

Effect of Nutritional Guideline on Knowledge, Attitude and Practices of Pregnant Women regarding Prevention of Iron Deficiency Anemia

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Abstract

Background: Iron deficiency anemia is a global public health problem; the pregnant women are the most vulnerable groups to iron deficiency anemia during pregnancy causing maternal deaths. **The aim of this research:** Was to evaluate the effect of nutritional guideline on knowledge, attitude and practices of pregnant women regarding prevention of iron deficiency anemia. **Design:** A quasi-experimental design (one group pre- posttest). **Sample:** A convenient sample of 90 pregnant women were included in the present study. **Setting:** The present study was conducted in outpatient clinics of obstetrics and gynecological department in Benha university hospitals. **Tools of data collection:** Three tools were used: **Tool I:** A structured interviewing questionnaire. **Tool II:** Modified likert scale. **Tool III:** Assessment of practices sheet for preventive iron deficiency anemia. **Results:** The result of the present study revealed that there was a highly statistically significant difference in relation to total studied women' knowledge, attitude and practices about prevention of iron deficiency anemia pre and post phases of nutritional guideline implementation. Moreover, there was a positive statistically significant correlation between total knowledge, total attitude and total practice scores pre and post phases of nutritional guideline implementation. **Conclusion:** The nutritional guideline had a positive effect on improving knowledge, attitude and practices of pregnant women regarding prevention of iron deficiency anemia. **Recommendations:** Counseling and health education programs should be applied on pregnant women to improve knowledge, attitude and practices regarding prevention of iron deficiency anemia during pregnancy.

Key words: Iron deficiency anemia, nutritional guideline, pregnant women.

Introduction

Anemia is one of the most common hematological disorders that occur during pregnancy. It has serious consequences on human health, social and economic development and associated with increased risk of morbidity and mortality, especially in pregnant women. The world health organization estimates that approximately two billion people are anemic based on hemoglobin concentrations below recommended threshold (Montufar et al., 2021).

Anemia defined as a condition of low level of hemoglobin in the blood as evidenced by a reduced quality or quantity of red blood cells which decreases oxygen-carrying capacity to tissues. Even in normal pregnant women, the hemoglobin concentration decreases with dilution as the volume of circulating blood increases. Anemia is considered as mild if the Hb level is (9.0-11.0 g\dl), moderate (7.0-9.0 g\dl) and severe (4.0-7.0 g\dl) (Hillegass, 2022).

Iron deficiency anemia during pregnancy is the most common form of

anemia encountered during pregnancy. It occurs due to lack of iron in the red blood cells. Iron deficiency anemia can arise in early pregnancy that a few of women find out they are anemic early in the pregnancy. The main reason for women being anemic in early pregnancy is that their daily diet did not contain enough iron-rich foods in the months and perhaps years before the pregnancy (**Lowdermilk et al., 2019**).

According to the World Health Organization (WHO), the prevalence of anemia among pregnant women is 41.8% worldwide (**Abdelmordy et al., 2022**). In Egypt, about 25% of pregnant women suffer from anemia and mainly result from variety of causes such as inadequate intake of iron, vitamin B12, folate, parasitic infections, blood loss as heavy menstrual bleeding and Internal bleeding as a peptic ulcer, a hiatal hernia, a colon polyp and malabsorption of iron (**Brown et al., 2019**). Symptoms associated with iron deficiency anemia in pregnant women include fatigue, lethargy, dizziness, palpitations, shortness of breath, ringing in ears, taste disturbances, pallor, pallor of the conjunctival mucosa, cold hand and feet and brittle nails or spoon nail and pica. (**Bhadra and Deb, 2020**).

In pregnant women, anemia increases the frequency of complications of pregnancy and childbirth. As the risk of maternal death, the rate of prematurity increases of low birth weight and perinatal mortality. In addition , antepartum and postpartum hemorrhage are more common in anemic women and are more often fatal because anemic women cannot tolerate blood loss (**Georgieff, 2020**).

Iron deficiency anemia treatment in pregnant women is important of providing adequate iron support during and after delivery. There are various possible forms of treatment of iron- deficiency anemia. Iron can be given by mouth oral iron therapy, most pregnant women with iron deficiency,

especially those diagnosed in the first trimester, by intramuscular injection or intravenous injection. Intravenous iron form may be preferred in those who have severe anemia and whose iron level does not increase with oral treatment in the third trimester of pregnancy or cannot tolerate oral iron. It is also possible to deliver iron by giving a blood transfusion (**Abdelrahim, 2021**).

