Enhancing Nutritional Knowledge and Practices among Pregnant Women through A Health Promotion Program

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Abstract

In pregnant women, iron deficiency anemia, underweight, gestational diabetes, overweight, and obesity are among the most common nutritional issues that can lead to serious pregnancy consequences. **Aim**: To enhance nutritional knowledge and practices among pregnant women through a health promotion program. **Design:** This study employed a pre-post-test quasi-experimental research design. **Setting**: The study was conducted at Sohag University Hospitals' antenatal clinics. 400 pregnant women were chosen from the previously chosen settings as a convenient sample. **Tools**: Tool (I): A structured interviewing questionnaire and Tool (I): Pregnant women's reported nutritional practices. **Results**: Pregnant women most frequently cited health team personnel as their source of nutritional knowledge. The dietary knowledge of pregnant women before and after health promotion programs about iron deficiency anemia, underweight, gestational diabetes, overweight, and obesity differed in a highly statistically significant way. Prior to the implementation of the health promotion program, over three-quarters of pregnant women had unsatisfactory total practice scores regarding nutritional issues. After the program was implemented, the majority of them had adequate total practice scores. In conclusion, pregnant women's dietary knowledge and practice were improved by the health promotion program through which it was conducted. **Recommendation**: During the antenatal period, pregnant women should be informed through a health promotion program about nutritional issues in order to prevent difficulties and related issues.

Keywords: Health promotional program, Pregnant women, Nutritional knowledge and practices.

Introduction:

Pregnancy represents a significant phase in a woman's life, characterized by numerous physical, physiological, hormonal, and anatomical transformations that necessitate attention from expectant mothers. Therefore, it is essential for pregnant women to maintain a nutritious diet to support the growth and development of their fetus while minimizing potential complications during their pregnancy **(Eshra &Ali, 2020).**

A balanced and nutritious diet is vital for all individuals to ensure the optimal functioning of bodily systems. The pregnancy period is associated with anticipated weight gain in women alongside the growth and development of the fetus Furthermore, proper nutrition can enhance neonatal and birth outcomes, as well as reduce the risk of the child developing chronic conditions such as heart disease and obesity later in life. The World Health Organization (WHO) has indicated that a healthy diet should provide adequate energy, protein, vitamins, and minerals sourced from a variety of foods **(World Health Organization, 2020).** Poor nutritional practices during pregnancy can result in excessive gestational weight gain, heightened maternal infections, preeclampsia, anemia, preterm birth, or miscarriage **(Abujilban et al., 2019).**

Low birth weight, intrauterine growth restriction, and neural tube abnormalities are just a few of the major issues that can result from inadequate nutrition during pregnancy.

Furthermore, anemia, miscarriage, pregnancy-induced hypertension, gestational diabetes, and the possibility of an early or caesarean delivery are among the issues that pregnant women may experience as a result of inadequate nutrition **(Zelalem et al., 2019).**

Iron deficiency anemia, underweight, gestational diabetes, overweight, and obesity represent significant nutritional challenges faced by pregnant women, which can lead to serious complications during pregnancy. Iron deficiency anemia may arise from nutritional inadequacies, medical conditions, insufficient intake of bioavailable iron, and excessive blood loss, as well as high tea consumption following a substantial lunch. Additionally, a low intake of vitamin C-rich foods contributes to this issue, as vitamin C is crucial for enhancing iron absorption. Raising awareness among mothers regarding appropriate dietary choices during pregnancy and lactation, fortifying certain staple foods with iron, and providing iron supplements are essential strategies to reduce the incidence of iron deficiency anemia **(Alemayehu &Tesema, 2019).**

Obesity in pregnant women is increasingly recognized as a contemporary issue linked to pregnancy. Recent research conducted in the GCC countries has indicated a significant prevalence of overweight and obesity among women, with rates ranging from 54% to 70%. Obesity is identified as a risk factor for various chronic conditions, including hypertension, diabetes, cardiovascular diseases, and certain cancers. Over the last decade, the rise in obesity has also correlated with an increase in macrosomia within the region. Maternal obesity and overnutrition trigger a series of events that elevate blood glucose levels, which in turn stimulates increased fetal insulin production, leading to excessive lipogenesis and fat accumulation. Pregnant women who are 150% overweight face heightened risks of developing gestational diabetes, elevated blood pressure, and increased blood lipid levels **(Kominiarek & Rajan, 2019).**

Underweight is considered a less common issue among pregnant women when compared to overweight, impacting only a small fraction of this demographic. Sufficient weight gain during the second and third trimesters is essential for optimal fetal development. For women who are underweight before pregnancy, increased weight gain during this time is correlated with a lower neonatal mortality rate. The prevalence of low birth weight (LBW) newborns is largely caused by underweight and insufficient intake of vital nutrients. According to **Suliga et al. (2018)**, the prevalence of LBW in underdeveloped countries varies from 7% to 15%.

