Evaluation of Nutrition Education during Pregnancy and Nutritional Knowledge of Pregnant Women

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Abstract

Introduction: Healthy diet during pregnancy plays a key role for the unborn baby and the mother. According to many studies pregnant women are unable to meet their nutritional needs and they have unhealthy nutritional habits. The pregnancy process can be concluded more healthily in terms of the mother and baby by providing nutrition education to the pregnant women.

Aim: The aim of this study was to investigate the necessity of prenatal nutrition training by measuring the level of nutritional knowledge in pregnant women.

Method: In order to measure the level of nutrition knowledge in pregnancy, 20 questions were asked to 100 pregnant women. Nutritional knowledge score was described as "good" for those who gave the right answer to 16 or more statements, "average" for those who gave the right answer to 11–15 statements, and "inadequate" for those who gave the right answer to 10 or fewer statements. The results were evaluated at a significance level of $p < 0.05$ in the 95% confidence interval.

Results: It was found that 26.0% of all the pregnant women had a "good" (16.4 ± 1.6), 46% of them had "average" (12.6 ± 1.9) and 28.0% had "inadequate" (8.5 ± 1.4) nutritional knowledge score. There was no statistically significant difference between average nutritional knowledge scores of those who received nutrition education (12.2 ± 3.1) and did not receive this training (12.3 ± 3.5) ($p > 0.05$).

Conclusion: Nutrition education should be given to all pregnant women and this education should be made more qualified.

Keywords: antenatal care, nutrition education, nutritional knowledge, pregnancy

Introduction

Pregnancy is one of the critical periods when the nutrition is very important. In this period, an unhealthy nutrition of the mother or an inability to meet the nutritional requirements causes some health problems to be seen both in the mother and the infant. Problems such as anaemia, osteomalacia, pregnancy toxaemia can be seen in pregnancies and stillbirth, premature birth, congenital anomaly, and mental retardation risks increase in infants due to insufficient and unbalanced nutrition (Karaağaoğlu & Samur, 2017). In addition, low maternal dietary quality causes foetal developmental maladaptation. This results in permanent structural, physiological, and metabolic changes and predisposes to cardiovascular, metabolic, and endocrine diseases in the adult period (Godfrey & Barker, 2000).

The risk of maternal and foetal health problems may increase due to inadequate or excessive intake of folic acid, B_{12}, A, C, D, and E vitamins (Kabaran & Ayaz, 2013) while enzyme pathway activity, synapses conduction and transcription pathway are completed with sufficient intake of micronutrients during pregnancy period (Roberfroid et al., 2012). The content and balance of the

macronutrient content of the maternal diet are very important for maternal and infant health and low protein intake by the maternal diet may suppress the renin-angiotensin system (RAS) by reducing the number and proliferation of renal cells, which are critical for the organ functioning in the foetus (Goyal & Longo, 2013). Low protein intake by the maternal diet may also reduce the number and proliferation of pancreatic β-cells and insulin secretion (Su et al., 2016). On the other hand, high fat intake with maternal diet may increase the risk of cardiovascular disease (HT) and metabolic syndrome by causing vascular dysfunction, DNA methylation, increased orexigenic and anorexigenic peptide release (Jackson et al., 2011). High carbohydrate intake may impair glycaemic control and insulin signalling pathways in infants with high carbohydrate intake while inadequate carbohydrate intake by the maternal diet reduces foetal survival, body weight, and hepatic glycogen storage (Srinivasan et al., 2008).

Despite these significant effects of nutrition during pregnancy in the short and long-term health of the mother, foetus, and infant, it is known that pregnant women are most affected by the insufficient and unbalanced nutritional problems in the developing countries (Black et al., 2013). The main reasons for the inadequate and unbalanced nutrition of pregnant women are failure to intake nutritional supplements required for the increasing needs of pregnancy and lactation, failure to purchase nutrients that are suitable in terms of nutritional content due to economic weakness, wrong nutrient selection due to tradition and customs, and mistakes during storage, preparation, and cooking of foods. Increasing the level of nutritional knowledge of mothers in pregnancy can eliminate the risk factors related to nutrition and can prevent problems that may occur with both mother and infant health.

