Effect of health promotion instructions regarding iron deficiency anemia on young pregnant women's knowledge and practice: (A pre and post study)

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Abstract

Background: Iron deficiency anemia in pregnancy is a major health problem and one of the leading causes responsible for maternal and perinatal morbidity and mortality. **The aim** of the present study was to investigate effect of health promotion instructions regarding iron deficiency anemia on young pregnant women's knowledge and practice. **Design**: Aquasi-experimental design was utilized to fulfill the aim of the study. **Sample:** A purposive sample composed of 100 young pregnant women. **Setting**: The present study was conducted at two Maternal and Child Health Centers (Al Nahal Medical Center and Sheba MCH) affiliated with the Zagazig City Ministry of Health and Population. **Tools of data collections:** Data were collected by using five tools. Tool I: through an interviewing questionnaire form, Tool II: Pregnant women assessment sheet, Tool III: Assessment of women knowledge, Tool IV: Observation checklist and Tool VI Follow up record. **Results**: after implantation of health promotion instructions the mean hemoglobin level was increase among the study subjects in second and third trimester compared that in first trimester also there is a regress of signs and symptom of anemia in second and third trimester. As well as marked improvement of women total knowledge and practices towards IDA from 55% in pre to 83% in post and 80% in follow up of health promotion instructions. **Conclusions**: The present study concluded that the implementation of health promotion instructions improve young pregnant women's dietary knowledge and practice thus it proved to be successful in raising the hemoglobin level. **Recommendation**s: A nutrition education is recommended to enhance the nutritional knowledge of young mothers about iron rich foods, enhancer and inhibitors of iron absorption. Also should be provided with instructional booklets about anemia based on scientific background to improve their knowledge and health belief.

Keywords: Health promotion instruction, iron-deficiency anemia, young pregnant women, knowledge, Practice

Introduction

Anemia defined as condition of a 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 **(Baharzadeh et al., 2017).**The World Health Organization defined anemia as hemoglobin (Hb) level of less than 11 g/dL, or hematocrit less than 33%, at any point during pregnancy. Furthermore, anemia was considered as mild if the Hb level was 9.0-11.0 g\dl), moderate (7.0-9.0 g\dl) and severe (4.0-7.0 g\dl). **(Rajeev et al., 2015).**

Iron deficiency is the most common single cause of anemia worldwide, accounting for about half of all anemia cases and the prevalence of iron deficiency in pregnancy varies from 20 to 90% **(Mehrabian et al., 2016)** . Specifically, increased blood volume and subsequent iron demand may lead to iron-deficiency. So, low socioeconomic status, higher number of previous births, inadequate iron reserves, absence of iron supplementation and iron deficient diets are among the most important causes or predisposing risk factors for Iron deficiency anemia during pregnancy **(Egypt EG 2016).**

WHO defines adolescents as individuals in the 10-19-year age group and "youth" as the 15-24

year age group. These two overlapping age groups are combined in the group "young people", covering the age range 10-24 years. .Adolescence is the period of life beginning with the appearance of secondary sex characteristics and ending with the cessation of somatic growth. Adolescents are facing a series of nutritional challenges which are not only affecting their growth and development but also their livelihood as adults. This is a vulnerable period in the human life cycle for the development of nutritional deficiencies particularly anemia which has been neglected by public health programs **(Egypt Independent, Child marriage in Egypt reaches2018).**

Pregnancy in young age is a high-risk condition that can predispose the patient to obstetric intercurrences and if pregnancy occurs during this period, an increased risk of nutritional deficiencies arises due to both the fetus' and mothers concurrent development and growing nutritional needs. Such deficiencies are often associated with serious maternal-fetal consequences, especially among lower socioeconomic classes who may have limited food resources **(Althabe et al., 2015).**

Anaemia in pregnancy is a condition with effects that may be deleterious to the mother and the fetus. The Consequences of iron deficiency anemia on pregnant woman and fetus includes an increasing of the mortality and morbidity for the fetus and mother, increasing incidence of antepartum and postpartum hemorrhage. In additions to, increased fetal risk of prematurity, lower birth weight, lower Apgar score, intrauterine growth restriction, acute distress, and neonatal anemia due to poor reserve **(Abdelhafez & El Soadaa 2012)**

Daily requirements of iron as well as folate are six times greater for a woman in the last trimester of pregnancy than for a non-pregnant woman. This need cannot be met by diet alone, but is derived at least partly from maternal reserves. In a well-nourished woman, about half of the total requirement of iron may come from iron stores**. (Althabe et al., 2015)**

Anemia the most preventable cause of maternal mortality should be eradicated from the female population in the coming years, which will ensure better maternal and perinatal health. Simple educational interventions can improve the

effectiveness of the antenatal oral iron supplementation programs **(Senanayake et al., 2010),** for that, a health promotion is the process of enabling people to increase control over and to improve their health. It moves, beyond a focus on individual behavior towards a wide range of social and environmental interventions**.**

