

Effect of Health Promotional Program on Pregnant Women' Knowledge and Practices regarding Pregnancy Nutritional Problems

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Abstract

Iron deficiency anemia, underweight, gestational diabetes, overweight, and obesity are one of the main nutritional problems among pregnant women which can associate with significant pregnancy complications. **Aim:** To evaluate the effect of health promotional program on pregnant women' knowledge and practices regarding pregnancy nutritional problems. **Design:** Quasi-experimental research design pre-post-test was used in this study. **Settings:** The study was applied in the antenatal clinics at Sohag and Tanta University Hospitals and maternal and child health centers at Sohag City (Dar E Salam Abdallah health center). **Sample:** purposive sample of 410 pregnant women was recruited from the previously selected settings. **Tools:** A structured interviewing questionnaire and pregnant women's reported practices. **Results:** The results showed that the most reported source of information among pregnant women on nutrition during pregnancy was health team personal. a highly statistically significant difference found between pregnant women's knowledge regarding nutritional problems including Iron deficiency anemia, underweight, gestational diabetes, overweight, and obesity at pre and post health promotional programs. pre the health promotional program implementation, more than three-quarters of pregnant women had unsatisfactory total practice scores pre the implementation of the program regarding nutritional problems which improved and become most of them had satisfactory total practice scores post-implementation of the program. **Conclusion:** The implemented health promotional program had positive effect on improving pregnant women's knowledge and practices regarding the nutritional problems during pregnancy. **Recommendation:** A health promotional program regarding the nutritional problems should be educated for pregnant women during the antenatal period to prevent complications associated with these problems.

Keywords: Health promotional program, pregnant women, knowledge, and practices, nutritional problems.

Introduction:

Pregnancy is a critical period during women's lives and included many physical, physiological, hormonal, and anatomical changes that require promotion by pregnant women. Hence, pregnant women should eat a healthy diet to ensure the growth and development of their fetus and avoid complications during their pregnancy (Eshra and Ali, 2016).

Balanced and healthy nutrition is considered fundamental for all human beings to maintain the proper functioning of the body system. Pregnancy is a period that included

many physical and hormonal changes. During pregnancy balanced nutrition can help maintain the expected weight gain of the women and the growth and development of the fetus (Soma-Pillay et al., 2016). It also can help improve neonate and birth outcomes and prevent the child from other developing diseases such as heart disease and obesity later in life. World Health Organization [WHO] reported that a healthy diet should contain sufficient energy, protein, vitamins, and minerals obtained from diverse food (World Health Organization, 2020). The practice of poor nutrition during pregnancy leads to gestational weight gain, increased maternal infections, preeclampsia,

anemia, preterm birth, or miscarriage (**Kominiarek & Rajan, 2017**)

Nutrition during pregnancy can cause adverse complications for the fetus such as neural tube defects, intrauterine growth retardation, and low birth weight. Insufficient nutrition may also develop complications among pregnant women such as anemia, miscarriage, pregnancy-induced hypertension, gestational diabetes, and early or cesarean delivery (**Alemayehu and Tesema, 2015**)

Iron deficiency anemia, underweight, gestational diabetes, overweight, and obesity are one of the main nutritional problems among pregnant women which can associate with significant pregnancy complications. Iron deficiency anemia can be caused by nutritional deficiencies, diseases, inadequate intake of usable iron, and excessive blood loss and tea consumption after a heavy lunch. The low consumption of food rich in vitamin C is another contributing factor, as this vitamin enhances the absorption of iron. An increase in the awareness of mothers towards the right food to be taken during pregnancy and lactation, fortification of some staple foods with iron, as well as iron supplementation, are the main activities to decrease the prevalence of iron deficiency anemia (**Zelalem et al., 2017**).

Obesity among pregnant women is considered a new problem associated with pregnancy. Recent studies in the GCC countries reported a high prevalence of overweight and obesity among women ranging from 54% to 70%. Obesity is considered a risk factor for several chronic diseases such as hypertension, diabetes, heart diseases, and some types of cancer. During the past decade, with obesity, the incidence of macrosomia has increased in the region. Maternal obesity and overnutrition set up the cascading events of increased blood glucose that stimulates increased fetal insulin, resulting in abnormally increased lipogenesis and excessive adipose tissue deposit. Obese pregnant women as much as 150% overweight are at risk for developing gestational diabetes, elevated blood pressure, and increased blood lipids (**Abujilban et al., 2019**).