Aim

In this study, the level of knowledge of pregnant women about their nutrition during pregnancy, which is important for the health of them and their infants, was measured and the necessity of nutrition training in antenatal care services was investigated.

Method

This study was conducted with 100 pregnant women who applied to various hospitals in Ankara between January 2017 and March 2017 for any reason and agreed to participate in the study. The pregnant women were given 20 expressions about nutrition during pregnancy period and their opinions were asked in the form of “I agree”, “I do not agree” or “No idea” including questions about socio-demographic characteristics and their eating habits. The nutritional knowledge score was “good” for those who gave the right answer to 16 or more statements, “average” for those who gave the right answer to 11–15 statements, and “inadequate” for those who gave the right answer to 10 or fewer statements out of a total of 20 statements, respectively. The World Health Organization (WHO) Body Mass Index (BMI: kg/m^2) classification was used when participants were assessed for their body weight. The data obtained in the study were evaluated with SPSS 15.0 program and statistical analyses were conducted. Research data are shown in absolute and percentage (%) values. Arithmetic mean and standard deviation values ($X \pm SD$) were taken where necessary. The Chi-square test was used to calculate categorical data. The results were evaluated at a significance level of $p < 0.05$ in the 95% confidence interval.

Results

The participants were between the ages of 17–37 and the average age was 27.1 ± 4.70 years. It was determined that 1% of the individuals were not literate, 9.0% were primary school graduates, 19.0% were middle school graduates, 38.0% were high school graduates and 33.0% were university graduates. 46.0% stated that they worked in a job. It was observed that 61.0% of participants had a normal weight and 31.0% were slightly obese according to the BMI before pregnancy. The planned pregnancy rate (53.0%) was higher than the unplanned pregnancy rate (47.0%). The rates of participants who considered their nutritional knowledge adequate and inadequate before pregnancy were 52.0% and 48.0%, respectively. 32 participants indicated that they took training in nutrition during the pregnancy period and 68 participants stated that they did not receive any training in nutrition during pregnancy. When the participants who stated that they had received this training were asked about where they got this training, 62.5% (n = 20) received this training from midwives, 21.9% (n = 7) from nurses, 12.5% (n = 4) from physicians and 3.1% (n = 1) from dietitians. When the pregnant women participating in the study were classified according to the pregnancy period, it was determined that 41.0% were in the first trimester, 34.0% were in the second trimester and 25.0% were in the third trimester (Table 1).

Tab. 1 **Certain characteristics of the pregnant women**

	Demographic Information	**n (%)**
Age	25 years and below	36 (36.0)
	26–30 years	41 (41.0)
	31 years and above	23 (23.0)
Educational Background	Illiterate	1 (1.0)
	Literate/ Primary School Graduate	9 (9.0)
	Middle School Graduate	19 (19.0)
	High School Graduate	38 (38.0)
	University Degree	33 (33.0)
Occupational Status	Unemployed	54 (54.0)
	Employed	46 (46.0)
BMI Before Pregnancy (kg/m^2)	Weak (< 18.5)	6 (6.0)
	Normal (18.5–24.9)	61 (61.0)
	Slightly Obese (25.0–29.9)	31 (31.0)
	1st Level Obese (30.0–34.9)	2 (2.0)
Pregnancy Planning	Planned	53 (53.0)
	Unplanned	47 (47.0)
Nutrition Education Status	Received	32 (32.0)
	Not Received	68 (68.0)
Pregnancy Period	1.Trimester	41 (41.0)
	2.Trimester	34 (34.0)
	3.Trimester	25 (25.0)
Nutritional Knowledge During Pregnancy	Adequate	52 (52.0)
	Inadequate	48 (48.0)