Nurses, who are working in primary health care settings and family health centers, play a very vital role in promoting health during pregnancy. The nurse's role within the aspect of health promotion has shifted from a disease instructions to a health instructions. The most important role's figured in teaching the pregnant women the importance of routine iron supplementation and frequency measuring the hemoglobin level. The other crucial role is instructing and informing the mothers about the importance of maintaining health during pregnancy especially those related to nutritional aspects and change their eating habits and practices that contribute to nutritional deficit **(McLean, et al., 2019).**

Significance of the study:

The Child Law of 2008 sets the minimum age of marriage in Egypt at 18 years for females. Despite the legislation, many girls are still married before the age of 18. In Egypt 17% of girls are married before their 18th birthday and 2% are married before the age of 15 this increase risk of maternal morbidity during this stage of life. Anemia in pregnancy is an important public health problem associated with increased maternal and perinatal morbidity and mortality. In Egypt, iron deficiency anemia, remains a public health problem, where the prevalence of anemia reached 40% **(Seabra et al., 2011).** A variety of interventions for anemia prevention and control are available, addressing all the major causes, but experience with effective protocol for management has been limited so that the present study was conducted to evaluate the effect of health promotion instructions regarding iron deficiency anemia on young pregnant women's knowledge and practice.

Aim of the Study:

This study aims to:

Aim of the present study was to: Evaluate the effect of health promotion instructions

regarding iron deficiency anemia on young pregnant women's knowledge and practice.

Research Hypothesis:

After implantation of health promotion instructions, the young pregnant women will adopt better nutritional practices and this will improve their hemoglobin level.

Subject and Methods:

Research design:

This study was carried out using a quasi-experimental research design with pre-posttest assessment.

Study Setting:

The study was performed at two Maternal and Child Health Centers (Al Nahal Medical Center and Sheba MCH) affiliated with the Zagazig City Ministry of Health and Population, Sharkia Governorate, Egypt. The reasons given for choosing the above setting, as they are the main health centers in Zagazig where women attend for antenatal follow-up, immunization during pregnancy and other reproductive health services. These also represent a wide variety of individuals with various socio-demographic and obstetric features, as well as attendance levels were high.

Study Population and Sample:

Sample criteria: A purposive sample composed of 100 young pregnant women attending the above mentioned study setting during the study period (12 months) was eligible for inclusion in the study sample if fulfills the following eligibility criteria:

Inclusion criteria:
- Age ranging between 18->25 years
- Pregnant women at the first trimester.
- Both primipara and multiparous women
- Women Hb level was less than 10 g/dl at the booking visit

Exclusion criteria:
- Medical or obstetric problems during current pregnancy.
- Any other disease that interfere with iron metabolism

Tools of data collection:

The current study data was collecting by using the following five tools, after reviewing the related literatures.

Tool I- An interviewing questionnaire form

The questionnaire was designed for the study's objectives and consisted of different questions and having two parts including:

- **Part 1:** pregnant woman's demographic data such as age, level of education, job status, income and residence as well as the identification data as the address and telephone number for follow-up.

- **Part 2**: Obstetrical history which include; weeks of gestation, parity, previous abortion, spacing of pregnancy*,* mode of delivery and types of contraception.

Tool II: Pregnant women assessment sheet:

This was used to record the data obtained during the initial physical examination of the woman. It included weight, height, symptoms of IDA, and Hb level estimation which was done at the MCH laboratory. These data was reassessed for two times after implementation of health instructions (at the second and third trimester).

Tool III: Assessment of women knowledge regarding iron deficiency anemia:

This involved 15 Multiple choice questions for assessing woman's knowledge about IDA based on **(Padmavathi, & Hephzibah, 2015).** This part was used before and after the implementation of the health instructions; it includes knowledge regarding (definition, causes, signs and symptoms, degree of anemia complications of IDA for mother and fetus, high risk group for anemia, food sources rich in iron or reducing iron absorption treatment and prevention).

Scoring for each knowledge question:

A correct response for women knowledge was scored 1 and the incorrect was scored zero with a total score ranged from 0-15, for each area of knowledge, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for each part. These scores were converted into a percent

score. Knowledge was considered Unsatisfactory: if the percent score was less than 60%, and Satisfactory: if the percent score was ≥ 60%. These scores were converted into a percent score, and means and standard deviations were computed.

Tool IV: Observation checklist:

This checklist was consists of three parts designed for assessing women dietary habits and cooking practices and food groups frequency per week. **As for the dietary habits and cooking practices**, the performance questions were based on self-report and consumption of iron enhancing diet as well as cooking habits and each had three choices ("never", "sometimes" and" always"). Each answer was given zero to two points.

Scoring system for the dietary and cooking habits:

The questions or phrases for dietary and cooking practice were considered as bad dietary behaviors if the score was < 60% for participants who had bad dietary behaviors or did not follow the healthy diet. Meanwhile, the optimal or good dietary behaviors, if the score was ≥ 60% for women who acted strictly in accordance with the instructions of health promotion for proper nutrition during pregnancy.