Underweight is considered a less common problem in pregnant women than is overweight occurs among a small percentage. Gestational weight gain during the second and third trimesters is a very important factor of adequate fetal growth. For pregnant women who are underweight before pregnancy the greater the gain during pregnancy, the lower the neonatal mortality rate. Underweight and low intake of essential nutrients is the main causes of low birth-weight (LBW) infants. The incidence of LBW in developing countries varies from country to country, with a range of 7% to 15% (**Suliga et al., 2018**).

Gestational diabetes may appear during pregnancy among pregnant women who have no previous history of diabetes. Indicators are available indicated that the prevalence of these symptoms is relatively high, varying from 5% to 10%. Gestational diabetes is linked with pregnancy complications such as macrosomia, perinatal mortality, and prematurity (**Brown et al., 2017**).

The WHO recommends that health care professionals should provide nutrition education at each antepartum visit. Several studies confirmed the positive effect of health education on the dietary knowledge levels and practices of pregnant women. For example, examining the impact of nutrition education on dietary knowledge and practices among 406 pregnant women in Ethiopia, it was found that knowledge of healthy nutrition increased from 53.9% to 97%, and dietary practice improved from 46.8% to 83.7%.5 (**World Health Organization, 2019**).

Health promotion enables women to increase control over their own health. It covers a wide range of interventions that are designed to benefit and protect women's health and quality of life by addressing and preventing the root causes of ill health, not just focusing on treatment and cure (**WHO, 2016**). Nutrition education as a health promotion activity can help pregnant women to adhere to healthy behavioral practices and controlling other associated health risk factors to maintain both pregnant women's health and pregnancy outcomes. World Health Organization (WHO) also recommends that health providers should provide adequate and acceptable nutrition-

related advice to their ANC clients during every visit of antepartum (Darnton, 2015)

Nutrition education during pregnancy about a healthy diet during pregnancy can be the right time to encourage adequate daily iron, folic acid intake, and other pregnancy-specific foods. Nutritional education programs can improve pregnant women's dietary intakes during pregnancy by promoting a balanced diet. Overwhelming evidence suggests that nutrition education during pregnancy has a significant effect on knowledge and dietary habit among pregnant women, which enables them to improve their maternal and birth outcomes of pregnancy (Alina et al., 2013).

Obstetric and community health nurses are to be in a unique position to provide pregnant women with nutritional advice their usual contact with the women via antenatal appointments. Health promotion and education are considered among the most important activities that nurses perform with pregnant women as advocates for health and wellbeing rather than managers of diseases. (Davies et al. 2016).

Significance of the study:

Several studies reported on women's preferred format for receipt of nutrition information. Pregnant women preferred to receive information about nutritional advice in the form of a written booklet from their healthcare professionals. In contrast, a study of pregnant women reported that listening to teachers and healthcare professionals was the best way to learn about nutrition (Sakhile and Shu, 2014). Findings from another quasi-experimental study among 100 pregnant women in Iran confirmed that the awareness levels of healthy nutrition have increased from 3% before the intervention to 31% after (World Health Organization, 2019).

Aim of the study

The study aimed to evaluate the effect of health promotional program on pregnant women' knowledge and practices regarding pregnancy nutritional problems through:

1- Assessing pregnant women' knowledge regarding pregnancy nutritional problems.

- 2- Assessing pregnant women' reported practices regarding pregnancy nutritional problems.
- 3- Investigate the relation between pregnant women' knowledge and practices regarding pregnancy nutritional problems.
- 4- Evaluating the effect of health promotional program on pregnant women' knowledge and practices regarding pregnancy nutritional problems

Research Hypotheses:

Health promotional program will has positive effect on improving pregnant women's knowledge and practices regarding pregnancy nutritional problems

Subjects and Methods:

Research design:

A quasi-experimental research design pre-post-test was used in this study, such design is important to the nature of the study issue, having one or more group subjects observed on pre and post manipulations (Creswell, 2012).

Setting:

The study was applied in the antenatal clinics at Sohag and Tanta University Hospitals and maternal and child health centers at Sohag City (Dar E Salam Abdallah health center).

Subjects

Purposive sample of 410 pregnant women was recruited from the previously selected settings.

Sample size:

Sample size was calculated based on a power analysis of $0.95(\beta=1-0.95=0.5)$ at alpha $.05(\text{one-sided})$ with large effect size (0.5) was used as the significance

Inclusion criteria included:

Pregnant women aged from 18 to 40 years, agree to participate in the study and who are in the first or second trimesters to receive health promotional program and continue the follow-up.