Nutrition specific interventions are those measures directed towards the primary causes of nutritional anemia, mainly from poor dietary intake or malabsorption of essential nutrients (iron, vitamin B12 and folic acid). Thus, the preventive measures for nutritional deficiency anemia are aimed at increasing dietary diversity, improving bioavailability of nutrient rich food, make fortified food accessible to all and advocate for diets that improve absorption. Also, pregnant women should be recommended to take the iron and folic acid supplementation early in pregnancy to avoid complications related to iron and folic deficiencies (**Mcintosh, 2021**).

knowledge and attitude of anemia among pregnant women are considerably low and can be a major cause to pregnancy related problems. So, proper awareness and nutritional guidelines regarding diet and lifestyle pattern during pregnancy can reduce the prevalence rate of anemia. Nutrition education is the foundation of any program intending for nutritional improvement. Knowledge about proper nutrition and a balanced diet during pregnancy are considered important for the well-being of both mother and fetus. Nutritional guidelines are a widely used strategy to improve the nutritional status of woman during pregnancy (**Ross et al., 2020**).

The nurse plays an important role in early detection and management of IDA. The role of nurse has focused on early recognition and detection of the women at risk, counseling

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related to antenatal visits, diet, women's responsibilities in iron supplementation, nursing care for anemic women during antenatal period, labor and postpartum period (**Leanne, 2020**).

The nurse's role as a counselor is important in informing the pregnant women about condition, proper diet and iron supplementation according to informed schedule for antenatal visits, diet and iron supplementation. Addressing dietary iron intake plays a crucial role both in the prevention of iron deficiency and in the management of early iron deficiency (**Leifer, 2022**).

Significant of the study:

Anemia in pregnancy is an important public health problem. Anemia affects maternal and fetal health. It affects the general wellbeing of the mother and increases the risk of maternal morbidity and mortality, cardiac failure, antepartum hemorrhage, postpartum hemorrhage and puerperal sepsis as well as preterm birth, fetal growth retardation and low birth weight which contributes to increased percentage of infant mortality in developing countries (**Vanié et al 2022**).

According to the World Health Organization (WHO), the prevalence of anemia among pregnant women is (41.8%) worldwide. The prevalence of anemia in developed countries is (14%), in developing countries it occurs up to (51%) (**Alghabbashi et al., 2022**). In Egypt, about (25%) of pregnant women suffer from anemia and mainly result from inadequate intake of iron. In Africa (57.1%), in Asia (48.2%), Europe (25.1%), America (24.1%) and in India (33.0%) of pregnant women suffer from anemia (**Dewi et al., 2022**). There is no study was done at faculty of nursing, Benha University about this study, so the researcher selected this area of research to evaluate the effect of nutritional guideline

on knowledge, attitude and practices of pregnant women regarding prevention of iron deficiency anemia.

Aim of this research

This research aimed to evaluate the effect of nutritional guideline on knowledge, attitude and practices of pregnant women regarding prevention of iron deficiency anemia.

The aim was achieved through:

- 1- Assessing of pregnant women's knowledge, attitudes and practices regarding iron deficiency anemia.
- 2- Designing and implementing a nutritional guideline for pregnant women with iron deficiency anemia.
- 3- Evaluating the effect of nutritional guideline on knowledge, attitude and practices of pregnant women regarding prevention of iron deficiency anemia.

Research hypothesis:

- H1 - Pregnant women who receive the nutritional guideline would have a higher level of knowledge about iron deficiency anemia than before.
- H2 - Pregnant women who receive the nutritional guideline would have a positive attitude regarding prevention of iron deficiency anemia than before.
- H3- Pregnant women who receive the nutritional guideline would have satisfactory practices regarding prevention of iron deficiency anemia than before.

Subjects and Method

Research design:

A quasi-experimental design (one group pre- post test) was used to achieve the aim of the study.

Research setting:

The study was conducted at outpatient clinics of obstetrics and gynecological department in Benha University Hospitals, Benha city, Egypt.

Sample type: A Convenient sample was used.

Sample size:

A total sample of (90) pregnant women were included in the study. According to the following inclusion criteria:

1. Pregnant women aged from 20 – 40 years.
2. Pregnant women in the second trimester and third trimester.
3. Primigravida and multipara.
4. Accepted to participate in the study.
5. Free from any medical disease or obstetrical complication.

Tools of data collection:

Three tools were used for data collection:

Tool I: A structured interviewing questionnaire: which included three parts

First part: Socio-demographic characteristics of studied women which included (age, residence, educational level, occupation marital status and monthly income).

Second part: Assessment of pregnant women's knowledge: It was adapted from (Padmavathi and Hephzibah, 2015). This part used before and after implementation of nutritional guidelines (pre/post test format). It consisted of (11) questions to measure pregnant women's knowledge regarding iron deficiency anemia during pregnancy as (definition, percentage of iron deficiency anemia, causes, signs and symptoms).

