

Assess Knowledge of pregnant women regarding nutritional requirements

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Abstract

Background:

Proper maternal nutrition is essential during pregnancy as it affects the health of both the mother and the fetus. Nutritional needs increase significantly during pregnancy, requiring a balanced diet that supports fetal growth and maternal health. This study aims to assess the knowledge, attitudes, and practices of pregnant women regarding maternal nutrition and to identify factors influencing these aspects.

Methods:

A descriptive cross-sectional study was conducted with 380 pregnant women attending antenatal care clinics. The study utilized an interview-based questionnaire to collect data on socio-demographic characteristics, obstetric history, and maternal nutrition knowledge, attitudes, and practices. Descriptive statistics, bi-variable analysis, and multivariable logistic regression models were used to analyze the data.

Results:

The majority of participants (75%) were aged between 20 and 35 years, with 89.7% being housewives. A large proportion (82.9%) demonstrated adequate knowledge about maternal nutrition, while 58.9% had positive attitudes, and 58.7% practiced good nutrition. A moderate positive correlation was found between knowledge and attitude scores ($r=0.544$, $p<0.001$), and between knowledge and practice scores ($r=0.693$, $p<0.001$). Most participants (90%) consumed fresh fruits and vegetables regularly, and 91.1% took iron supplements correctly. However, only 18.7% followed a specific dietary regimen.

This study highlights the importance of knowledge in shaping attitudes and practices related to maternal nutrition during pregnancy. The findings suggest that although many women possess

Introduction

Pregnancy is a crucial phase during which proper maternal nutrition significantly impacts the health of both the mother and the child (1). During pregnancy, a woman's energy and nutrient requirements increase to meet the needs of the developing fetus and her own body, which adapts to the changes of pregnancy. It is essential to maintain a balanced diet to provide adequate energy for fetal growth without depleting the mother's body stores (2).

To ensure that nutritional needs are adequately met, pregnant women are advised to consume a diet rich in vegetables and folic acid (3).

The total daily caloric intake should include 55% carbohydrates, 15% protein, and 30% fats, while considering the individual needs of each pregnant woman (4). The recommended total caloric intake ranges from 2200 kcal to 2800 kcal/day, with higher amounts for active or nutritionally deficient women. Energy requirements during pregnancy can be fulfilled by consuming more complex carbohydrates, healthy fats, and proteins in the diet (5).

A) Macronutrients:

Carbohydrates: A carbohydrate intake of at least 175 g/day is essential to ensure a sufficient glucose supply for the fetus during pregnancy (6). Food sources of carbohydrates include whole grain bread, cereals, fruits, and vegetables, which also provide fiber for bowel regulation (7).

Fat: While the percentage of calories from fat should remain at 30%, the type of fat consumed during pregnancy is particularly important. Pregnant women are encouraged to increase intake of omega-3 fatty acids, which are vital for the development of fetal brain and nerve tissues (8). Omega-6 (linoleic acid) and omega-3 (alpha-linolenic acid) essential fatty acids, which cannot be synthesized by the body, must be obtained from food sources. These fatty acids are linked to longer gestational periods, better cognitive and visual development, and a reduced risk of preterm birth, preeclampsia, and depression. DHA is especially concentrated in the brain and retina (9).

Food sources of essential fatty acids include vegetable oils such as corn oil, sunflower oil, and soybean oil for linoleic acid, and flaxseed, soybean oil, and canola oil for alpha-linolenic acid (10).

Protein: Protein is crucial for the healthy development of the baby, as it forms the foundation for all new cells and tissues in both the mother and fetus. Maintaining a proper balance of protein and energy is essential, as excessive protein intake can harm the fetus. A balanced intake supports fetal growth (11). Protein is needed for tissue repair, hormone and enzyme synthesis, and immune functions. Sufficient energy intake is necessary to utilize proteins and amino acids effectively for these purposes. The demand for protein increases, particularly in the third trimester, to support maternal tissue synthesis and fetal growth (12).

Food sources of protein include complete proteins, which contain all essential amino acids such as eggs, milk, cheese, and meat. Incomplete proteins, typically plant-based, include legumes, grains, nuts, and seeds. A varied diet combining both animal and plant-based proteins ensures balance (5).