Exclusion criteria included:

Pregnant women with any medical problems or chronic diseases during pregnancy such as gestational diabetes, preeclampsia, anemia, or hypertension were excluded from the study.

Tools of data collection:

Two tools were used to collect the data of the study as the following:

Tool I: Structured interviewing questionnaire: it was developed by researchers and consisted of four parts as follow: (**World Health Organization, 2019 and World Health Organization, (2020):**

Part (1): It included demographic data of the pregnant women such as age, educational level, occupation, and residence.

Part (2): It included the obstetrical history of pregnant women; it contained five questions about the gravida, abortion, and pregnancy stage.

Part (3): Pregnant women's knowledge regarding nutritional problems tool (pre-post tool): it was designed by the researchers to identify the level of pregnant women's knowledge regarding nutritional problems and their source of information, it contained 28 items for knowledge.

Scoring system:

The items of knowledge about nutritional problems included "yes/no" and multiple-choice answers. For each "yes/no" question, an incorrect response was answered with 0, and a correct response was answered with 1. Further, the multiple-choice questions were answered from 0 for do not know, 1 for the incomplete correct answer, and 2 for the complete correct answer. The total score of knowledge ranged from 0 to 30 for the 28 items. The level of knowledge was determined as good ($\geq 70\%$), average (51-69%), and poor level ($\leq 50\%$).

Tool II: Pregnant women's reported practices tool (pre-post tool); it was composed of two elements; the first one contained ten questions to assess the pregnant women's practices.

Scoring system:

The items of reported practices included "yes/no" answers and the total score of practices score ranged from 0 to 10 for the ten items; an incorrect response was answered with 0 and a correct response was answered with 1. The sum of scores for all of the items was calculated, then the level of practice was classified, as satisfactory practices if the score is ($>60\%$), and unsatisfactory practices if the score was ($\leq 60\%$).

Validity and reliability of the tools:

The content validity was tested for clarity, comprehensiveness, appropriateness, and relevance and reviewed by five experts in the obstetrics and gynecology nursing field and the community health nursing field. Modifications were done according to the panel judgment to ensure clarity of sentences and appropriateness of the content. The reliability of the tools was assessed through Cronbach's alpha test $\alpha = 0.89$.

Operational Design:

The operational design for this study included three phases named by; preparatory, implementation, and evaluation phase.

It was designed to evaluate the effect of health promotional program on pregnant women' knowledge and practices regarding pregnancy nutritional problems.

A-Preparatory phase:

It was based on the assessment data was obtained during the interviewing questionnaires, literature review, through learning, nutritional knowledge, and practices. Booklet was written in Arabic language, printed out regarding the sample size, and given after implementing the health promotional program.

Ethical considerations:

Before starting the research, ethical approval was obtained from the scientific research ethical committees of the faculties of nursing, Sohag and Ain Shams Universities. The researchers met both medical and nursing directors of the selected settings to clarify the purpose of the study and take their approval. Written consent was obtained from the pregnant women to participate in the study

after the objective of the study was explained to them. The researchers informed the pregnant women that, the study was voluntary, they were allowed to not participate and they had the right to withdraw from the study at any time, without giving any reason. Moreover, they were assured that their information would be confidential.

Pilot study

A pilot study was carried out on 10% of the sample (41) pregnant women to observe the clarity and testing of the feasibility of the research process needed for modifications to develop the final form of the tools. Pregnant women involved in the pilot study were excluded from the study. The researchers were done modifications for some items in the form of Arabic translation to make them more suitable for pregnant women's perception. The pilot sample was excluded from the main research sample.

Implementation phase:

An official permission letter was issued by the Dean of the Faculty of Nursing to the directories of antenatal clinics of Sohag and Tanta University Hospitals and child health center at Sohag City (Dar E Salam Abdallah health center).

Data were collected from the beginning of August 2020 to the end of January 2021. The researchers attended the previously selected settings two days per week starting from 9.00 a.m. until 11:00 a.m.

Data was collected by all the researchers and they introduced themselves to the pregnant women. Clear and simple explanations about the aim and nature of the study were discussed by the researchers with pregnant women.

The interview took approximately 35-45 minutes for each pregnant woman to answer and fill the questionnaire (Tool 1) to assess the knowledge and practice of pregnant women regarding nutritional problems. Each session took about 2 hours. The program was implemented for 3 months. The researchers prepared supported educational material (booklet) after reviewing related literature regarding nutritional problems and given it to all study participants pregnant women.