As for Food frequency group:

This part included frequency response formats to recall each pregnant diet per week. The food intake frequencies were classified into four categories: a time per week, 2-5 times per week, more than 5 times per week and rarely, the questionnaire included the most important items that are rich or poor in iron or influences the iron absorption. The data were analyzed according to the main food groups and the numbers of servings according to the recorded quantities **(Abdelhafez & El Soadaa, 2012)**.

Tool VI*: Follow up record:

All participants were followed up by the researcher one time every trimester till the end of pregnancy were re-evaluated by questionnaires and observation checklist at the end of the educational program for Hb level and signs and symptoms of anemia.

Administrative design:

An official permission was granted by submission of an official letter from the Faculty of Nursing to the responsible authorities of the study setting to obtain their permission for data collection**.** Nursing and medical staff responsible for the pregnant women were approached to gain their cooperation.

Ethical consideration:

All ethical issues were taken into consideration during all phases of the study; the researcher maintained an anonymity and confidentiality of the subjects. The researchers introduced themselves to the women and briefly explained the nature and aim of the study to every woman before participation and obtained verbal agreement from her. Women were assured that the information obtained during the study was confidential and used for the research purpose only.

Field work:

Preparatory phase:

After extensive review of the literature, the researchers prepared the tools for data collection. Then, the tools and the health instructions interventions were tested for their content validity through the opinions of experts. These included 5 experts in the field of obstetrics and gynecology from medical and nursing faculty staff whose opinions were thought using a questionnaire sheet. They were requested to express their opinions and comments on the tool and provide any suggestions for any additional or omissions of items. Then necessary modifications were done. This phase was carried out in a period of two months. Reliability was done by Cronbach's Alpha Co-efficient Test which revealed that each item of the utilized tools consisted relatively homogeneous items. The Cronbach's coefficient alpha of knowledge questionnaire was 0.853 and 0.721 for food habits.

Pilot study:

A pilot study was carried out on (10%) 10 women who match with eligibility criteria in order to test the applicability of the tools, clarity and simplicity of the included questions as well as to estimate the average time needed to complete the sheets. Necessary modifications

were carried out based on the finding of the pilot study to develop the final form of the tools and those who shared in the pilot study were excluded from the main study sample.

Intervention phase*:* Following this pilot study, the process of data collection and implementation of the educational program consumed 12 months from the beginning of January 2020 to the end of December 2020. The data were collected according to the following phases.

Assessment phase*:* During this phase, the process of sampling was done. Women fulfilling the eligibility criteria were invited to participate. The data were collected from the pregnant women who gave their verbal agreement to participate using the data collection forms. The collected data served as a pre-test in first trimester (at the initial visit) for baseline comparison with post-test data in second trimester and follow up in third trimester. It also helped the researchers to identify the educational needs of the participants in order to design the program.

Design of the health promotion instructions*:* A health promotion instructions aimed at improving pregnant women's knowledge and dietary practice related to the IDA. These health instructions was designed by the researchers based on scientific background, and in the light of the needs identified in the pre-test assessment and was written in simple Arabic language.

Implementation phase*:* All of the educational sessions were conducted by the researchers who had adequate experience in the field of health education and had full understanding of the health promotion instructions. At the beginning of the classes, a question and answer session was conducted for the initial survey of the women's knowledge (pretest) and the average time for the completion of the question was around (15-25 minutes). This was followed by a lecture, presentation of posters, photographs, and training booklet, and then continued with group discussions. Physical assessment; pregnant women's weight, and height were measured at first visit, and at second and third trimester of pregnancy.

The results of blood test /hemoglobin level was obtained from pregnant women record at first booking visit. The hemoglobin level was repeated, 2nd trimester and 3rdtrimester at MCH laboratory. Signs and symptoms denoting anemia were recorded. All participants were followed up by the researcher for a period that ranged between 5-6 months. The program was administered to study subjects in small groups (5- 10) with a duration of 45-60 minutes for each session. Different and suitable teaching methods were used including; booklet, data shows (laptop).

Evaluation phase:

Evaluation of women' knowledge and dietary practices regarding the management of IDA was done after the end of the program by using the same tools.

Statistically analysis:-

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows (SPSS Inc., Chicago, IL, USA 2011). Quantitative data were expressed as the mean ± SD &median (range), and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Percent of categorical variables were compared using Chi-square test or Fisher's exact test when appropriate. Paired t test was used to compare between two dependent variables of normally distributed variables. Wilcoxon Signed Ranks Test was used to compare between two dependent variables of non-normally distributed variables. All tests were two sided. p-value < 0.05 was considered statistically significant and p-value ≥ 0.05 was considered statistically insignificant

Results

Table 1 shows demographic characteristic of studied women. It was found that 65% of the studied women their age were between 20 – 25 years with a mean age of 20.4±2.9 and 40% of them were secondary educated. As regards occupation 90% of women were housewives and 70% of them were in second grad of family income "just meet life expenses".