Knowledge scoring system:

Each item was assigned a score (1) for incorrect answer and score (2) for correct answer. The knowledge score was calculated by adding the scores for the correct answers. The higher scores reflect higher levels of knowledge regarding iron deficiency anemia during pregnancy The total knowledge score was summed up and the total score of knowledge ranged from (0 – 22) categorized as following:

- Poor <60% equal (0 – 12)
- Average 60- 75% equal (13 – 17)
- Good >75% equal (18 – 22)

Tool II: Modified Likert scale:

It was adapted at (Aboud et al., 2019) To assess the attitudes of pregnant women regarding the prevention of iron deficiency anemia. This part is used before and after implementation of nutritional guidelines (pre/posttest format). The scale consisted of 10 statements about several issues related to iron deficiency anemia and its prevention as (iron deficiency anemia is a serious problem, iron deficiency anemia makes the women unable to work, space between pregnancy and other reduces the risk of anemia, iron deficiency anemia lead to serious complications during pregnancy). The items were rated on 5-point Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree). The total attitudes score ranged from 10 to 50. The participant is considered to have negative attitude if score ranged from 10-23, neutral attitude if score ranged from 24-37 and positive attitude if her score is more than 37.

Total scoring categorized as following:

- Negative attitude <60%
- Positive attitude ≥60%

Tool III: Assessment of practices sheet for preventive iron deficiency anemia to assess practices of pregnant women toward prevention iron deficiency anemia. This part is used before and after implementation of nutritional guidelines (pre/post test format). it consisted of (8) questions to assess pregnant women's practices regarding prevention of iron deficiency anemia during pregnancy as (Avoiding drink tea, coffee with meal, eating a red meat, liver, chicken and fish, eating food contain fiber, eating green leafy vegetable in diet every day and eating fruits as apples, dates, grapes). Each item was

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scored (2) if the answer is (yes) and (1) if the answer is (No).

Total scoring categorized as following:

- Un satisfactory <60%
- Satisfactory \geq 60%

Tools validity and reliability:

Tools of data collection were reviewed by three panel expertise of Obstetrics and Gynecological Nursing according to their comments, modifications were done.

Reliability of tools was done by Cranach alpha for test internal consistency for knowledge was equal (0.89) , for practice was equal (0.81) and attitude was equal (0.86).

Ethical consideration:

Approval to conduct the study was obtained from the Scientific Research Ethical Committee, Faculty of Nursing at Benha University. An official permission from the selected study setting was obtained for the fulfillment of the study. The aim of the study was explained to each pregnant woman before applying the tools to gain their confidence and trust. The researcher took oral consent from each pregnant woman to participate in the study. Maintain confidentiality, self-esteem and dignity of pregnant women. Allowing freedom to the participation to withdraw from the study at any time.

Pilot study:

The pilot study was carried out on 10% of total sample size (9 pregnant women) to assess objectivity, applicability, clarity and feasibility of the tools and find out the possible obstacles and problems that might face the researcher and interfere with data collection and to detect any problems. It also help to estimate the time needed for data collection. According to the results obtained from pilot study, items correction, modification, omission and addition was done as needed. The pregnant women

involved in the pilot study were excluded in the main study sample.

Field work:

The study was carried out from the beginning of March 2022 and completed at the end of August 2022 covered six months. The researcher visited the previously mentioned setting three days/ week (Saturday, Monday and Wednesday) from 9.00 Am to 12.00 Pm according to the schedule of obstetrics and gynecological outpatient clinic. To fulfill the aim of this study the following phases adopted. Preparatory phase, interviewing and assessment phase, planning phase, implementation phase and evaluation phase.

Phase 1: Preparatory phase

It was the first phase of the study, and it included reviewing current and related literatures. Also, theoretical knowledge of various aspects of the study using periodicals, magazines, books, articles and internet to develop tools for data collection.

Phase 2: Interviewing and Assessment phase :(first visit)

The researcher attended the pervious mentioned setting after taking approval from research ethical committee of faculty of nursing at Benha university. This phase was the second phase, in this phase the researcher introduced herself to the participant and clarified the study aim and expectations and process that involved in the study to participant. At this phase the researcher took oral consent from each participant women in the study. The researcher was provided appropriate separate place for the studied women during the study to maintain privacy and confidentiality of the study.

Data was collected by the researcher through the structured interviewing questionnaire as pretest to assess women sociodemographic characteristics. The

duration of the assessment is 3-5 minutes. The researcher was distributed questionnaire sheet to pregnant woman (tool no. I) to assess knowledge of pregnant women. Then the researcher was used (tool no. II) to assess the attitudes of pregnant women regarding the prevention of iron deficiency anemia. Then the researcher was used (tool no. III) to assess the practice of pregnant women regarding the prevention of iron deficiency anemia.

Phase 2: Planning phase:

Based on results obtained from pregnant woman during assessment phase, the nutritional guideline was developed by the researcher in a form of printed Arabic booklet to satisfy the studied pregnant women's deficit knowledge and attitudes regarding prevention of iron deficiency anemia during pregnancy. The researcher designed the theoretical and practical session and divided the study sample into five session. Then the researcher clarifying the different methods of teaching and instructional media were determined according to pregnant woman.