The developed health promotional program was implemented in the training room at the selected settings. The researchers visited clinics and health centers of the intervention groups six times, three times for each clinic and health center to provide six educational sessions. At each visit, the researchers gathered the assigned subgroup of 22-24 pregnant women in the meeting room where pretest structured questionnaires was completed. Then, one educational lecture was delivered for the group. At the end of the lecture, booklets were distributed for supporting the explained lecture.

The researchers firstly were introduced themselves to pregnant women and gave them a complete explanation about the study objective and the tool used which translated by the researchers in the Arabic language to collect the required data. All women were asked to fill the pretest questionnaire and provide a health promotional program was conducted in a meeting room in the selected clinics and health center by the researchers.

Session 1: All researchers began with a discussion about the previous session's content then the learning outcomes of the next session. The session was performed by the researchers using the Arabic language that appropriate for women's understanding. Start assessed for knowledge and practices regarding nutritional problems

Session 2: The theoretical part was contained knowledge about nutritional problems during pregnancy such as underweight, overweight, iron deficiency anemia, gestational diabetes and obesity, causes, signs and symptoms, nursing care, prevention, and complications of these problems, the normal weight gain during pregnancy, body's requirement of the of diet during pregnancy, the balance between energy intake and consumption were explained. Other examples of the topics covered are the physiological changes that occur in pregnant women, the importance of diet and supplements for pregnant women and the fetus. It was implemented through lectures, posters, demonstrations with real food samples,

educational films, scenarios, and role-plays.

Session 3: The practical part was contained information about nutritional problems during pregnancy and about how to improve dietary behaviors, supplementation of vitamins and folic acid, eating foods rich with protein, iron, eating fruits and vegetables, drinking milk, following weight during pregnancy, and doing required tests to ensure pregnancy efficiency. It was implemented through lectures, posters, educational films.

Session 4: The researchers explained the importance of ante-natal care visits and illustrated follow up importance & provide referral in sever problems and complication management explained nutritional problems prevention during pregnancy

The Evaluation phase:

After implementing the health promotional program about nutritional problems during pregnancy, evaluation of research sample knowledge and practice was done using the same format of tool that was used in the pre-test to evaluate the effect of the health promotional program. Post-test was done in the follow up visit at the same previously selected settings.

Statistical Analysis:

The content of each questionnaire was analyzed, classified, and then coded by the researchers. Using SPSS software version 21, the data were tabulated and analyzed. Excel is used for figures. Descriptive statistics were used to present information in the form of frequencies, percentages for qualitative variables, and quantitative variables were described utilizing means and standard deviations. Paired T-test was utilized to measure the knowledge of pregnant women before and after the program, and analyze the differences. To evaluate the inter-relationships among quantitative variables, Pearson correlation analysis was used At P-value.

Results

Table (1): Represented that 81% of pregnant women their age ranged between $18 < 30$ years and their mean age 21.10 ± 7.58 , (35%) of them had secondary education, meanwhile, and also, it is pointed out that 75% of pregnant women were not working.

Figure (1): Demonstrated that (83%) of pregnant women lived in rural areas and 17% of them were from urban areas.

As shown in **table 2**, (53%) of the pregnant women were multigravida, 63% of them were not aborted before, and 54% were in the first trimester.

Figure (2) illustrated that the major source of information among the studied pregnant women was doctors (57%)

Figure (3): Illustrated that there was an improvement in pregnant women's knowledge regarding nutritional problems pre and post health promotional programs.

Table (3): Revealed that there was a highly statistically significant difference between pregnant women's knowledge regarding nutritional problems including Iron deficiency anemia, underweight, gestational diabetes, overweight, and obesity at pre and post health promotional program ($p < 0.001^{**}$).

Table (4): Clarified that there was a highly statistically significant difference between pregnant women's practice regarding nutritional problems including health dietary behaviors, supplementation of vitamins and folic acid, eating foods rich with protein, iron, fruits and vegetables, following weight during pregnancy, and doing required tests to ensure pregnancy efficiency at pre and post health promotional program ($p < 0.001^{**}$).

It was noticed from **figure 4** that, 89% of pregnant women had unsatisfactory total practice scores pre the implementation of health promotional program regarding nutritional problems which improved and become 91% of them had satisfactory

total practice scores post-implementation of health promotional program.