Table 2 represents the distribution of the studied women according to their obstetric history. 41 % of women in the study sample were Para

1and 20% were Para 2 and 30% of this percent have no pregnancy space and 41% had cesarean section as a mode of delivery. Only 20% used family planning methods

Figure (1): As regards BMI of the studied subjects figure 1 illustrates that 68% of the study subject had normal BMI and only 13% of the study subjects were obese.

Table3 : Regards symptoms and sign of anemia among studied women through the three trimesters and after implantation of health promotion instructions. Table 3 shows that there is a regress of signs and symptom of anemia as pallor skin and sclera from 20% in first trimester to 15% in second and 2% in third trimester. Also Pale nail regress from 65% in first trimester to 42% in second and 22% in third trimester as well as headache regress from 81% in first trimester to 44% in second and 23% in third trimester.

Table 4: Clarifies the distribution of the study subjects according to their mean hemoglobin level through the three trimesters. It is noticeable that the mean hemoglobin level was increase among the study subjects after implantation of health promotion instructions in second and third trimester compared to Hb level in first trimester and this increasing was statistically significant (p=0.001).

Figure (2): demonstrates upswing of women's degree of anemia from moderate to mild level during first to third trimester (88% and 13% respectively).

Figure (3): illustrates a marked improvement of women total knowledge towards IDA from 55% in pre to 83% in post and 80% in follow up of health promotion instructions for satisfactory knowledge**.**

Figure (4): Shows an improvement of women food habits after application of health promotion instructions from11% to 89% and 77% for good habits through the three stages respectively. And regress of bad habits from 89% to 14% and 23% through the three stage respectively.

Table 5: Shows an increase in pregnant women's consumption of different food group per week after application of health promotion instructions and this increase had a statistically significant difference (**p**= .0001) .

Regards relation between total knowledge score about Iron deficiency anemia among studied women and their demographic characteristics pre intervention.

Table 6: Shows a statistically significant difference between women's educational level (100% of university education show satisfactory level, occupation 100% of employee women show satisfactory level of total knowledge score.

Table 7: Represents the relation between total knowledge score about Iron deficiency anemia among studied women and their demographic characteristics post intervention. Women's age from 20-25 years shows satisfactory total knowledge score more than who from18-20 years. The same table also shows satisfactory knowledge score in majority women in the study regardless their demographic characteristics after implantation of health improve instructions.

Table 8: Show that the majority of women shows bad food habits regardless their demographic characteristics in pre-intervention phase.

Table 9: After implementation of health improve instructions, there is an improve in food habits of women in the study. This appear clearly in table 9 with no statistically significant difference as regards demographic characteristics except educational level as women who read and write shows reported good food habits 84.2% in post intervention phase.

Table (1): Demographic characteristics of studied pregnant women (n= 100)

Item	No	Percent
Age	.	
18 -20	35	35.0
> 20 -25 years	65	65.0
Mean ±SD	20.4±2.9	
Education	.	.
Read and write	19	19.0
Primary school	10	10.0
Secondary school	40	40.0
University	31	31.0
Occupation	.	.
House wife	90	90.0
Employee	10	10.0
Family Income	.	.
Sufficient	20	20.0
Just meet life expenses	70	70.0
Un sufficient	10	10.0

Table (2): Distribution of the studied pregnant women according to their obstetric history (n= 100)

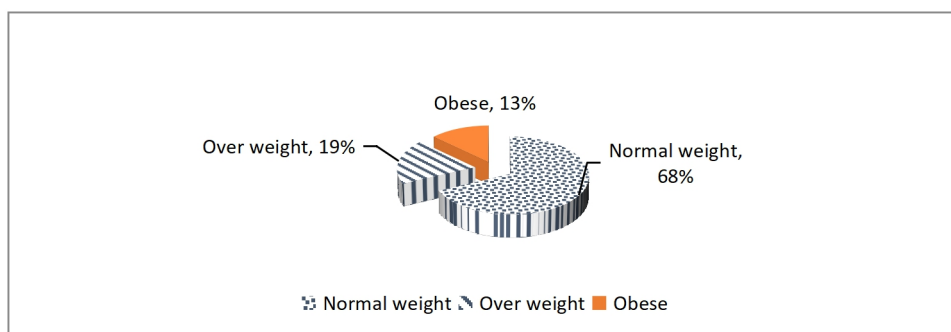|	Mean ±SD	Range
Gestational age (weeks)	3 ±5.7	6-9
Parity	**N.**	**%**
Para0(primipara)	39	39.0
Para1	41	41.0
Para2	20	20.0
Abortion		
No	89	89.0
Yes	11	11.0
Pregnancy spacing		
Yes	30	30.0
No	31	31.0
Mode of last delivery		
NVD	20	20.0
CS	41	41.0
Used of Family planning		
Yes	20	20.0
No	41	41.0
Method of family planning		
Pills	10	10.0
IUD	10	10.0

Figure (1): Distribution of the study pregnant women according to their body mass index through the different phases of intervention. (n= 100)

Table (3): Symptoms and sign of anemia among studied pregnant women through different trimester after implantation of health promotion instructions (n.100).