Women without a history of diabetes may acquire gestational diabetes during pregnancy. Evidence points to a comparatively high prevalence of these symptoms, ranging from 5% to 10%. Prematurity, neonatal mortality, and macrosomia are among the prenatal problems linked to gestational diabetes **(Brown et al., 2019).**

The World Health Organization recommends that all prenatal visits should include dietary education. Numerous research have confirmed the positive effects of health education on pregnant women's eating practices and knowledge. In Ethiopia, for example, a research evaluating the impact of nutrition education on dietary practices and knowledge among 406 pregnant women found that dietary practices improved from 46.8% to 83.7% and knowledge of optimal nutrition increased from 53.9% to 97% **(World Health Organization, 2021).**

Promoting health enables women to take responsibility for their own well-being. By addressing and preventing the root causes of ill health rather than just focusing on treatment and cure, it includes a wide range of activities meant to improve and protect women's health and quality of life **(WHO, 2020).**

Pregnant women who get nutrition education can maintain their health and pregnancy outcomes by addressing other associated health risk factors and maintaining good behavioral behaviors. Additionally, at each antepartum visit, the World Health Organization (WHO) recommends that health providers provide their antenatal care (ANC) clients with adequate and pertinent nutrition-related guidance **(Darnton, 2019).**

Giving pregnant women nutrition information about eating a healthy diet can be a

good way to encourage them to get enough iron, folic acid, and other pregnancy-specific nutrients each day. By promoting a balanced diet, nutritional education initiatives can improve pregnant women's dietary intake. There is strong evidence that nutrition education during pregnancy improves mother and birth outcomes by having a significant impact on pregnant women's knowledge and dietary habits. During their routine prenatal visits, obstetric and community health nurses play a unique role in providing pregnant women with nutritional advice. As advocates for health and wellness rather than just treating illnesses, health promotion and education are thought to be among the most important tasks that nurses perform with expectant mothers **(Davies et al. 2021).**

Significance of the study:

Several research have identified the format that women prefer to receive nutrition information in. Pregnant women said that they would prefer to get dietary guidance from their healthcare providers in the form of a written booklet. On the other hand, a study on expectant mothers discovered that the best way to learn about nutrition was to listen to instructors and medical professionals (**Sakhile & Shu, 2021**). Furthermore, findings from a different quasi-experimental study that included 100 pregnant Iranian women showed that knowledge of healthy diet increased from 3% before the intervention to 31% after it **(World Health Organization, 2021).**

Aim of the study

The study aimed to enhance nutritional knowledge and practices among pregnant women through a health promotion program through:

1- Assessing pregnant women' nutritional knowledge.

2- Assessing pregnant women' nutritional reported practices.

3- Assessing how a health promotion program affects pregnant women's nutritional practices and knowledge.

Research Hypotheses:

A health promotion program is anticipated to improve the nutritional practices and knowledge of pregnant women.

Subjects and Methods:

Research design:

This study employed a pre-post-test quasi-experimental research design, 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 conducted at Sohag University Hospitals' antenatal clinics.

Subjects

A convenient sample of 400 pregnant women was recruited from the previously selected settings.

Tools of data collection:

Two instruments were utilized to gather the data for the study as follows:

Tool I: Structured Interviewing Questionnaire: This tool was created by the researchers and comprised four sections as outlined below **(World Health Organization, 2021 and World Health Organization, 2020):**

Part (1): This section included demographic information of the pregnant women, such as age, educational attainment, occupation, and place of residence.

Part (2): This section encompassed the obstetrical history of the pregnant women, containing five questions regarding gravida, abortion, and the stage of pregnancy.