Table (5): Indicated that there was a correlation between knowledge and practices among pregnant women concerning nutritional problems pre and post health promotional program implementation at $p < 0.001$.

Table (6): Illustrated that there was a statistically significant association between pregnant women's knowledge, regarding the nutritional problems during pregnancy and some of their demographic characteristics as age and educational level. No association was noticed between women's knowledge and the other demographic characteristics.

Table (1): Distribution of studied pregnant women according to their demographic characteristics (n=410)

| Item | Pregnant women (410) | |
|--------------------------------|----------------------|------|
| | No. | % |
| Women ' age in years | | |
| 18 < 30 | 332 | 81 |
| 30 < 40 | 78 | 19 |
| Mean ±Stander deviation | 21.10 ± 7.58 | |
| - Women ' education | | |
| - Illiterate | 56 | 13.6 |
| -Basic education | 96 | 23.4 |
| -Secondary education | 143 | 35 |
| -University education | 115 | 28 |
| Occupation | | |
| - Working | 102 | 25 |
| - Not working | 307 | 75 |

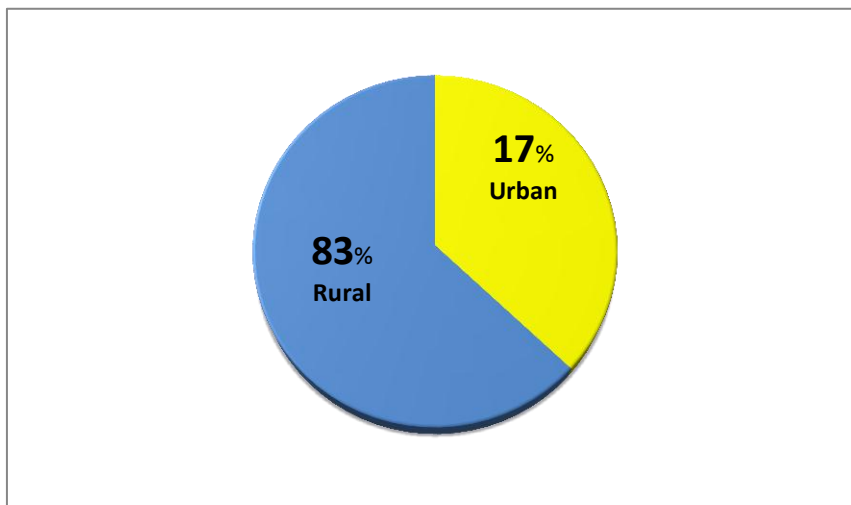


Figure (1): Distribution of studied pregnant women according to their residence (n=410)

Table (2): Distribution of pregnant women according to their obstetrical history (n=410)

| Item | Pregnant women (410) | |
|------------------------|----------------------|------|
| | No. | % |
| Gravida | | |
| - Primigravida | 156 | 38 |
| - Multigravida | 217 | 53 |
| - Grand Multigravida | 37 | 9 |
| Abortion | | |
| - Less than 2 | 90 | 22 |
| - More than 2 | 62 | 15 |
| - No abortion | 258 | 63 |
| Pregnancy stage | | |
| - First Trimester | 221 | 54.0 |
| - Second Trimester | 189 | 46.0 |

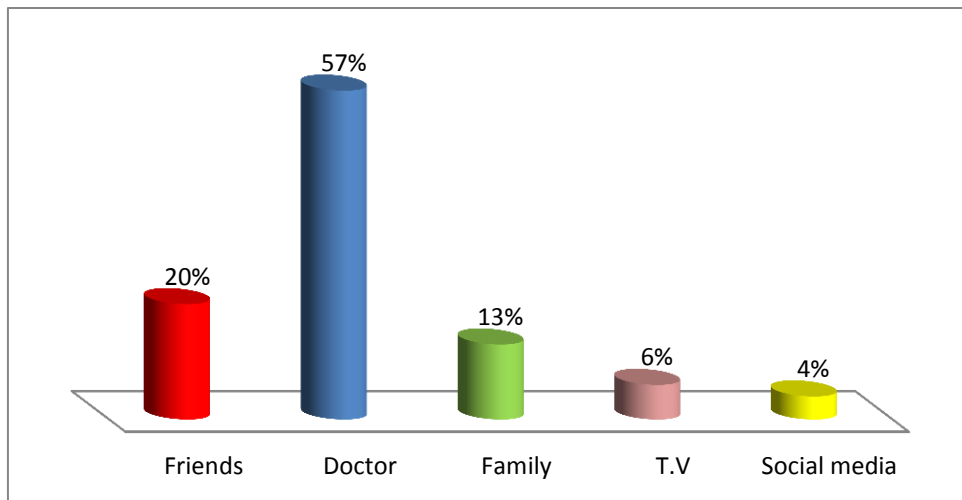


Figure (2): Percentage distribution of studied pregnant women according to their source of information about nutritional problems (n=410)

