultana et al., 2019). So, present study aimed to assess knowledge and preventive practices of pregnant women about iron deficiency anemia at Assiut city.

According to the current study, near one tenth, near one third and near three fifths of the investigated women had good, fair, or poor levels of knowledge on IDA, respectively. Similar findings reported by Padma & Jan, (2020), who implemented their research in Bangalore to determine the effect of a structured teaching program on antenatal mothers' knowledge regarding the treatment of iron deficiency anemia and discovered that only 8.4%, near one third, and more than three fifths of the women under study had adequate, average, and inadequate levels of knowledge about IDA, respectively.

And Kamel, et. al., (2022), who conducted research on pregnant women's knowledge and practices regarding iron deficiency anemia in Egypt and found that one fifth, more than one third, and near half of the women under study had good, average, and poor levels of knowledge about IDA, respectively.

Also, near to previous findings, Appiah et al., (2020), who studied pregnant women's compliance with Ghana's anemia prevention strategies being used in the Juaboso District and found that near one-sixth, near one-third, and near three-fifths of the women had good, fair, and low levels of knowledge about anemia, respectively. This similarity made it impossible to teach them the vital information about IDA, which should be controlled by offering them a variety of approaches to do so.

On the other side, Al-Sattam et al., (2022), who achieved their study in Iraq to determine the level of knowledge about anemia in pregnancy among adult females visiting primary health care centers (PHCCs) and to determine if adult females' socio-demographic

traits and knowledge about anemia in pregnancy are related in any way, and reported that slightly more than one sixth of the studied females had poor knowledge, three fifths of them had fair knowledge, while the remaining (slightly less than one quarter) had good knowledge score. Different findings may be related to assessing knowledge about anemia as a general, different sample (adult females) and different setting (Iraq).

Also **Abdu & Hussein, (2019)**, who applied their study in Ethiopia to evaluate pregnant mothers' knowledge, attitudes, and practices for the prevention of iron deficiency anemia, it was discovered that, respectively, near two-fifths of the expectant moms studied and more than three-fifths of them had low and good knowledge. Dissimilarity may be related to different in the setting and the studied sample' culture and customs.

It was determined that fewer than half, just over one fifth, and near one sixth of the women in the study received their information about IDA from health care professionals, the media, and books, respectively, while more than one tenth of them had no knowledge of the condition. In line with earlier discoveries, **Serbesa & Tefera, (2019)**, who completed their study to evaluate the knowledge, attitudes, and practices of pregnant women about the prevention of iron deficiency anemia, and it was revealed that more than half of the women in the study received their information from healthcare professionals. Also **Padma & Jan, (2020)**, who reported that near one fifth and near one third of the studied participants gained their information from books& newspaper, and electronic source respectively.

Incongruent with above findings **Sayad et al., (2022)**, who carried out their study in Yemen to ascertain pregnant women's information and attitudes regarding Iron Deficiency Anemia and its effects, and found that only one fifth of the women gained their knowledge from health facility workers. These findings illustrated that health team had a little role in publishing awareness that should be increased by providing continuous counseling from health team to the women.

Concerning total practice level, current study clarifies that more than two fifths and more than one half of the women had satisfactory and unsatisfactory preventive practices level regarding IDA respectively. similar opinion reported by **Abd Elhakeem et al., (2019)**, who proceeded their study to assess pregnant women attending primary health centers in Tabuk region's knowledge, attitudes, and practices addressing iron deficiency anemia prevention, and showed that more than two fifths of the studied women had good practices level regarding IDA.

And **Balcha et. al., (2023)**, who applied the study to assess maternal awareness of anemia and methods for prevention in public health settings, and illustrated that more than one half of the women had good practices level regarding anemia. Also **Daka et. al., (2018)**, who applied the study to assess pregnant women's information and practices on anemia prevention, and found that more than one half of the women had good practices level regarding anemia. Also **Appiah et al., (2020)** reported that near two fifths of the studied women had good practices level regarding prevention of anemia among pregnant mothers. Similarity between findings reported that there are lacks of awareness regarding preventive practice of anemia among pregnant mothers that should be managed by providing a continuous training and counseling regarding preventive practice of IDA.

Incongruent with previous findings, **Dhafer, (2019)**, who implemented research on the knowledge, attitudes, and practices of women on iron deficiency anemia and iron supplements in comparison to their hemoglobin (Hb) blood level, reported that the great majority of the studied women had poor practices level regarding prevention of IDA. Difference may be back to changing in the study setting, culture and values that may have an effect on the women's practices level.

The current study reveals that there is a highly statistically significant association between total knowledge and preventative practices level with regard to IDA, with a p-value of 0.01. In line with earlier discoveries, **Alabedi et al., (2020)**, who performed their study to determine the relationship between pregnant women's knowledge, practices, and socio-demographic factors in relation to the prevention of iron deficiency anemia, and reported that there was highly statistical significant relationship between total knowledge and preventive practices level regarding IDA at p-value <0.01. Also **Kamel, et al., (2022)**, **Appiah et al., (2020)**, and **Balcha et al., (2023)** reported the same findings. This agreement supports the relation between the women's knowledge and its effect on changing their practices.

The actual study demonstrates that there was a highly statistically significant association between total knowledge level and domicile, qualifications, and years of marriage at p-value 0.01 with regard to the relations between total knowledge level concerning IDA and socio demographic data. Additionally, at a p-value of 0.05, there was a statistically significant correlation between overall knowledge level, age, and employment position. Additionally, at a p-value of >0.05, there was no statistically significant association between total knowledge level, BMI, and family income.