Phase 4: Implementation:

The researcher was applied five scientific sessions for applying the nutritional guidelines regarding prevention iron deficiency anemia, three sessions theoretical lecture through discussing all information regarding iron deficiency anemia, then the researcher was utilized two practical session regarding all practices for prevention of iron deficiency anemia, the duration of each session was around (30-45) minutes, the researcher divided the study sample into five groups each group involved (18) pregnant women then each group received of five session. At the beginning of the first session women were oriented with the nutritional guidelines' contents. Each pregnant woman was informed about the time of the next sessions at the end of the

session. The subsequent session started by feedback about the previous session and the objectives of the new session, simple Arabic language was used to suit women' level of understanding. At the end of each session, women ask any questions to correct any misunderstanding of any knowledge.

The sessions were discussed as the following:

1st theoretical session: The theoretical part included orientation regarding the aim of the study and its expectation.

2nd theoretical session: The theoretical part contained an overview of iron deficiency anemia to provide the women with knowledge about meaning of iron deficiency anemia, causes, symptoms, complications, treatment and prevention of iron deficiency anemia. At the end of this session the researcher gave women the opportunity to ask questions and provided period of discussion.

3rd theoretical session: Started by feedback about the previous session and discuss the objectives of the new session then, the theoretical part contained the importance of iron, daily allowance of iron during pregnancy and forms of iron.

4th practical session: Implementation of the practical part and recognized diet rich with iron (as meat, liver, chicken, fish and green leafy vegetables) and nutritional habits that enhance iron absorption (eat food rich in vitamin c as citrus fruits or tomatoes).

5th practical session: Started by feedback and re- demonstration of the previous session. The practical part recognized nutritional hazards that inhibit iron absorption (as drinking tea, coffee with meal) and food to be limited during pregnancy. Different methods of teaching were used such as discussion, demonstration, re-demonstration and brainstorming. Instructional media included laptop and educational booklet about

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prevention of iron deficiency anemia and healthy nutrition which constructed by the researcher in a simple Arabic language after reviewing the related literatures were distributed to all recruited women in the study to achieve its objectives.

Phase 5: Evaluation phase:

This phase was utilized to investigate the effect of nutritional guideline on knowledge, attitude and practices of pregnant women regarding prevention of iron deficiency anemia (posttest) by using the same format of tools which were used before the implementation (pretest). Data were collected at the end of the study period with the same tools used in pretest and post test.

Limitation of the study

One of the problems that the researcher faced in this study was overcrowding and noise in outpatient clinics, which caused interruption during session.

Statistical analysis:

After completion of data collection, the data were organized and tabulated; statistically analyzed using the Statistical Package for Social Sciences (SPSS version 20.0). Descriptive statistics were applied (e.g., mean, standard deviation (SD), frequency, and percentages). Inferential statistics as test of significance (Fisher's exact test or Chi-square test) and independent t-test to compare mean scores of variables).

Pearson correlation coefficients were used.

- No significant level value was considered when $p > 0.005$.
- A significant level value was considered when $p \leq 0.05$.
- A highly significant level value was considered when $p \leq 0.001$.

Results

Table (1): Shows that less than one half 45.6% of the studied women were in age group (25- < 30) years old with a mean age of (28.12 \pm 5.62) years. More than one third (37.8%) of them were secondary education. As regards occupation more than one half (58.9%) of them were housewives and more than one half (57.8%) of them lived in a rural area Furthermore, the majority (95.6%) of them were married and less than two thirds (60%) of them had insufficient monthly income.

Figure (1): Illustrates that less than three quarters (72.2%) of the studied women had a good total knowledge score regarding prevention of iron deficiency anemia after implementing of nutritional guideline compared to (10%) pre-intervention.

Figure (2): Illustrates that less than three quarters (71.1%) of the studied women had a positive attitude regarding iron deficiency anemia after intervention of nutritional guideline.

Figure (3): Illustrates that more than three quarters (75.6%) of the studied women had a satisfactory level of practice after intervention, while nearly two thirds (61.1%) of them had unsatisfactory level of practice in pre- intervention scores.

Table (2): Shows that there was highly Statistically significant positive correlation between studied women total pre and post intervention knowledge, attitude and practices scores at ($p \leq 0.001$).

Table (1): Distribution of the studied women regarding their Socio-demographic characteristics (n=90).