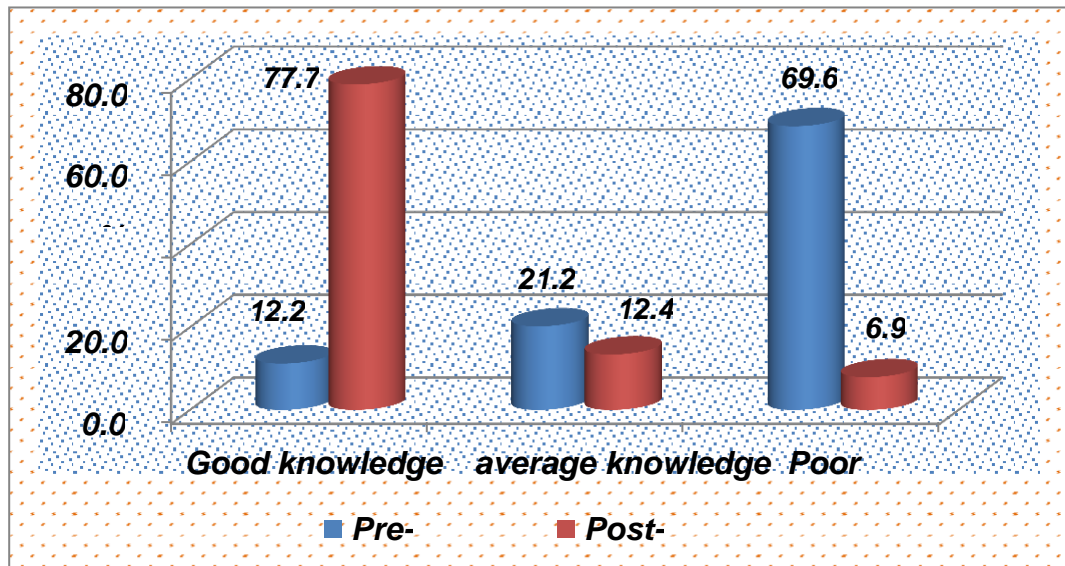


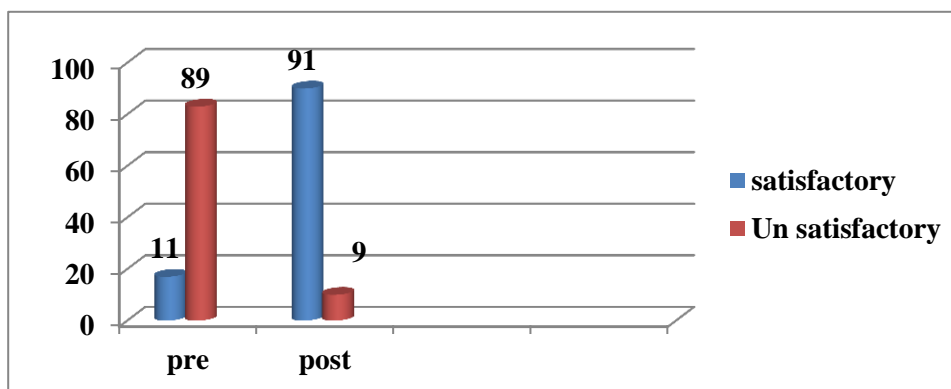
Figure (3): Percentage distribution of total knowledge score of the studied pregnant women according to their source of information regarding nutritional problems pre and post-health promotion (n=410).