There was no statistically significant difference between the average nutritional knowledge scores of those who received nutrition education (12.2 ± 3.1) and did not receive this training (12.3 ± 3.5) ($p > 0.05$). When the data on nutritional knowledge levels in the pregnancy period were examined, it was found that 26.0% of all the pregnant women had a "good" (16.4 ± 1.6), 46% of them had an "average" (12.6 ± 1.9) and 28.0% had an "inadequate" (8.5 ± 1.4) nutritional knowledge score. Among those who stated that they received nutrition education, 25.0% had a "good" (16.6 ± 1.5), 43.8% had an "average" (12.1 ± 2.0) and 31.2% had an "inadequate" (8.1 ± 1.2) nutritional

knowledge score while among those who stated that they did not receive any training, 25.0% had a "good" (16.2 ± 1.5), 47.0% had an "average" (12.8 ± 2.1) and 28.0% had an "inadequate" (8.8 ± 1.3) nutritional knowledge score. While among those who consider they have adequate nutritional knowledge during the pregnancy period, 26.9% had "good" (15.9 ± 0.8), 50.0% had "average" (12.0 ± 1.9) and 23.1% had "inadequate" nutritional knowledge, among those who consider they have inadequate nutritional knowledge, 22.9% had a "good" (16.0 ± 0.9), 43.8% had an "average" (11.9 ± 1.7) and 33.3% had an "inadequate" (8.2 ± 1.0) nutritional knowledge score (Figure 1).

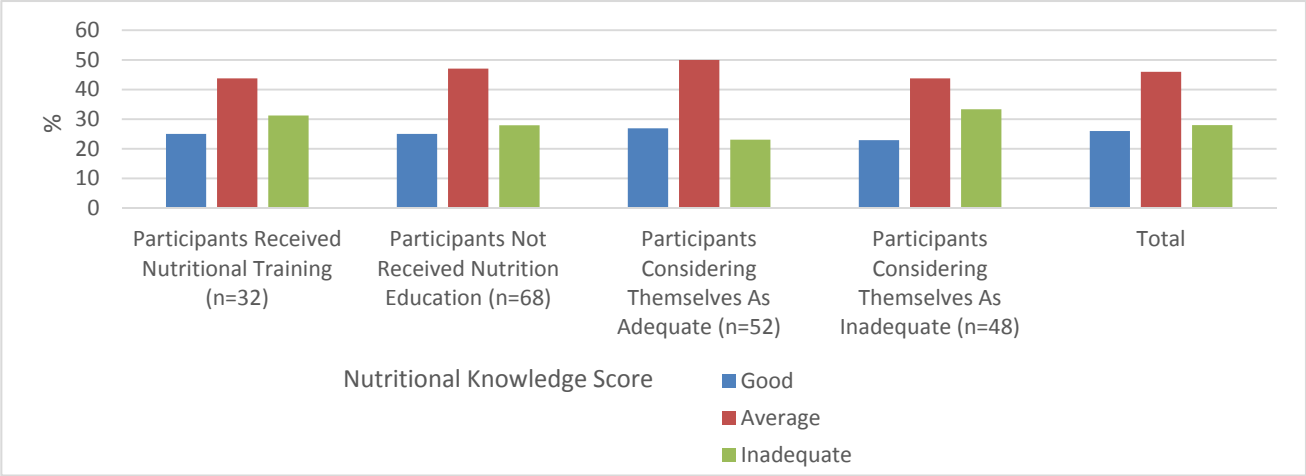

Fig. 1 **Classification of the nutritional knowledge scores of the pregnant women**