Items	First trimester		Second trimester		Third trimester	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Pallor skin and sclera	20	20.0	15	15	2	2
Pale nail	56	56.0	42	42	22	22
Shortness of Breath	50	50.0	35	35	15	15
Palpitation	70	70.0	50	50	30	30
Headache	81	81.0	44	44	23	23
General fatigue	59	59.0	60	60	49	49

•**More than one symptoms**

Table (4): Distribution of the study women according to their mean hemoglobin level through the three trimesters. (n=100)

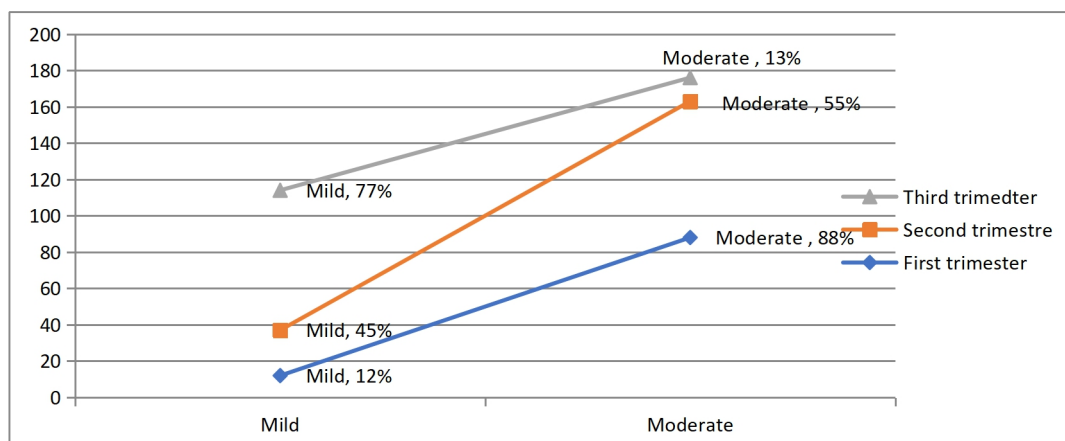| Mean hemoglobin level	First trimester	Second trimester	Third trimester
Hb level Mean $\pm$ SD	9.20±1.27/dl	10.88±0.76 /dl	11.8±0.7/dl
F(P)	0.001*		

Figure (2): Distribution of the study subjects according to their degree of anemia during three trimester (n=100).
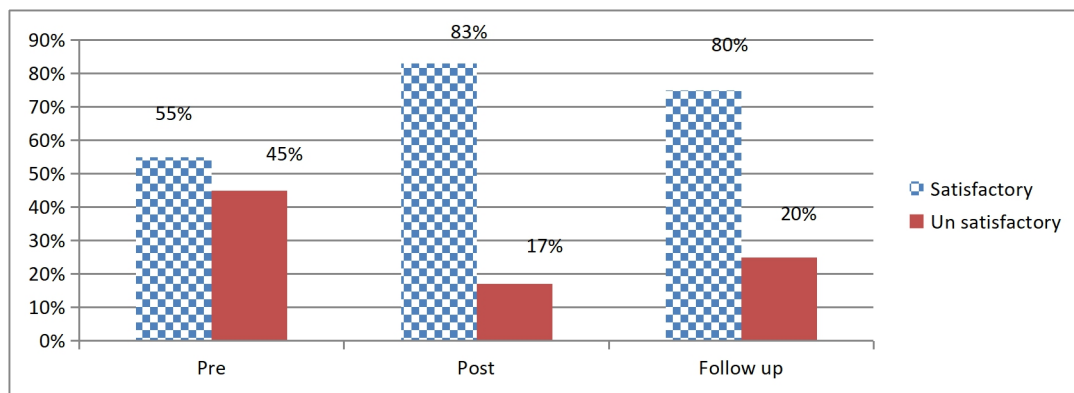

Figure (3): Comparison of women total knowledge scores towards IDA pre, post and follow up of health promotion instructions (n=100)
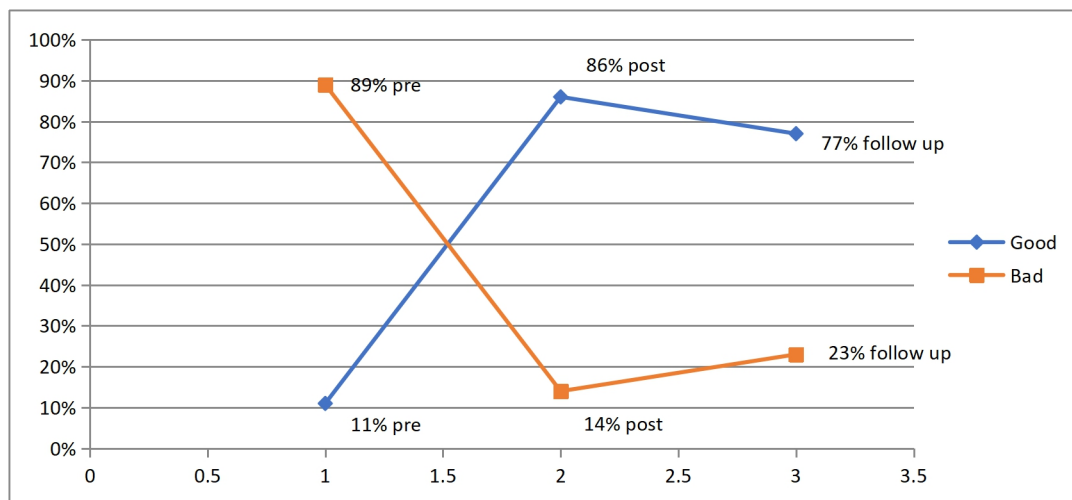
Figure (4): Comparison of women total dietary habits and cooking practice through the intervention phases. (n=100).