Table (3): Mean differences between pre/post-implementation regarding knowledge of the studied pregnant women regarding nutritional problems pre and post health promotional program (n=410).

| Variable | Score | Pre-intervention | Post-intervention | Paired t-test | P-value |
|------------------------|-------|------------------|-------------------|---------------|----------|
| | | Mean \pm SD | Mean \pm SD | | |
| Iron deficiency anemia | 6 | 1.47 \pm 0.48 | 4.62 \pm 1.37 | 45.8 | <0.001** |
| Underweight | 6 | 1.54 \pm 0.79 | 4.63 \pm 1.83 | 217.3 | <0.001** |
| Gestational diabetes | 6 | 1.59 \pm 0.38 | 4.21 \pm 0.92 | 75.3 | <0.001** |
| Overweight | 6 | 2.48 \pm 0.83 | 4.51 \pm 0.84 | 54.2 | <0.001** |
| Obesity | 6 | 2.65 \pm 0.58 | 4.62 \pm 0.51 | 65.7 | <0.001** |

Table (4): Mean differences between pre/post-implementation regarding practices of the studied pregnant women regarding nutritional problems pre and post health promotional program (n=410).

| Variable | Score | Pre-intervention | Post-intervention | Paired t-test | P-value |
|-------------------------------------------------------------|-------|------------------|-------------------|---------------|----------|
| | | Mean \pm SD | Mean \pm SD | | |
| Health dietary behaviors | 2 | .70 \pm .46 | 1.56 \pm .42 | 16.2 | <0.001** |
| Supplementation of vitamins and folic acid | 2 | .34 \pm .60 | 1.18 \pm .27 | 10.03 | <0.001** |
| Eating foods rich with protein, iron, fruits and vegetables | 2 | .82 \pm .47 | 1.68 \pm .36 | 13.1 | <0.001** |
| Following weight during pregnancy | 2 | .62 \pm .54 | 1.4 \pm .38 | 60.5 | <0.001** |
| Doing required tests to ensure pregnancy efficiency | 2 | .64 \pm .56 | 1.47 \pm .45 | 11.4 | <0.001** |

**Figure (4):** Percentage distribution of total reported practices score of the studied pregnant women regarding nutritional problems pre and post health promotional program**Table (5):** Correlation matrix of total knowledge and reported practices scores of the studied pregnant women regarding nutritional problems pre and post health promotional program (n=410)

| Items | Pre-test | | Post-test | |
|-----------------------|----------|---------|-----------|---------|
| | r | p | r | p |
| Knowledge VS practice | 0.378** | <0.001* | 0.309** | <0.001* |

(*) Statistically significant at $p < 0.05$ (**) statistically significant at $p < 0.01$

Table (6): Association between pregnant women's knowledge, regarding the nutritional problems during pregnancy and their demographic characteristics

| Demographic characteristics | M | SD | Statistical test | p-value |
|-----------------------------|-------|------|------------------|---------|
| Age (years) | | | | |
| • 18<30 | 16.33 | 6.03 | r=2.13 | .013 |
| • 30>40 | 17.56 | 3.45 | | |
| Educational level | | | F=3.45 | .035 |
| • Illiterate | 17.22 | 3.27 | | |
| • Basic education | 18.32 | 3.73 | | |
| • Secondary education | 16.23 | 3.32 | | |
| • University education | 17.32 | 3.22 | | |
| Occupation | | | t=-0.56 | .583 |
| • Working | 16.24 | 6.04 | | |
| • Not working | 17.53 | 3.23 | | |
| Residence | | | t=-0.25 | .804 |
| • Urban | 17.43 | 3.15 | | |
| • Rural | 17.72 | 4.34 | | |

Discussion

Nutritional knowledge deficiency and improper practice cause a nutritional problem that can lead to complications diseases. However, knowing nutritional problem prevention and management and following proper practice can prevent and control them during pregnancy (Tanay et al., 2014). Obstetrics, gynecology, and community nurses play a vital role as health educators and counselors; also need to be aware of promoting pregnant women's nutritional problems that required medical care. Health promotion was the primary emphasis in antenatal intervention programs and to improve health (Naylor et al. 2015). The study aimed to evaluate the effect of health promotional program on pregnant women' knowledge and practices regarding pregnancy nutritional problems.

The findings of the present study revealed that the major source of information among more than half of the studied pregnant women was doctors. This result indicated the importance of health care providers in improving nutrition education to provide pregnant women with the necessary information which is crucial to prevent the complication of nutrition problems during pregnancy. These results were consistent with Zahara et al., (2014) who studied "Nutritional Status and Nutritional Knowledge of Malay Pregnant Women in Selected Private Hospitals in Klang Valley" and stated health providers in their study were the source of information for the pregnant women.

The findings of the present study revealed that there was an improvement in pregnant women's knowledge regarding nutritional problems pre and post health promotional programs. This result reflected the positive effect of providing the program and implicates the positive impact of nutritional promotion in improving knowledge of pregnant women during pregnancy.