Socio-demographic characteristics	No.	%
Age (years)		
20-<25	33	36.6
25-<30	41	45.6
≥ 30	16	17.8
Mean ±SD	28.12±5.62	
Educational level		
Illiterate	2	2.2
Read and write	11	12.2
Basic education	25	27.8
Secondary education	34	37.8
University education	18	20.0
Occupation		
Housewife	53	58.9
Working	37	41.1
Residence		
Rural	52	57.8
Urban	38	42.2
Marital status		
Widow	4	4.4
Married	86	95.6
Monthly income		
Un sufficient	54	60.0
Sufficient	36	40.0

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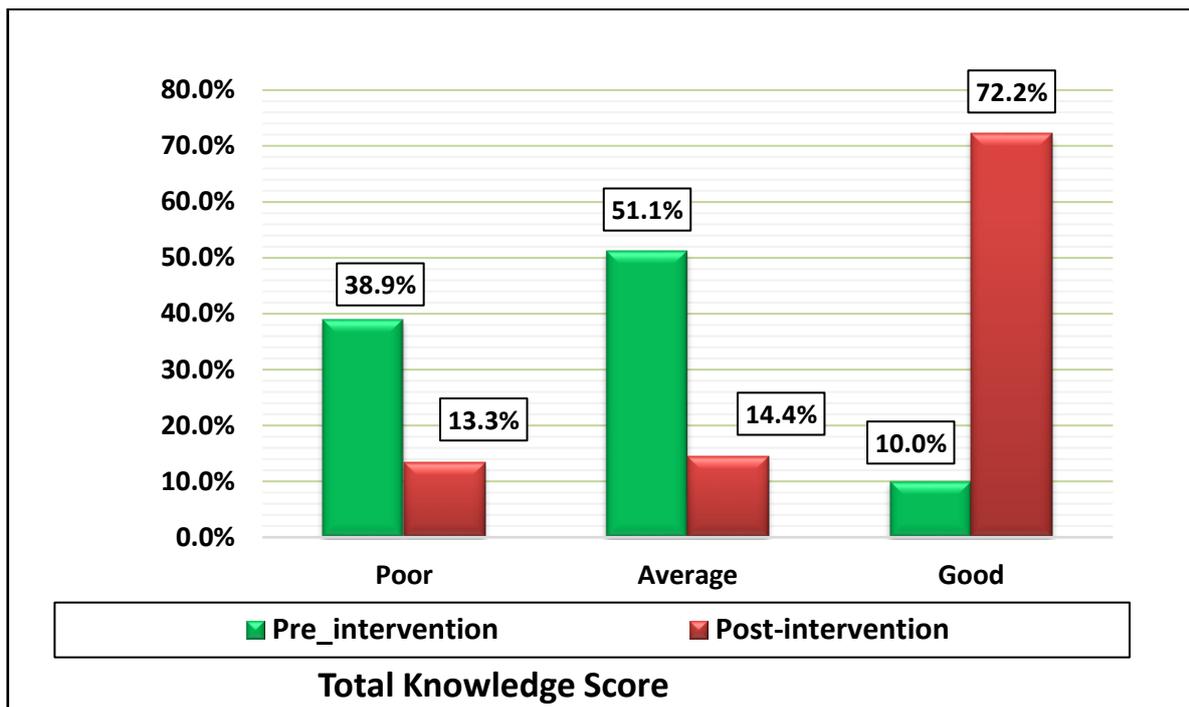


Figure (1): Distribution of studied women regarding total knowledge scores at pre and post-intervention (n=90).