B) Micronutrients:

Vitamins play a vital role in supporting a healthy pregnancy. Both vitamin A and C are needed in increased amounts for tissue growth. There is also a heightened demand for B vitamins, which serve as coenzymes in energy production and protein metabolism. B vitamins are integral to metabolic activities that produce energy and are crucial for the functioning of muscles, nerves, and tissues during pregnancy. A well-balanced diet will provide these necessary nutrients in both quantity and quality (4).

1. **Vitamin A:** Supplementation is recommended only in areas where vitamin A deficiency is a public health concern to prevent night blindness (3).
2. **Vitamin D:** Essential for calcium and phosphorus absorption for fetal bone growth (13). Vitamin D deficiency is a global issue and can lead to complications such as preeclampsia, gestational diabetes, and impaired fetal growth (14, 15).
3. **Vitamin E:** Although deficiency is rare in healthy adults, insufficient vitamin E during pregnancy can lead to complications like preeclampsia and low birth weight (16).
4. **Vitamin K:** Important for bone development and protein formation in the liver, and crucial for blood clotting. Adequate vitamin K levels are necessary for both maternal recovery and infant health after birth (17).
5. **B vitamins:** Including thiamine, riboflavin, niacin, pyridoxine, B12, pantothenic acid, and folate, are all important during pregnancy (18).
6. **Vitamin C:** Enhances the absorption of non-heme iron and is essential for preventing iron-deficiency anemia, a condition that can affect maternal and fetal health (19).

C) Minerals:

1. **Iron:** Essential for oxygen transport in the blood and necessary for various body functions. Iron requirements increase during pregnancy to support the expanded blood volume and fetal growth. The recommended daily intake is 27 mg (20).
2. **Calcium:** Vital for the development and maintenance of strong bones and teeth. Calcium needs during pregnancy are 1000 mg/day, and vitamin D, at 600 IU/day, is necessary for optimal calcium absorption (20, 21).
3. **Zinc:** Particularly important in the first trimester for fetal organ formation and immune system development. Zinc deficiency during pregnancy can lead to an increased risk of congenital anomalies, low birth weight, and preterm birth (22).
4. **Iodine:** Critical for thyroid hormone production, with requirements increasing by 50% during pregnancy. Iodine deficiency can lead to complications such as abortion, stillbirth, and cognitive issues (23).
5. **Selenium:** Increased selenium intake during pregnancy supports fetal growth, provides antioxidant functions, and aids thyroid hormone metabolism, which may help protect against certain cancers and cardiovascular diseases (24).

Methods

A descriptive cross-sectional study was conducted to assess the knowledge, attitudes, and practices of pregnant women regarding maternal nutrition, using a quantitative data collection approach. The study included all pregnant women who visited healthcare facilities for antenatal care during the study period.

Inclusion Criteria:

- Pregnant women attending antenatal care clinics.
- Women within the child-bearing age range.

Exclusion Criteria:

- Non-pregnant women.
- Women with serious health conditions.
- Women who declined to participate.

Administrative Considerations:

Official permissions were obtained from the relevant health departments, and approval was secured from the scientific ethical committee of the university.

Ethical Considerations:

Participants were informed about the nature and purpose of the study, and verbal consent was obtained prior to the interview, ensuring the confidentiality of their information.

Data Collection:

Data were collected using an interview-based questionnaire, which included questions on socio-demographic characteristics, obstetric history, medical conditions, and the participants' knowledge, attitudes, and practices regarding nutrition during pregnancy.

Data Analysis:

The collected data were reviewed, cleaned, and entered into SPSS software for analysis. Descriptive analysis, including proportions, percentages, frequency distributions, and measures of central tendency, was conducted. A bi-variable analysis was performed to explore the associations between knowledge, attitudes, and practices of the participants and various potential factors. The odds ratios (OR) at 95% confidence intervals (CI) and p-values were calculated to identify significant associations. Subsequently, multivariable analysis was carried out using logistic regression models.

Results

The study involved 380 pregnant women attending antenatal care clinics to assess their knowledge, attitudes, and practices regarding maternal nutrition during pregnancy.

A majority of participants (75%) were aged between 20 and 35 years. Most women (63.9%) had completed secondary school, and 89.7% were housewives. Additionally, 67.4% had an income greater than 2000 units per month.

Around 36.1% of participants had made 4 antenatal visits, with 51.6% being in the third trimester. The majority (67.9%) were multigravida, and 64.3% had undergone cesarean sections. Over half (52.7%) of the multigravida women reported birth spacing of 2 to 3 years. Among those who reported health problems, 21.3% had anemia, which was the most common issue.