Part (3): The tool for assessing pregnant women's nutritional knowledge (pre-post tool) was developed by the researchers to evaluate the level of nutritional knowledge among pregnant

women and their sources of information; it consisted of 28 items related to knowledge.

Scoring System:

The knowledge items concerning nutritional issues included "yes/no" and multiple-choice responses. Each "yes/no" question was scored with 0 for an incorrect answer and 1 for a correct answer. Additionally, the multiple-choice questions were scored as follows: 0 for "do not know," 1 for an incomplete correct answer, and 2 for a fully correct answer. The total knowledge score ranged from 0 to 30 across the 28 items. The knowledge level was classified as satisfactory (≥60%) or unsatisfactory (≤60%).

Tool II: The tool for assessing pregnant women's reported nutritional practices (pre-post tool) consisted of two components; the first component included ten questions aimed at evaluating the practices of pregnant women.

Scoring system:

The nutritional practices assessed included responses in the form of "yes/no" answers, with the total score for these practices ranging from 0 to 10 across ten items; a response deemed incorrect received a score of 0, while a correct response was assigned a score of 1. The total score for all items was computed, and the level of practice was categorized as adequate if the score exceeded 60%, and inadequate if the score was 60% or lower.

Validity and reliability of the tools:

The content validity was evaluated for clarity, comprehensiveness, appropriateness, and relevance, and was reviewed by five experts in the fields of obstetrics, gynecology nursing, and community health nursing. Adjustments were made based on the panel's judgment to enhance the clarity of the sentences and the appropriateness of the content. The reliability of the tools was measured using Cronbach's alpha test, yielding a coefficient of $\alpha = 0.89$.

Procedure of data collection:

The operational design for this study comprised three phases: preparatory, implementation, and evaluation. It was structured to improve nutritional knowledge and practices among pregnant women through a health promotion program.

A-Preparatory phase:

This phase was grounded in assessment data collected through interview questionnaires, literature reviews, and evaluations of nutritional knowledge and practices. A booklet was created in Arabic, printed according to the sample size, and distributed following the implementation of the health promotion program.

Ethical considerations:

Prior to commencing the research, ethical approval was secured from the scientific research ethical committees of the nursing faculties at Sohag and Ain Shams Universities. The researchers met with both medical and nursing directors of the selected settings to explain the study's purpose and obtain their approval. Written consent was acquired from the pregnant women to participate in the study after the study's objectives were thoroughly explained. It was explained to the pregnant women by the researchers that their involvement in the study was entirely optional and that they might opt out at any moment without providing a reason. They were also given the assurance that the information they provided would remain private.

Pilot study

A pilot study was conducted involving 10% of the sample, which consisted of 40 pregnant women, to evaluate the clarity and assess the feasibility of the research process necessary for modifications aimed at developing the final version of the tools. The pregnant women who participated in the pilot study were excluded from the main study. The researchers made modifications to certain items by providing Arabic translations to enhance their suitability for the understanding of pregnant women. The pilot sample was not included in the primary research sample.

Implementation phase:

An official permission letter was issued by the Dean of the Faculty of Nursing to the directors of antenatal clinics in Sohag.

Data collection occurred from early February 2023 until the end of July 2023. The researchers visited the selected settings twice a week, from 9:00 a.m. to 11:00 a.m.

Data was gathered by all researchers, who introduced themselves to the pregnant women. The researchers provided clear and straightforward explanations regarding the purpose and nature of the study to the pregnant women.

The interview lasted approximately 35-45 minutes for each pregnant woman to complete the questionnaire (Tool 1), which assessed their knowledge and practices concerning nutritional issues. Each session lasted about 2 hours. The program was conducted over a period of 3 months. The researchers developed supplementary educational materials (a booklet) after reviewing relevant literature on nutritional information, which was distributed to all participating pregnant women.

The health promotional program that was developed was executed in the training room at the designated locations. The researchers made six visits to the clinics and health centers of the intervention groups, with three visits to each clinic and health center, to conduct a total of six educational sessions. During each visit, the researchers assembled a designated subgroup of 22-24 pregnant women in the meeting room, where they completed pretest structured questionnaires. Following this, an educational lecture was presented to the group. At the conclusion of the lecture, booklets were distributed to reinforce the information presented.