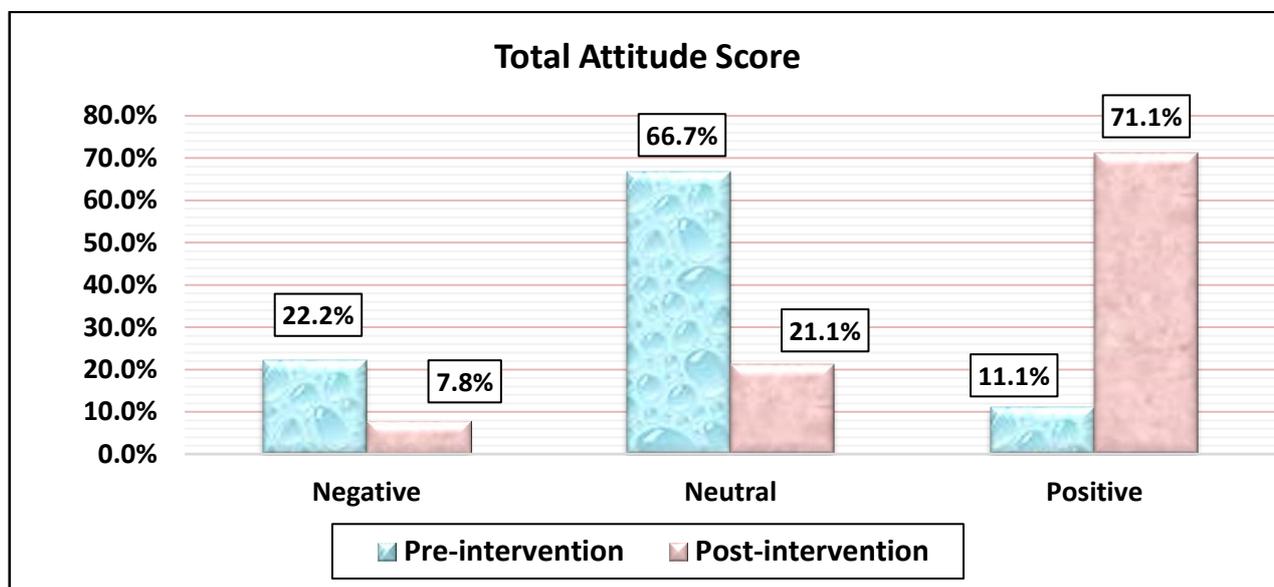


Figure (2): Distribution of studied women total attitude score regarding prevention of iron deficiency anemia at Pre- intervention and Post- intervention phases (n=90).

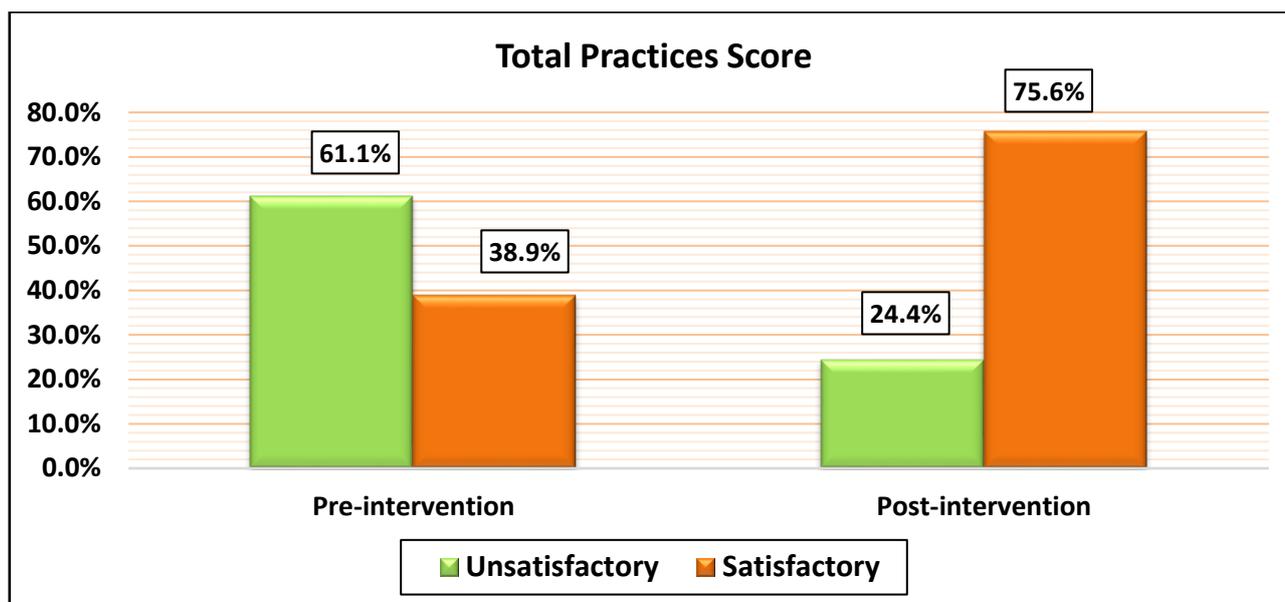


Figure (3): Distribution of studied women total practices scores regarding prevention of iron deficiency anemia at Pre- intervention and Post- intervention phases (n=90).

Table (2): Correlation between total knowledge, total attitude and total practices scores of the studied women regarding prevention of iron deficiency anemia at Pre- intervention and Post-intervention phases (n=90).

Variables		Pre-intervention				Post-intervention			
		Total attitude		Total practices		Total attitude		Total practice	
		r	P-value	R	P-value	R	P-value	r	P-value
Pre-intervention	Total knowledge	0.93	0.000**	0.85	0.000**				
	Total attitude			0.82	0.000**				
Post-intervention	Total knowledge					0.86	0.000**	0.90	0.000**
	Total attitude							0.78	0.000**

Discussion:

Anemia is a common medical disorder in pregnancy and is an identical common problem in developing countries. It establishes significantly both maternal and fetal consequences. The incidence of anemia in pregnancy varies significantly because of variances in socioeconomic status, lifestyles and health seeking behaviors across different cultures (Labib et al., 2021).

Maternal anemia not only impairs maternal health and well-being, but also

causes adverse outcomes for the mother as it increases the risk of postpartum hemorrhage, infection and cardiac failure which in turn increases the prevalence of maternal mortality. Moreover, maternal anemia is associated with preterm birth and low birth weight and increases the risk of perinatal mortality (Rahman et al., 2020).