Table (5): Comparison Frequency of consumption of different food group per week pre, post and follow-up health promotion instructions(n=100)

Consumption of different food groups/week	Time			W	p-value
	Pre	post	Follow up		
	Median(range)	Median(range)	Median(range)		
• Dairy products	2(1-3)	6(1-8)	5 (1-6)	8.77	.0001
• Protein	13(11-14)	18(8-20)	15 (8-15)	6.98	.0001
• Vegetables	7(6-7)	11(7-12)	10 (7-11)	8.7	.0001
• Fruits	4(2-4)	6(2-8)	5 (2-7)	8.6	.0001
• Cereals	7(6-8)	8(8-8)	8 (8-8)	7.1	.0001
• Miscellaneous(soft drink)	9(7-9)	3(2-9)	3(2-9)	8.2	.0001

Table (6): Relation between total knowledge score about Iron deficiency anemia among studied women and their demographic characteristics pre intervention (n=100)

Items	Total Knowledge score				n.	χ^2	p-value
	Un satisfactory		Satisfactory				
Age per years	No.	%	No.	%			
18-20	18	51.4	17	48.6	35	0.28	0.59
>20-25	37	56.9	28	43.1	65		
Education (Read and write)	18	94.7	1	5.3	19		
Primary school	8	80.0	2	20.0	10	57.5	0.0001
preparatory school	29	72.5	11	27.5	40		
University	0	.0	31	100.0	31		
Occupation	.	.	.	.	.		
House wife	55	61.1	35	38.9	90	f	0.0001
Employee	0	.0	10	100.0	10		
Family Income	.	.	.	.	.		
Sufficient	13	65.0	7	35.0	20		
just meet life expenses	33	47.1	37	52.9	70	7.5	0.023
Un sufficient	9	90.0	1	10.0	10		

$\chi 2$ **Chisquare test   f =Fisher Exact test p<0.05 significant**

Table (7): Relation between total knowledge score about Iron deficiency anemia among studied women and their demographic characteristics post intervention (n=100)

Items	Post total Knowledge score				n.	χ²	p-value
	Satisfactory		Unsatisfactory				
Age per years	No.	%	No.	%			
18-20	22	62.9	13	37.1	35	15.5	0.0001
>20-25	61	93.8	4	6.2	65		
Education (Read and write)	17	89.5	2	10.5	19	3.6	0.31
Primary school	10	100.0	0	.0	10		
preparatory school	31	77.5	9	22.5	40		
University	25	80.6	6	19.4	31		
Occupation - House wife	75	83.3	15	16.7	90	f	.677
Employee	8	80.0	2	20.0	10		
Income - Sufficient	11	55.0	9	45.0	20	14.7	0.001
just meet life expenses	62	88.6	8	11.4	70		
Un sufficient	10	100.0	0	.0	10		

χ 2 **Chi-square test   f =Fisher Exact test p<0.05 significant**

Table (8): Relation between total food habit level among studied women and their demographic characteristics pre intervention (n=100)

	Pre intervention Food habit level				n.	χ²	p-value
	Good		Bad				
Age per years	No	%	No	%			
18-20	6	17.1	29	82.9	35	f	0.19
>20-25	5	7.7	60	92.3	65		
Education (Read and write)	0	.0	19	100.0	19	27.5	0.0001
Primary school	0	.0	10	100.0	10		
preparatory school	0	.0	40	100.0	40		
University	11	35.5	20	64.5	31		
Occupation (House wife)	11	12.2	79	87.8	90	f	.59
Employee	0	.0	10	100.0	10		
Income (Sufficient)	0	.0	20	100.0	20	5.3	0.071
Just meet life expenses	11	15.7	59	84.3	70		
Un sufficient	0	.0	10	100.0	10		

χ 2 **Chi square test   f =Fisher Exact test p<0.05 significant**

Table (9): Relation between Food habit level among studied women and their demographic characteristics post intervention (n=100)