When the responses given to the statements measuring the nutritional knowledge level were examined, the statements to which the participants responded the most accurately were: *"The protein need of the mother increases during the pregnancy period"*, *"The daily iron need of the mother increases during the pregnancy period"*, and "*The need for minerals such as calcium, iron, zinc and iodine increases during the pregnancy period"* (correct response rates were 96%, 92%, and 90%, respectively). The statements to which the participants responded the most inaccurately were: "*The folate content of animal foods such as meat, milk, eggs, and fish is higher than of foods such as lentils, broccoli, and spinach"*, *"Since vitamin A need is increased in pregnancy, it is okay to use multivitamin whose vitamin A content is high"*, and *"Folate/Folic Acid inadequacy in pregnancy causes neural tube defective births"* (correct response rates were 11%, 21%, and 23%, respectively) (Table 2). Among the participants who received nutrition education in pregnancy and did not receive this training, the responses towards "*Consumption of seafood such as mussels with high mercury content should be avoided during the pregnancy period"* (the rates of correct response were 71.9% for trained participants and 57.3% for the others) and *"If the mother is fat in the pre-pregnancy period, she should lose weight and reach the normal range of BMI"* (the rates of the correct response were 58.8% for trained participants and 50.0% for the others) differed statistically significantly ($p < 0.05$), but there was no significant difference between the groups for the other statements (Table 2).

Tab. 2. **Responses to questions about nutritional knowledge in pregnant women who received nutrition education in pregnancy and did not receive this training**

Question	RNE			NRNE			*p*
	T	F	NI	T	F	NI	
To give birth to a healthy baby, a pregnant woman should take as much weight as possible during her pregnancy.	16	14	2	39	29	0	0.107
At least 3–4 portions of milk and dairy products a day should be consumed in pregnancy.	25	6	1	51	17	0	0.283
If enough meat cannot be consumed during pregnancy, it can be compensated with juice and compote.	17	10	5	42	24	2	0.068
Inadequate and unbalanced nutrition of the mother during pregnancy will not affect the health of the baby even if it adversely affects the health of the mother.	28	1	3	59	8	1	0.074
The daily iron need of the mother increases during pregnancy.	29	2	1	63	1	4	0.368
Folate/Folic Acid inadequacy in pregnancy causes neural tube defective births.	9	2	21	14	4	50	0.693
The folate content of animal foods such as meat, milk, eggs, and fish is higher than of foods such as lentils, broccoli, and spinach.	4	16	12	7	28	33	1.07
Seafood, milk and dairy products, spinach and chard are high iodine content foods.	17	0	15	27	6	35	0.149
The iron content of milk and dairy products is higher than of meat and green leafy vegetables.	16	11	5	40	13	15	0.239
Consumption of seafood such as mussels with high mercury content should be avoided during pregnancy.	23	1	8	39	16	13	**0.040***
There is no effect of tea and coffee intake with meals on iron absorption.	25	1	6	48	12	8	0.108
Inadequate consumption of minerals such as calcium and phosphorus in pregnancy and inadequate exposure to sunlight may cause softening of bones and deterioration of bone tissue (osteomalacia).	19	2	11	30	4	34	0.33
During the pregnancy period, the daily consumption of vegetables and fruits of the mother should be increased compared to the pre-pregnancy period.	26	5	1	63	3	2	0.154
If the mother is fat in the pre-pregnancy period, she should lose weight and reach the normal range of BMI.	16	8	8	40	23	5	**0.048***
Protein need of the mother increases during pregnancy.	30	1	1	66	1	1	0.733
Since vitamin A need is increased in pregnancy, it is okay to use multivitamin whose vitamin A content is high.	5	6	21	16	24	28	0.071
Women should limit their energy intake to prevent weight gain and protect the form during the pregnancy.	18	7	7	41	22	5	0.095
The need for minerals such as Calcium, Iron, Zinc and Iodine increases during the pregnancy.	27	1	4	63	1	4	0.437
Women who are fed with a healthy diet during the pregnancy period do not need physical activity.	15	16	1	45	23	0	0.085
In order to prevent nausea during pregnancy, there is no harm in the consumption of chickpeas, crackers.	26	4	2	42	23	3	0.081

T: True answer; F: False answer; NI: No idea; RNE: pregnant women received nutrition education; NRNE: pregnant women did not receive nutrition education

Discussion

In this study the effect of nutrition education was determined on the level of nutritional knowledge during pregnancy. Whether the pregnant woman received any nutritional training was determined according to the participants' own statements; however, the duration and quality of the training were not asked. Actually, the fact that there was not a statistically significant difference in the level of nutritional knowledge of the pregnant women who stated that they had received nutrition education and those who stated that they had not received such training may be related to distinct

perceptions of the participants on "nutritional training in pregnancy" as well as the trainings were not concluded in parallel with their actual purpose.