The study found that the majority of respondents had correct knowledge about maternal nutrition, including balanced diets, the importance of proper nutrition during pregnancy, the dangers of malnutrition, and the benefits of birth spacing. Specifically, 74.2% knew what a balanced diet was, 86.8% recognized the nutritional needs of pregnant women compared to others, and 95.3% understood the importance of proper nutrition throughout pregnancy. Additionally, 74.2% of participants were aware of the sources of iron, calcium, vitamins, and proteins, while 84.2% knew the importance of iron, 83.9% knew the benefits of milk and its products, and 86.1% understood the importance of proteins.

Most participants held positive attitudes towards maternal nutrition. A significant number (74.2%) agreed that they should eat more food during pregnancy, and 86.6% agreed they needed more carbohydrates. Furthermore, 75.3% supported preparing omega-3 rich foods, 95% were in favor of eating more proteins, and 90% supported eating more dairy products. Most women (90%) also favored the use of iodized salt, while 75.5% preferred eating more fresh fruits and vegetables.

Only 18.7% of participants followed a specific dietary regimen. However, 90% regularly consumed fresh fruits and vegetables, and 96.6% had meals at least four times a day. Most respondents (85.3%) regularly ate snacks, and 80% ate more carbohydrates between meals during pregnancy compared to their pre-pregnancy state. About 70.3% monitored their body weight during pregnancy, and 95% regularly drank coffee or tea. Regarding micronutrient intake, 91.1% of women took iron supplements correctly, while 90% took folic acid, with 95% starting it before or during the first trimester. Around 96.8% of women took calcium supplements, and most women (98.7%) consumed animal-sourced protein, though only 24.5% consumed it daily or more than three times a week. In contrast, 98.2% consumed plant-sourced protein, with 97.1% eating it daily or more than three times a week.

The study revealed that 82.9% of participants had adequate knowledge, 58.9% held positive attitudes, and 58.7% practiced good nutrition during pregnancy.

There was a significant moderate positive correlation between knowledge and attitude scores ($r=0.544$, $p<0.001$), as well as between knowledge and practice scores ($r=0.693$, $p<0.001$).

Table 1: Knowledge about Nutrition Among the Studied Pregnant Women (N = 380)

Knowledge Area	Do Not Know (%)	Incomplete Knowledge (%)	I Know (%)	Total (%)
1. Good Balanced Diet	13.9	11.8	74.2	100
2. Pregnant Diet Differs from Non-pregnant	3.7	9.5	86.8	100
3. Components of a Balanced Diet	14.5	12.9	72.6	100
4. Proper Nutrition is Important from First to Third Trimester	3.2	1.6	95.3	100
5. Dangers of Malnutrition on Pregnant Women	23.9	31.1	45	100
6. Dangers of Malnutrition on Baby	1.8	3.4	94.7	100
7. Importance of Sufficient Intervals Between Pregnancies	4.7	15.8	79.5	100
Total	-	-	-	100

Table 2: Knowledge About Sources and Importance of Some Nutrients Among the Studied Pregnant Women (N = 380)

Knowledge Area	Do Not Know (%)	Incomplete Knowledge (%)	I Know (%)	Total (%)
8. Sources of Iron	7.2	18.6	74.2	100
9. Sources of Calcium	10	3.4	86.6	100
10. Sources of Vitamins	9.7	12.9	77.4	100
11. Sources of Proteins (Animal, Plant)	3.9	9.5	86.6	100
12. Importance of Iron	9.5	6.3	84.2	100
13. Importance of Milk and Its Products	10.8	5.3	83.9	100
14. Importance of Proteins	4.5	9.5	86.1	100
Total	-	-	-	100

Table 3: Attitudes About Nutrition Among the Studied Pregnant Women (N = 380)

Attitude	Don't Agree (%)	Agree (%)	Total (%)
1. Concept of Eating for Two (Eat More Food)	15.3	84.7	100
2. Must Have More Carbohydrates Than Non-pregnant	19.7	80.3	100
3. Must Have More Proteins	5	95	100
4. Must Have More Milk Products	10	90	100
5. Prepare Iron-Rich Meals	11.1	88.9	100
6. Prepare Omega-3 Rich Foods	24.7	75.3	100
7. Prepare Meals with Iodized Salt	10	90	100
8. Eat More Fresh Fruits and Vegetables	24.5	75.5	100
Total	-	-	100