Items	Post Food habit level				n.	χ²	p-value
	Good		Bad				
Age per years	No.	%	No.	%			
18-20	32	91.4	3	8.6	35	f	0.37
>20-25	54	83.1	11	16.9	65		
Education (Read and write)	16	84.2	3	15.8	19	20.1	0.0001
Primary school	10	100.0	0	.0	10		
preparatory school	40	100.0	0	.0	40		
University	20	64.5	11	35.5	31		
Occupation (House wife)	76	84.4	14	15.6	90	f	0.34
Employee	10	100.0	0	.0	10		
Income (Sufficient)	20	100.0	0	.0	20	6.9	0.031
Just meet life expenses	56	80.0	14	20.0	70		
Un sufficient	10	100.0	0	.0	10		

χ 2 **Chi-square test   f =Fisher Exact test p<0.05 significant**

Discussion

Anemia is the 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**(Padmavathi et al 2015,).**

Anemia is a global public health problem affecting both developing and developed countries with major consequences on human health as well as socioeconomic development. It occurs at all stages of the life cycle but is more prevalent in young pregnant women**.(Seyoum,2019).** So that this study aimed to evaluate the effect of health promotion instructions regarding iron deficiency anemia on young pregnant women's knowledge and practice.

Demographic characteristics of the women in the study sample shows that more than half of them were between 20-25 years old and were primary and secondary educated. This characteristic homologues to that of young married women in rural areas in Egypt. In this respect, **Farrag et al., (2020)** who reported that one third of participants were below 25 years, 90.9% were not employed, and 57% completed secondary schools' education.

In the same line **Pundkar et al., (2017)** who study risk factors for anemia in pregnancy. It was seen that majority of the age of study participants ranged from 20 to 25 years. Also **Abdel-Mageed, et al., (2017)** in a study about the impact of management protocol on pregnant women with iron deficiency anemia who found that level of education and the job status of their study subjects were secondary school education and were housewives.

As regards obstetric history of the studied women the current study has also demonstrated that more than half of them primipara or para1. As well as one third of them had no pregnancy space and nearly half of them had cesarean section as a mode of delivery and nearly one quarter of them–used family planning methods. In agreement with the previous finding a cross-sectional survey was carried out in Alexandria,

Egypt in 2017 with target population was married fertile women aged were in young age 15-24 years. Also 70.4% of them have cesarean delivery. As well as **El-Zanaty F, Way A 2014** reported that contraceptive methods varies widely across Egypt regions and Urban women were more likely to be using contraceptives than rural women.

Aspects of women BMI the present study results shows that nearly one quarter of the study subjects were overweight. In the other hand **Millicenta etal.,(2019)** who compare trends and determinants of anemia between adult and teenage pregnant women in two rural districts of Ghana who reported that study subjects had lower mean body weight, BMI and mean Hb at first antenatal services. These implied that the teenagers were more likely at risk of a poorer health status. Also **Seyoum Y. et al (2019)**in similar study reported that approximately a third of the adolescent girls (35%) were underweight (BMI <18.5)

The current study results showed that symptoms and sign of anemia among studied women through the third trimesters after implantation of health promotion instructions . There is a regression of signs and symptom of anemia as pallor skin and sclera regress from one quarter in first trimester to 15% in second and 2% in third trimester. Also Pale nail regress from more than half in first trimester to more than one third in second and nearly one quarter in third trimester. As well as headache regress from majority of cases in first trimester to nearly half in second and nearly one quarter in third trimester. That is similar to the results of a study done in Ethiopia in 2018 by **Serbesa et al., (2018)** who reported that 88.9%, 84.5%, 93.3%, 75.6% and 80% of the participants who reported that IDA was associated with such symptoms as fatigue, general weakness, dizziness and fainting, headaches, and pallor of face, lips and nail beds

Also **Imran et al., (2019)**who study anemia with pregnancy who reported that nonspecific signs and symptoms may present with fatigue being the most common. Also, women may suffer from headaches, palpitations, dizziness, and dyspnea and hair loss.

As regards degree of anemia the present study results shows that majority of the study subject had moderate anemia followed by mild anemia in 13% of women during first trimester. After application health promotion instructions this level changed from 88% mild and 12% moderate. This finding is in the same line with **Abdel-Ati , et al., (2019)** who evaluate the impact of health promotion directive based on Health Belief Instructions on pregnant women diagnosed with Iron Deficiency Anemia in Egypt who reported that hemoglobin level was elevated among the study group during the first and second assessment

Also **Maka et al. 2017** who reported that the incidence of mild, moderate, severe anemia were 28%, 54%, 18% respectively. Most of the anemic woman belonged to low socio-economic status 84%. 16% had maternal complications. Poor perinatal outcome was seen in un booked and referred cases. In the opposite line **Grace Stephen et al.,2018** reported that the prevalence of anemia among pregnant women was 18.0%. Additionally in another study conducted by **Bekele et al., (2016)** among the pregnant women, who reported that mild anemia was found to be common and followed by moderate anemia.

Concerning food habit of the study subjects pre, post and follow up application of health promotion instructions. There was an improvement of women food habits after application of health promotion instructions-from majority for good habits through in third trimester if compared to that in first trimester. This high level of bad food habits pre-intervention reflects some deficiency in the role of ANC in the area of nutritional education pertaining to IDA. In agreement with this **Saaka M, Rauf. (2015)** reported that consumption of fruits two or more time per week was associated with decreased risk of anemia. As well as Abdel **Mageed, et al., (2017)** reported that there is an increased trends of intake of animal and plant proteins and eating green vegetables and fruits daily after intervention in the study group.