Initially, the researchers introduced themselves to the pregnant women and provided a comprehensive explanation of the study's objectives and the tools utilized, which were translated into Arabic by the researchers to facilitate data collection. All women were requested to complete the pretest questionnaire, and a health promotional program was conducted in a meeting room at the selected clinics and health centers by the researchers.

Session 1: The researchers commenced with a discussion of the content from the previous session, followed by outlining the learning outcomes for the upcoming session. This session was conducted in Arabic, ensuring it was suitable for the women's comprehension. An assessment of knowledge and practices related to nutritional issues was initiated.

Session 2: The theoretical component encompassed knowledge regarding nutritional issues during pregnancy, including underweight, overweight, iron deficiency anemia, gestational diabetes, and obesity, along with their causes, signs, symptoms, nursing care, prevention, and complications. The normal weight gain during pregnancy, dietary requirements during this period, and the balance between energy intake and expenditure were thoroughly explained. Additional topics included the physiological changes experienced by pregnant women, as well as the significance of diet and supplements for both the mother and fetus. This was delivered through lectures, posters, demonstrations with actual food samples, and educational materials, scenarios, and role- plays.

Session 3: The practical segment included information regarding nutritional issues encountered during pregnancy and strategies for enhancing dietary habits, such as vitamin and folic acid supplementation, consumption of protein and iron-rich foods, intake of fruits and vegetables, milk consumption, monitoring weight throughout pregnancy, and conducting necessary tests to ensure the effectiveness of the pregnancy. This was delivered through lectures, posters, and educational films.

Session 4: The researchers emphasized the significance of ante-natal care appointments and demonstrated the importance of follow-up, as well as providing referrals for severe issues and complications management. They also discussed the prevention of nutritional problems during pregnancy.

The Evaluation phase:

After implementing the health promotional program about nutritional Knowledge and practice were conducted using the same tool structure as the pre-test to enhance nutritional knowledge and practices among pregnant women through a health promotion program.

Statistical Analysis:

The researchers examined, categorized, and then coded each questionnaire's content. Version 21 of the SPSS software was used to tabulate and analyze the data. For figures, Excel is utilized. Quantitative data were represented using means and standard deviations, whereas qualitative variables were presented as percentages and frequencies using descriptive statistics. Pregnant women's knowledge was measured before and after the program, and any changes were analyzed using the paired T-test. Pearson correlation analysis was utilized to assess the correlations between quantitative variables at the P-value.

Results

Table (1): Indicated that 85% of pregnant women were aged between 18 and 30 years, with a mean age of 23.12 ± 9.77. Among them, 39% had completed secondary education, while it was also noted that 79% of the pregnant women were unemployed. **Also,** 87% of pregnant women resided in rural areas, whereas 13% were from urban regions.

Table 2 shows that 58% of the pregnant women were in their first trimester, 67% had never undergone an abortion, and 57% were multigravida.

Doctors were the main source of information for 61% of the pregnant women in the study, as seen in **figure (2).**

Figure (3) showed that pregnant women's understanding of nutritional issues had significantly improved both before and after the health promotion initiatives.

Pregnant women's understanding of nutritional concerns, including iron deficiency anemia, underweight, gestational diabetes, overweight, and obesity, differed significantly before and after the health promotion program ($p<0.001^{**}$), according to **Table (3).**

Table (4): It was explained that there is a highly statistically significant difference between pregnant women's practices regarding nutritional issues, such as following a healthy diet, taking supplements of vitamins and folic acid, eating foods high in protein, iron, fruits, and vegetables, keeping track of their weight during pregnancy, and getting the tests they need to make sure their pregnancy is working before and after the health promotion program ($p<0.001^{**}$).

According to **figure 4**, 93% of expectant mothers had insufficient total practice scores before the nutritional health promotion program was put into place. After the program was put into place, 95% of them were able to get suitable total practice scores.

Table 5: This table showed that pregnant women's knowledge and behaviors about dietary difficulties were correlated before and after the health promotion program was put into place ($p=<0.001$).

Table 6: This table demonstrated a statistically significant correlation between pregnant women's awareness of dietary concerns during pregnancy and specific demographic traits like age and educational attainment. Nevertheless, no correlation between women's knowledge and other demographic data was discovered.