The present study aimed to evaluate the effect of nutritional guidelines on knowledge, attitude and practices of pregnant women

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regarding prevention of iron deficiency anemia.

Regarding socio-demographic characteristics the findings of the present study revealed that less than one half of the studied women were in age group between (25-35)years with mean age of (28.12±5.62) years. This result is nearly similar to **Kaleem et al., (2020)** who conducted study on “Effect of Nutrition Education Package on Pregnant Women Knowledge and Healthy Dietary Practice “and reported that half of studied pregnant women were aged from (25-30)years. However, these findings disagree with **Lim et al., (2020)** who conducted study on “Knowledge of Nutrition During Pregnancy and Associated Factors among Antenatal Mothers” and found that two third of studied pregnant women aged from (20-30)years.

Concerning level of education of studied women, the findings of the current study showed that more than one third of the studied women were secondary education. This finding in the same line with **Olatona et al., (2021)** who studied “Dietary Habits, Diversity, and Predictors among Pregnant Women Attending Primary Health Care Centers for Antenatal Care in Lagos, Nigeria” and found that one third of pregnant women had secondary education.

On the other hand, this finding in disagreement with **Tesfa et al., (2022)** who studied “Maternal Nutritional Knowledge, Practice, and Their Associated Factors During Pregnancy in Addis Sub-city Health Centers, Addis Ababa, Ethiopia” and found that minority of studied woman read and write and one third of them had university education. This may be due to the most mothers preferred to stay at home to take care of their husbands and children rather than complete their education and most of the studied women had a low level of education and from

rural areas, which leads to decrease their work opportunities.

Regarding occupation of the studied women, the findings of the present study revealed that more than one half of studied women were housewife. This finding is nearly agree with **Demilew et al., (2020)** who studied “Dietary Practices and Associated Factors Among Pregnant Women in West Gojjam Zone, Northwest Ethiopia” and reported that three fifths of woman had housewife and two fifths of them were employee.

On the other hand, this result is contradicted with **Guneri et al., (2019)** who studied “Knowledge, Attitudes and Behaviors of Pregnant Women About Food Safety: A cross Sectional Survey” and found that majority of them were housewife.

Regarding residence, the findings of the present study revealed that more than one half of the studied women live in rural area. This finding agrees with **Wells et al., (2022)** who conducted study on “Nutrition Status of Nulliparous Married Indian Women; Decadal Trends, Predictors and Program Implications” and found that more than one half of them live in rural area.

On the other hand, this finding is contradicted with **Jessica et al., (2020)** who conducted study on “Prevalence of Anemia and Low intake of Dietary Nutrients in Pregnant Women living in Rural and Urban Areas in The Ashanti Region of Ghana” and found that more than half of participant were live in urban areas while the remaining two fifths of them were live in rural areas.

Concerning marital status of studied women, the findings of the present study revealed that the majority of studied women were married. This finding is supported by the study of **Zelalem et al., (2019)** who conducted study on “Effect of Nutrition Education on Pregnancy Specific Nutrition

Knowledge and Healthy Dietary Practice Among Pregnant Women in Addis Ababa” and found that the majority of the study participants were currently married.

On the other hand, this finding disagrees with **Kara et al., (2020)** who studied on “African American and White Women's Perceptions of Weight Gain, Physical Activity, and Nutrition During Pregnancy” and reported that one third of participants were married and three quarter of them were single.

Regarding economic level, the result of present study revealed that more than half of studied women had insufficient monthly income. This finding agrees with **Abdelmordy et al., (2022)** who studied “Effectiveness of BASNEF Model-Based Health Education on Reduction of Iron Deficiency Anemia among Pregnant Women” and found that less than two third of participant had insufficient monthly income. This may be due to more than half of the studied women were housewife.

This result revealed significant improvement of women's knowledge about prevention of iron deficiency anemia (p-value ≤ 0.001). This improvement in women's knowledge may be due to women's active participation and good communication with the researcher who helped them to acquire information. Besides, booklet plays a very important role in helping women to acquire knowledge about prevention for iron deficiency anemia.

This finding in the same line **Demilew et al., (2020)** who reported that high level of participant knowledge regarding healthy nutrition during pregnancy. On the other hand, this result disagrees with **Ali et al., (2020)** who studied “Effect of Nutrition on Pregnant Women Weight in Assiut Health Units” and found that three quarter of studied women had poor knowledge about nutrition.

Regarding attitude related to prevention of iron deficiency anemia during pregnancy among studied women, the finding of the present study revealed that there was a highly statistically significant difference regarding attitude related to prevention of iron deficiency anemia during pregnancy among studied pregnant women at pre and post intervention ($P \leq 0.001$). This result may be due to the positive effect of the nutritional guidelines and the learning sessions. This finding agrees with **Abd Elhamied et al., (2021)** who studied “Effect of Instructional Package on Pregnant Women's Knowledge and Attitude regarding Healthy Nutrition” and found that positive attitude regarding healthy nutrition during pregnancy.