Concerning women's knowledge towards IDA pre, post and follow up of health promotion instructions. Present study results demonstrate marked improvement of women knowledge towards IDA from 55% in pre to 83% in post and 80% in follow up of health promotion instructions for satisfactory knowledge.

This finding was in agreement with a study conducted by **Fredanna A. D.,et al., (2012)** to assess anemia knowledge, attitudes and behaviors among pregnant women in Sierra Leone. Participants' knowledge about anemia causes, prevention, and treatments need to be addressed, as it was generally poor. If knowledge is lacking, this could be problematic for participants to make decisions based on sound information to reduce anemia risk. As more than three quarters of participants indicated that they could get more information about anemia at a hospital or clinic.

In this respect, **de Jersey et al. (2013)** observed a group of Australian expectant mothers and found that their nutrition knowledge during pregnancy was poor. They need knowledge regarding healthy diet during pregnancy such as taking enough fruits and vegetable, addition to, one in ten women followed important dietary.

After application of health promotion instructions women reported increase consumption of different food group per week. And this shows a statistically significant difference from pre to post and follow up health promotion instructions. Similar finding was reported by **Hailu A, Zewde T. (2014)** who study anemia among pregnant women reported that women with restricted dietary behavior were more likely to be anemic compared to those without restrictive dietary behavior.

Also **Abd El Aziz, 2016**confirmed that, there was a positive highly statistically significant correlation between health beliefs and health behavior in both intervention and control groups before and two months after program implementation. This finding is consistent with **Yossif & EL Sayed, 2014** who stated that there was a statistically significant correlation between total health beliefs score and total intention score to practice health preventive behavior in both intervention and control groups before and two months after the self-learning package.

Regards relation between total knowledge score about Iron deficiency anemia among studied women and their demographic characteristics pre intervention. A statistically significant difference observed between women's educational level(100% of university education show satisfactory level, occupation 100% of employee women show satisfactory level of total knowledge score.

In agreement with the previous finding **Obse N, et al (2013)** who reported that Socio-economic status of household was significantly associated with anemia among pregnant women. Women from lower socio-economic class had higher prevalence of anemia than those from higher socio economic status. The higher prevalence of anemia was reported in lower socioeconomic class.

Examining relation between total knowledge score about Iron deficiency anemia among studied women and their demographic characteristics post intervention. Women's age more than 20 years shows satisfactory total knowledge score more than who less than or equal 20years. In agreement with the previous finding a study among 600 patients conducted by **Balasubramanian, et al 2016** who study awareness of anemia among pregnant women. The study shows the lack of knowledge among antenatal mothers regarding anemia and its complications. 72% belongs to 20-29 years age group. The significant determinants are literacy, socioeconomic status and gestational age.

Regards relation between food habit level among studied women and their demographic characteristics pre intervention. The majority of women shows bad food habits regardless their sociodemographic characteristics in pre-intervention phase This may be due to those women from lower socio-economic status being unable to purchase the good quality as well as enough quantity of foods. These changes indicate a positive impact of the educational program among women in the study group

In the same line **Abriha A., et al., (2014)** who study prevalence and associated factors of anemia among pregnant women in Ethiopia the study results showed that women who had low dietary diversity score were 3.18

times more likely to develop anemia than those with higher dietary diversity score.

Finally, the present study finding revealed that after implementation of health instructions there is an improve in food habits of women in the study. There is no statistically significant difference as regard demographic characteristics except educational level as women who read and write shows reported good food habits 84.2% in post intervention phase. This may be attributed to the fact that the researcher used simple applications and simulations in order to simplify the information and help attendants to apply their knowledge to practice.

In the same line **Kesten JM, et al., (2016)& Zelalem, A., et al (2017)** reported that that after the implementation of Education Based on Health Belief instructions on dietary nutrition education observed in knowledge change and behavior improvement pre and post assessment significant differences between the two groups in terms of respectively

Conclusion

In the light of the main findings of the current study, it can be concluded that:- implementation of health promotion instructions improve young pregnant women's dietary knowledge and practice thus it proved to be successful in raising the hemoglobin level

Recommendation

Based on the results of the present study, the following recommendations are suggested:

- A nutrition education is recommended to enhance the nutritional knowledge of young mothers about iron rich foods, enhancer and inhibitors of iron absorption. Also should be provided with instructional booklets about anemia based on scientific background to improve their knowledge and health belief.
- Also nurses working in MCH centers should be trained to improve their knowledge and skills, so they will be able to educate and counsel pregnant women regarding nutrition.
- Special attention should be given to the iron intake of young females from the beginning of menarche.

- Further study should be conducted at urban settings and different age group to foster the health of pregnant women with Iron Deficiency Anemia and to find out if there is difference between urban and rural community

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