Table (1): Demographic characteristics among of studied pregnant women (n=400)

Item	Pregnant women (400)	
	No.	%
Women ' age in years		
18 < 30	340	85
30 < 40	60	15
Mean ±Stander deviation	23.12 ± 9.77	
- Women ' education		
- Illiterate	64	16
-Basic education	96	24
-Secondary education	156	39
-University education	84	21
Occupation		
- Working	84	21
- Not working	316	79
Residence		
Rural	348	87%
Urban	52	13%

Table (2): Obstetrical history among of studied pregnant women (n=400)

Item	Pregnant women (410)	
	No.	%
Gravida		
- Primigravida	144	36
- Multigravida	228	57
- Grand Multigravida	28	7
Abortion		
- Less than 2	88	22
- More than 2	60	15
- No abortion	268	67
Pregnancy stage		
- First Trimester	232	58.0
- Second Trimester	168	42.0

Figure (1): Source of information about nutritional knowledge during pregnancy among the studied pregnant women (n=400)

Table (3): Differences in mean scores regarding nutritional knowledge among the studied pregnant women regarding pre and post health promotional program (n=400).

Variable	Pre-program	Post-program	Paired	P-value
	Mean ±SD	Mean ±SD	t-test	
Nutritional knowledge	11.33± 0.65	26.77±1.45	49.7	<0.001**

Figure (2): Total knowledge level of the studied pregnant women according to their nutritional knowledge pre and post-health promotion (n=400).

Table (4): Differences in mean scores regarding nutritional practices among the studied pregnant women regarding pre and post health promotional program (n=400).

Variable	Pre-program	Post-program	Paired	P-value
	Mean ±SD	Mean ±SD	t-test	
Nutritional practices	3.56±.88	8.45±.67	18.7	<0.001**

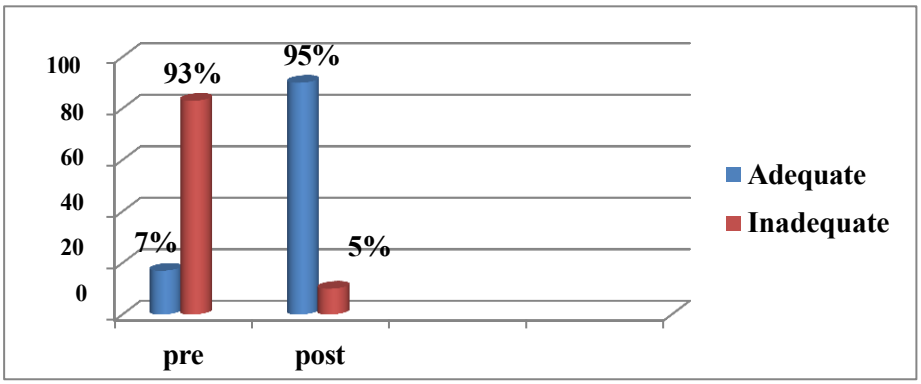

Figure (3): Total reported practices level of the studied pregnant women pre and post-health promotion (n=400).

Table (5): Correlation between the pregnant women's reported practices scores and total nutritional knowledge before and after the health promotion program (n=400)

Items	Pre-test		Post-test	
	r	p	r	p
Knowledge and practice	0.369**	<0.001*	0.312 **	<0.001*

(**) statistically significant at p<0.01

Table (6): Relation between pregnant women's nutritional knowledge during pregnancy and their demographic data

Demographic data	M	SD	Statistical test	P-value
Age (years)	17.44	6.04	r=2.24	.013
• 18<30	18.33	3.22		
• 30>40				
Educational level	17.22	3.27	F=3.43	.035
• Illiterate	18.32	3.73		
• Basic education	16.23	3.32		
• Secondary education	17.32	3.22		
• University education				
Occupation	16.24	6.04	t=-0.56	583
• Working	17.53	3.23		
• Not working				
Residence	17.43	3.15	t=-0.34	.804
• Urban	17.72	4.34		
• Rural				

Discussion

Nutritional problems that might lead to difficulties and diseases are exacerbated by inadequate information and inappropriate actions. However, these concerns can be lessened during pregnancy if one knows how to prevent and manage nutritional deficiencies and follows the right procedures . As health educators and counselors, obstetricians, gynecologists, and community nurses play a vital role. They must also be on the lookout for dietary issues in pregnant women that require medical attention. Prenatal intervention programs that sought to improve health had health promotion as their main goal **(WHO, 2021).** The aim of the study was to to enhance nutritional knowledge and practices among pregnant women through a health promotion program.