On the other hand, this result is contradicted with **Tsegaye et al., (2022)** who studied “Theory Based Nutrition Education Intervention Through Male Involvement Improves the Dietary Diversity Practice and Nutritional Status of Pregnant Women in Rural Illu Aba Bor Zone, Southwest Ethiopia” and found that negative attitude towards dietary diversity.

Regarding practices related to prevention of iron deficiency anemia during pregnancy among studied women, the finding of the present study showed that there was a highly statistically significant difference regarding practices related to prevention iron deficiency anemia during pregnancy among studied women at pre and post intervention ($P \leq 0.001$). This improvement due to all pregnant women attendance to theoretical and practical sessions and correct knowledge and practices.

This finding is in agreement with **Roshana and Mahendran, (2022)** who studied “Assessment of Knowledge and Practices regarding Iron Deficiency Anemia among Pregnant Women in Kattankudy DS Division of Batticaloa District, Sri Lanka” and found that a high statistically significant difference

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regarding practices related to prevention iron deficiency anemia during pregnancy.

Regarding correlation between total knowledge, total attitude and total practices scores of the studied women regarding prevention of iron deficiency anemia at pre-intervention and post- intervention phases, the findings of the present study illustrated that there was highly statistically significant positive correlation between studied women total pre and post intervention knowledge, attitude and practices scores. These findings were supported by **Abd Elhamied et al., (2021)** who found that a positive correlation between knowledge and practices among pregnant women concerning nutritional problems pre and post health promotional program implementation.

This result is contradicted with **Ehwarime et al., (2019)** who studied “Knowledge and Practice of Healthy Nutrition Among Pregnant Women Attending Antenatal Clinic at Selected Private Hospitals in Benin City” and found that there is no significant difference in the knowledge of healthy nutrition and attitude of healthy nutrition among the respondents in the selected hospitals in Benin City.

From the researcher’s point of view, this result can be interpreted by great effect of knowledge on attitude the higher knowledge, the higher attitude. Finally, it showed the result of the present study was significantly supported the study hypothesis.

Conclusion

According to the findings of the current study, it could be concluded that: The nutritional guideline had positive effect on pregnant women’s knowledge, attitude and practices regarding prevention of iron deficiency anemia. In addition, there was a highly statistically significant differences in the total score of pregnant women' knowledge, attitude and practices regarding prevention of iron

deficiency anemia when comparing pre and post intervention of the nutritional guideline. Furthermore, there was a highly statistical significant positive correlation between the total score of knowledge, attitude and practices. Hence, the research hypothesis was supported and the study aim was achieved.

Recommendations

- Counseling and health education programs are important for pregnant women to improve their knowledge, attitude and practices regarding prevention of iron deficiency anemia during pregnancy.
- Intensive counseling and motivation of pregnant women to consume iron to ensuring adequate supply to prevent iron deficiency anemia.
- Providing the pregnant women with nutritional booklets about anemia based on scientific background to improve knowledge.

Further studies:

- Effect of mass media on prevention of iron deficiency anemia among primigravida women.
- Investigate the effect of risks factor of iron deficiency anemia among women health lifestyle during pregnancy.
- Replication of the present study on large sample size and in different setting for generalization of results.

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تأثير الدليل الغذائي على معلومات واتجاهات وممارسات السيدات الحوامل تجاه الوقاية من انيميا نقص الحديد

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يعتبر الحمل فترة حاسمة في حياة المرأة حيث تحدث العديد من التغييرات. يحدث للحامل تغييرات جسدية وفسيوولوجية وعقلية أثناء فترة الحمل، وتحتاج الي زيادة الحاجة إلى الطاقة والمغذيات الكبيرة طوال فترة الحمل لتوفير العناصر الغذائية اللازمة للجنين ولضمان صحة الجنين والأم. هدفت الدراسة لتقييم تأثير الدليل الغذائي على معلومات واتجاهات وممارسات السيدات الحوامل تجاه الوقاية من انيميا نقص الحديد. أجريت هذه الدراسة في العيادات الخارجية للنساء والتوليد بمستشفى جامعة بنها على عينة متاحة من ٩٠ سيده حامل، تم استخدام ثلاث أدوات لجمع البيانات. وقد اسفرت الدراسة عن تحسن في معلومات وممارسات واتجاهات السيدات الحوامل تجاه الوقاية من انيميا نقص الحديد بعد الدليل الغذائي . كما اوصت الدراسة باستمرار تنفي برامج تثقيفية للسيدات الحوامل لزيادة معلوماتهم وممارساتهم تجاه الوقاية من انيميا نقص الحديد.