It was reported that nutrition education resulted in an increase in the level of nutritional knowledge, a decreased level in the complication rates due to pregnancy (anaemia, low birth weight, preterm delivery) and a more positive pregnancy period for the mother and infant (Girard & Olude, 2012). In the study examining the knowledge level of pregnant women about pregnancy nutrition, it was determined that 83.1% of the pregnant women had good / very good nutritional knowledge and these results were quite high compared to the results of the present study (Dibek, 2007). However, in some other studies carried out in Turkey, there were data indicating that women did not have adequate knowledge about nutrition, especially nutrition during the pregnancy period (Özkan & Mete, 2010; Yavuz & Aykut, 2014). This difference may be due to differences in the assessment and evaluation methods. However, when the statements measuring the knowledge level of the pregnant women were examined, although the rate of the participants who gave the correct responses to the statements such as *"At least 3–4 portions of milk and dairy products should be consumed daily during pregnancy"*, *"The daily iron need of the mother increases during the pregnancy period"*, *"Consumption of fruit and vegetable should be increased in pregnancy compared to pre-pregnancy period"*, *"Protein need of the mother increases during the pregnancy period"* and *"The need for minerals such as calcium, iron, zinc and iodine increases during the pregnancy period"* was high as in the present study, in the studies where eating habits were examined, it was found that pregnant women could not meet the increased need of macro- and micronutritional elements or they had malnutrition behaviours (Arija, Cuco, Vila, Iranzo, Fernandez-Ballart, 2004; Bookari, Yeatman, & Williamson, 2016; Fowles, 2002; Yavuz & Aykut, 2014). This may be due to the inadequate knowledge level of pregnant women.

The results obtained from the study suggested that nutrition education in pregnancy was usually provided by midwives. However, more positive results could be obtained if nutrition education is given by a dietitian during the pregnancy period when nutrition has a critical value. As a matter of fact, in a study carried out in the USA, it was stated that as a result of nutrition education provided by a dietitian, saturated fat intake was decreased, and protein and calcium intake and vegetable consumption were increased during the pregnancy period (Guelinckx, Devlieger, Mullie, & Vansant, 2009). Appoh and Krekling (2005) found that children of mothers with inadequate nutritional knowledge during the pregnancy period had a higher incidence of malnutrition and nutritional deficiency in later years. When such a result was considered, the problems that could be seen in children in early years due to nutritional deficiencies could be addressed with the help of a qualified nutrition education to be provided by a professional dietitian.

Although it was an important goal to increase the level of nutritional knowledge related to the pregnancy period in antenatal care services, it was seen that the nutrition education was not taken efficiently by the pregnant women and they did not take this education from a dietitian, as it was seen in this study (the rate of those who took this education from a dietitian is 3.0%). There was also no widely accepted scale to assess the level of nutrition knowledge. In Turkey, although prenatal care was assessed both quantitatively and qualitatively with the help of the "Turkish Demographic and Health Survey" (TNSA) every 5 years, the absence of such a scale made the qualitative assessment of nutrition education difficult. The pregnancy period has more effects on the mother and infant (Girard & Olude, 2012; Guelinckx et al., 2009) and as for the pregnant women

receiving nutrition education, the problem and solution may become more understandable and resolute in the studies to be carried out.

Conclusion

To conclude, it was found that in general, the pregnant women had inadequate information about the nutrition. It was important to raise awareness about nutrition during pregnancy to improve the public health since nutrition was vital for the health of the mother, foetus and infant. In addition, the nutrition trainings given by nutrition specialists may result in more effective quantitative results.

Ethical Aspects and Conflict of Interest

None of the authors had any conflicts of interest to declare.

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