According to the current study's findings, more than half of the pregnant women asked said that their doctors were their main information source. This research emphasizes how important it is for healthcare professionals to improve nutrition education by giving expectant mothers the knowledge they need to prevent pregnancy-

related difficulties from nutritional issues. These results are consistent with those of **Zahara et al. (2022),** who found that the pregnant women's primary information source was their healthcare providers.

The present investigation's findings demonstrated that pregnant women's understanding of dietary concerns had improved both before and after the introduction of health promotion initiatives. This result shows the program's favorable impact and points to the advantage of nutritional promotion in raising pregnant women's awareness during their pregnancy.

These results are in line with those of a study by **Farnoush et al. (2023)** found that pregnant women's knowledge of nutrition during pregnancy increased after nutritional education was introduced. Similarly, this study's findings are consistent with those of **Garg and Kashyap (2019)** in India, who looked into how counseling affected pregnant women's nutritional status and discovered that participants knew more about nutrition both before and after the study. Additionally, these findings are consistent with those of a study carried out in East Wollega by **Daba et al. (2023),** which also showed comparable results.

The findings of the study demonstrated a highly statistically significant difference in the knowledge of pregnant women concerning nutritional issues. This underscores the effectiveness of these programs in enhancing the knowledge of pregnant women.

The current study's findings showed that more than three-quarters of pregnant women had inadequate total practice scores before the health promotion program on nutritional concerns was put into place. These scores then improved, and the majority of them were able to obtain satisfactory total practice scores after the program was put into place.

These findings are corroborated by **Zelalem et al. (2019),** who reported the critical importance of providing antenatal health education to pregnant women to promote better practices. This outcome is also consistent with the report by **Desalegn et al. (2022),** which highlighted a significant enhancement in food practices following nutrition education compared to the period before such education among pregnant women in Wondogenet District, Southern Ethiopia.

The results of the current study indicated a correlation between knowledge and practices among pregnant women regarding nutritional issues before and after the implementation of the health promotional program, with a significance level of p=<0.001. This association is explained by the constant relationship between satisfying practices and adequate knowledge. The current study's findings showed a statistically significant District, suggesting that pregnant women's ignorance may be linked to their lower educational attainment and younger age.

The results of this study showed that the health promotion program hypothesis was successful in improving pregnant women's knowledge and habits regarding nutritional concerns during pregnancy after they took part in the program.

These findings and hypotheses are corroborated by **Farnoush et al. (2023),** who concluding that health education effectively increased dietary knowledge and practices within the study group. Furthermore, the outcomes of this study align with those of **Oliveira et al. (2018),** who investigated the effects of an educational intervention on pregnancy in Brazil and found a significant enhancement in dietary knowledge and practices following health education.

These findings are also consistent with a study conducted by **Ashenafi et al. (2019),** which focused on the "Effect of Nutrition Education on Pregnancy-Specific Nutrition Knowledge and Healthy Dietary Practices among Pregnant Women in Addis Ababa," demonstrating improvements in knowledge and practices following nutrition education for pregnant women.

The significant role of Community-Based Health Planning and Services (CHPS) in enhancing and expanding access to antenatal care is evident; pregnant women have gained from improved high-quality antenatal care and

services **(Dickson et al. 2020).**

These findings are consistent with those of **Kululanga et al. (2020),** who discovered that age and educational attainment were among their demographic traits. In terms of education, health literacy and the extent to which women can access and comprehend basic health information are associated to knowledge deficits **(Berkman et al., 2019).**

Conclusion

The current study's findings and research hypotheses led to the conclusion that the implementation of the health promotion program improved pregnant women's knowledge and practices regarding nutritional issues during pregnancy. The successful implementation of the & health promotion program has resulted in an enhancement in the knowledge and practices of pregnant women, with the majority displaying satisfactory practices.

Recommendations:

The following suggestions were put out in light of the results of the current study:

- Pregnant women should participate in health promotion programs that teach them about nutritional issues during the prenatal stage in order to avoid consequences related to these issues.

- Pregnant women should read the instructional brochure regarding dietary issues during pregnancy.

- Repair of unhealthy eating patterns that are frequently observed in the community among expectant mothers.

- Future studies on the risk factors for nutritional issues in pregnant women and how they relate to socio-demographic information.

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