These results are reliable with the finding of Farnoush et al., (2013) who studied "Effects of Nutrition Education on Levels of Nutritional Awareness of Pregnant Women in Western Iran" and reported that after the implementation of nutritional education for pregnant women the knowledge of pregnant women nutrition during pregnancy was increased. Similarly, the study result is in agreement with a study conducted in India by Garg and Kashyap (2016) about the effect of counseling on nutritional status during pregnancy and found that nutritional knowledge has been improved among participants at pre and post assessment respectively. Also, the result is in the same line with the result of a study done by Daba et al., (2013) in East Wollega who stated the same result.

The study findings indicated that there was a highly statistically significant difference between pregnant women's knowledge regarding nutritional problems including Iron deficiency anemia, underweight, gestational diabetes, overweight, and obesity at pre and post health promotional programs. This is reflected the

effectiveness of health promotional programs on the knowledge of pregnant women.

The findings of the present study revealed that more than three-quarters of pregnant women had unsatisfactory total practice scores pre the implementation of health promotional program regarding nutritional problems which improved and become most of them had satisfactory total practice scores post-implementation of health promotional program.

These findings are supported by **Zelalem et al., (2017)** in a study about the Effect of nutrition education on pregnancy-specific nutrition knowledge and healthy dietary practice among pregnant women in Addis Ababa and reported that it is very important to expose pregnant women to antenatal health education to encourage them to better practices. This result also is matched with a report of **Desalegn et al., (2015)** which indicated in their study about dietary practice and associated factors among pregnant women in Wondogenet District, Southern Ethiopia that there was a significant improvement in the food practice in the post nutrition Education as compared to pre-Nutrition Education.

The findings of the present study revealed that there was a correlation between knowledge and practices among pregnant women concerning nutritional problems pre and post health promotional program implementation at $p < 0.001$. This is explained by that sufficient knowledge is always associated with satisfactory practices.

The findings of the present study revealed that there was a statistically significant association between pregnant women's knowledge, regarding the nutritional problems during pregnancy and some of their demographic characteristics as age and educational level. Regarding education, it is related to knowledge deficit is linked with health literacy which and the degree of women to obtain and understand basic health information (**Berkman et al., (2019)**).

These results are congruent with those reported by **Kululanga et al., (2020)** in their study about Knowledge deficit on health promotion activities during pregnancy: the case for adolescent pregnant women at Chiladzulu

District and found that knowledge deficit among pregnant women may be attributed to low educational level and young age.

All findings of the present study revealed a positive impact and success of the health promotional program hypothesis on improving knowledge and practices among pregnant women regarding nutritional problems during pregnancy after receiving the program. These results and hypotheses are supported by **Fallah et al., (2013)** who conducted a study about the effects of nutrition education on levels of nutritional awareness of pregnant women in Western Iran and reported that health education was effective in increasing dietary knowledge and practices among the study sample. Also, the results of this study are supported by the results of the study conducted in Brazil by **Oliveira et al., (2018)** about the effect of an educational intervention on pregnancy and revealed a significant improvement in dietary knowledge and practices post-providing health education.

These results also were in the same line with a study done by **Ashenafi, et al., (2017)** who conducted a study about "Effect of Nutrition Education on Pregnancy Specific Nutrition Knowledge and Healthy Dietary Practice among Pregnant Women in Addis Ababa" that showed improvement in knowledge and practices post nutrition education for pregnant women.

It is reflected the important role of Community-Based Health Planning and Services (CHPS) in improving and increased access to antenatal care; pregnant women benefitted from better high-quality antenatal care and services (**Dickson et al. 2020**).

Conclusion

Based on the results of the current study and research questions, it was concluded that the implemented health promotional program had positive effect on improving pregnant women's knowledge and practices regarding the nutritional problems during pregnancy. The levels of knowledge and practices have been improved and satisfactory practices were found among the majority of the pregnant women after the implementation of the oral health promotion program. There is a significant statistical relationship between the demographic characteristics of the studied pregnant women and

their level of knowledge regarding nutritional problems during pregnancy.

Recommendation

In the light of the findings obtained from the current study, the following recommendations were suggested:

- Health promotional programs regarding nutritional problems should be educated for pregnant women during the antenatal period to prevent complications associated with these problems.
- The educational booklet should be distributed to pregnant women about nutritional problems during pregnancy.
- Correction of false dietary habits that commonly widespread among pregnant women in the community.
- Future research about pregnant women risk factor for nutrition problems and its relation with sociodemographic data.

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