On the same line, **Ayidh et al., (2020)**, who conducted their research to assess pregnant women's information, attitudes, and practices (KAP) regarding IDA, and found that there was highly statistical significant relation between total knowledge level and education at $PV < 0.01$., and there was no statistical relation between total knowledge level and family income at $PV > 0.05$. Also **Al-Sattam et al., (2022)**, who reported that there were statistical relations between total knowledge level and females' age, educational level and occupation at p -value < 0.01 . And **Alabedi et al., (2020)**, showed that there were highly statistical significant relation between total knowledge level and age, educational level and occupation at p -value < 0.01 .

Otherwise, **Dhafer, (2019)**, reported that there was highly statistical significant relation between total knowledge level and educational level at $PV < 0.01$. And there were no statistical significant relation between total knowledge level and age, educational level and occupation at $PV > 0.05$. And **Kamel, et al., (2022)**, illustrated that there were no statistical significant relation between total knowledge level and age, educational level and occupation at $PV > 0.05$. All previous finding supported the role of level of education in increasing women's knowledge regarding IDA.

The current study demonstrates that there were highly statistically significant relationships between total preventive practices level and residency and qualifications at $PV 0.01$ regarding links between total preventive practices level regarding IDA and socio demographic data. Additionally, at $PV > 0.05$, there were no statistically significant relationships between the amount of total preventive practices and age, employment status, the number of years of marriage, BMI, or family income.

Similar with previous findings, **Appiah et al., (2020)**, illustrated that there were no statistical significant relationship between total preventive practices level and age and occupation at $PV > 0.05$. Also **Ayidh et al., (2020)**, who concluded that the degree of overall preventive behaviors and educational attainment had a statistically significant relationship ($PV 0.05$). Additionally, at $PV > 0.05$, there were no statistically significant relationships between the amount of overall preventive practices and age, employment status, or family income.

When red blood cell count, size, or hemoglobin concentration falls below defined cut-off values, anemia is present. Low hemoglobin levels during pregnancy favor the change of placental angiogenesis, which limits the amount of nutrients that are available to the fetus and, as a result, results in fetal growth retardation and low birth weight. (**Kuma et al., 2021**).

The current study shows that more than two thirds of the women tested had hemoglobin levels below 11, and near one third of the women analyzed had hemoglobin levels over 11. On the same line, **Ahamed et al., (2018)**, who carried out their study at Women Health Hospital, Assuit university to gauge pregnant women's knowledge and attitudes regarding iron deficiency anemia and reported that near one-third of the women had a hemoglobin level of 11, and more than two-thirds of them did not, bringing the study's application to the same setting and participants full circle. Also **Balcha et al., (2023)**, showed that slightly more than one third of the studied women had a hemoglobin level of < 11 and slightly near two thirds of them had hemoglobin level of ≥ 11 . On the other side, **Sayad et al., (2022)** reported that that less than two fifths of the women had a hemoglobin level of < 11 . This difference may be back to change in the study setting.

More than one sixth of the women in the study didn't take iron supplements during their current pregnancies, according to the actual study. Near to previous findings **Ahamed et al., (2018)**, revealed that more than a quarter of the women in the study had not taken an iron supplement during their pregnancy. This demonstrates the critical necessity to educate pregnant women about the value of iron supplements during pregnancy in preventing anemia by offering them counseling.

According to the current study, more over one third of the analyzed women had a history of abortion, and near two thirds and less than half of them were multigravida and multipara, respectively. More than a quarter of them had 1-2 live children, while near a sixth experienced stillbirths. More over half of the women in the study received CS, and more than two-fifths of them gave birth in a private clinic or hospital. Similar findings reported by **Abd Elhakeem et al., (2019)**, who illustrated that near one third of the studied women were primgravida. And **Sayad et al., (2022)**, who showed that less than two fifths of the studied women were primgravida. On the other side **Ayidh et al., (2020)**, reported that the vast majority of the studied women were multigravida and maultipara. As regard socio demographic data, actual study shows that more than one half of the women their age group from 25-34 year with a mean \pm SD of 30.25 ± 7.89 , near three fifths of them lived at rural area. Regarding working status more than two thirds of them were housewives. Concerning years of marriage, near one half of the women had a year of marriage from 2-5 year. Related to BMI, more than three quarter of them were normal. More than two thirds of the studied women had a family income ranged from 2000- $<$ 5000 pound. Also more than one third of the women had a secondary education.

Similar findings were reported by **Sayad et al., (2022)**, who reported that more than one half had an age group from 20-29 year, near three fifths had a moderate financial status and less than one half had a secondary level of education. Also **Abd Elhakeem et al., (2019)** and **Dhafer, (2019)** had a similar findings.

Conclusion:

Most of the studied women had poor knowledge and unsatisfactory practices regarding iron deficiency anemia

Recommendations

- Pregnant women should get counseling and health education by nurses to improve their awareness and preventative measures regarding iron deficiency anemia.
- A straightforward, clear-cut, and customer-friendly counseling service at ANC facilities that emphasizes the consumption of iron-rich foods, the value of making reservations as soon as a woman knows she is pregnant, and iron supplementation.
- Doctors and nurses should concentrate on the demand for iron supplement adherence counseling and follow-up.
- The nurses should instruct all pregnant women for regular monitoring of hemoglobin level for early detection of anemia.
- The present study's replication using larger samples and alternative contexts.

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