Discussion

In the current study, 74.2% and 72.6% of the participants demonstrated good knowledge of the meaning and components of a balanced diet, respectively. These figures were higher than those reported by Latifa M et al. (2012), where only 45.9% and 49.2% of pregnant women in the USA had a correct understanding of these aspects. Overall, 82.7% of respondents in our study were knowledgeable about nutrition during pregnancy, which is a higher percentage compared to studies in East Wollega (64.4%) and Malawi (70%) (Abdel-Aziz S et al., 2018). This high level of nutritional knowledge could be attributed to effective information dissemination regarding nutrition during pregnancy. Our results are in contrast to a study among adolescent pregnant women in Egypt, which found that 61.7% had poor knowledge about pregnancy nutrition, and their dietary intake did not meet pregnancy nutritional requirements.

Regarding attitudes toward nutrition, 58.9% of the pregnant women in our study held a positive attitude, which is in agreement with Perumal N et al. (2011), who reported that 59.6% of pregnant women in Western Kenya had a positive attitude towards nutrition. Additionally, only 15.3% of our respondents disagreed with the concept of "eating for two," and 19.7% did not agree that pregnant women require more carbohydrates than non-pregnant women. These findings are lower than those reported by Latifa M et al. (2012), where 40.3% of women held negative views on "eating for two," and 44.4% believed that more than three-quarters of their diet should consist of starchy foods. Our study also aligns with Ajantha et al. (2015) in India, where over half (52%) of participants agreed that their diet should include starches, dairy, meat, and beans, and the majority (98%) acknowledged the increased nutritional needs during pregnancy.

In terms of practices regarding nutrition, our study found that 18.7%, 90%, and 78.9% of respondents followed a specific dietary regimen, habitually consumed fresh vegetables, and drank milk daily, respectively. These practices were more common than those observed in a study conducted in the USA, where the figures were 25.8%, 58.9%, and 42.7%, respectively. This difference may be attributed to cultural and socioeconomic factors. Additionally, 96.6% of the respondents in our study consumed four or more meals per day, 85.3% snacked between meals, and 80% ate more carbohydrates between meals. In contrast, the East Wollega study found that only 33.9% had three or more meals per day, and 40.1% consumed snacks between meals, with 29.1% eating more carbohydrates. These differences may stem from variations in residence and economic conditions. Our findings are also at odds with Ajantha et al. (2015), who reported that 96% of participants in India did not consume snacks.

Regarding protein consumption, 97.1% of the participants in our study ate either plant or animal protein daily, which was significantly higher than the 42.7% observed by Latifa M et al. (2012). This difference could be due to the widespread use of plant proteins in diets. Concerning micronutrient supplementation, 91.1% of women took iron supplements correctly, and 90% had folic acid supplements, with 95% taking them before pregnancy or within the first trimester. This is consistent with Al-Hindasi et al. (2010), where 71.2% of women received iron/folic acid tablets during their last pregnancy. However, a study conducted in Riyadh found a higher percentage of women (93.4%) taking iron supplements during pregnancy.

Our study also found that 95% of respondents took folic acid before pregnancy or within the first trimester, which is consistent with findings from studies in Pakistan and Australia (51.25% and 81.6%, respectively). The differences may be explained by socioeconomic factors and the high coverage of preconception care. Additionally, the findings align with studies in Korea, which indicated that 26.4% of women used folic acid before conception, with higher education levels being associated with greater awareness and use of folic acid.

A significant positive correlation was found between knowledge scores and practice scores ($r=0.693$, $p<0.001$), which is in agreement with the study by Abdel-Aziz S et al. (2018), which found that nutrition knowledge significantly predicted improvements in dietary habits. This underscores the importance of promoting nutritional education to encourage better dietary practices among pregnant women.

Conclusion and Recommendation

The findings of this study indicate that 82.9% of women had adequate knowledge, 58.9% had a positive attitude, and 58.7% demonstrated good practices regarding nutrition during pregnancy. A significant positive association was found between women's education level, family income, and the presence of associated diseases with their knowledge about nutrition during pregnancy. Additionally, factors such as educational background, occupation, monthly income, antenatal care visits, gestational age, birth spacing, and associated diseases were all statistically linked to the nutritional practices of mothers during pregnancy.

Based on these findings, it is recommended that nutrition interventions, including educational programs, be implemented in villages, health centers, and women's organizations. These efforts should specifically target pregnant women to enhance their nutritional knowledge and improve practices related to pregnancy nutrition.

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