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A comparison of the dietary and total intake of micronutrients in a group of pregnant Greek women with the Dietary Reference Intakes

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Abstract

Objective: We compared the dietary and total (diet and supplement) intake of micronutrients with the Dietary Reference Intakes (DRIs) from the USA in a population of pregnant Greek women.
Methods: Two hundred pregnant women participated in a nutritional survey, 98 in the second trimester and 102 in the third trimester in a random sampling. To examine dietary intake we used two questionnaires, the nutritional questionnaire for pregnant women from the California Department of Health Services, and a semi-quantitative questionnaire (Walter Willet) with modifications for use in Greece. Dietary intake analysis was performed using the Diet Analysis Plus software, Version 3, ESHA Research. Statistical analysis was performed with Minitab for Windows, Release 12. A simple complementary questionnaire concerning demographic and socio-economic features was also completed.
Results: The average total intake of vitamins A, B_1, B_2, B_3, B_6, B_{12} and C, calcium and phosphorus was higher than the respective DRIs. Folic acid and iron intake exceed the highest values specified for pregnancy. Vitamin E and zinc was lower than the DRIs, while vitamin D, magnesium and thiamin did not differ.
Conclusions: The results of our study suggest that in a Greek population, sufficient micronutrients appear to be received in adequate amount from diet, except for folic acid and iron, which also had to be taken in the form of nutritional supplements.

Keywords: Dietary; Micronutrients; Pregnancy

1. Introduction

Pregnancy is a critical period during which the diet of the pregnant woman reflects not only on her own health, but on the health of the foetus as well. Nutritional adequacy both in quantity and quality during this time is important for the physical and mental development of the infant and later on, of the child [1,2]. Pregnant women represent a demographic group with many particularities in their diet. The understanding of these necessities is critical for the pregnant woman's well being. Until now, research into alimentary evaluation of pregnant Greek women has not been reported, as it concerns the engagement of micronutrient components. This study was conducted in order to give us more information about the nutritional intake and attitudes of pregnant Greek women in order to gain information to aid in the application of interventions that may improve nutritional

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status. It examines pregnant Greek women in the second and third trimester of gestation. The aim of this study is to compare the dietary and the total intake (in the diet and as supplements) of micronutrients with the latest US dietary recommendations or Dietary Reference Intakes (DRIs) of the Food and Nutrition Board (Institute of Medicine of the National Academies) [3]. In addition, we presented the demographic, anthropometrical, clinical and other descriptive characteristics of this sample of pregnant Greek women.

2. Materials and methods

Two hundred pregnant Greek women participated in this descriptive study, 98 of whom were in the second trimester and 102 in the third trimester of gestation. The sample collection was initiated in March 2003 and was completed in June 2003. Women who consented to participate were enrolled in the study randomly (random sample) from the attendees of the Outpatient's Department of the Obstetrics and Gynaecologic Clinic, of the ''TZANEIO'' General Hospital of Piraeus. Pregnant women completed the questionnaires with the consent of their gynaecologist and in the presence of a responsible dietician who informed them about the aim of the study. Pregnant immigrant women were not included in the sample for the reason that their dietary practices differ substantially from those of the Greeks. Additionally, pregnant women with serious complications during their gestation (i.e., haemorrhage, pre-eclampsia) were not selected for inclusion in the sample due to the differentiation in their diet and the medications provided.

For the dietary assessment, the following questionnaires were used:

- Nutritional questionnaire for pregnant women of the California Department of Health Services, MCH/WIC;
- Semi-quantitative questionnaire on the frequency of food consumption by Walter Willet with some minor modifications that concern the adjustment of the questionnaire for use in Greece regarding adaptation of the measurement [29].

Despite the fact that the questionnaires were anonymous, many women did not complete them. Information was obtained with respect to the number of previous pregnancies as well as the weight of the foetuses. Anthropometrical and demographic features were evaluated, as well as the clinical status, the intention to breastfeed and the smoking attitudes of these women. Furthermore, diseases during pregnancy such as anaemia, diabetes mellitus, hypertension, nausea, vomiting, diarrhoea, cramps and constipation, were recorded. Age, weight before pregnancy and weight gained during the current pregnancy were also recorded. Pregnant women reported any dietary supplement intake, smoking habit, water intake, cooking practices, education level, marital status, breastfeeding intention and finally the necessity of dietetic advice. All of these were completed in a simple recoding questionnaire.

In the semi-quantative questionnaire information about the intake of specific foods from all groups was recorded. Participants were asked to record how often they consumed every kind of food during pregnancy (once or twice a day, or a week or a month, etc.). Weekly intake of fruits and consumption of seasonal foods was recorded too. Minor modifications were made regarding measurement (weight and volume) and some foods not common in Greece. The dietician finally reduced all the food consumed to daily doses. This questionnaire has many advantages because it covers a vast period of time and has a better approach to that of regular dietary intake. It offers specific portions of food, a common metre of comparison and consequently limits faults in the calculation of dietary intakes.

Dietary intake analysis was then carried out by a qualified dietician using the Diet Analysis Plus software, Version 3, ESHA Research, a software program that is based mainly on food composition tables of the Department of Agriculture of the United States of America (USDA) due to the lack of local recommendations. This program is able to give an estimate of intake of specific nutrients including vitamins A, B_1, B_2, B_3, B_6, B_{12}, C, E, D, folic acid, calcium, magnesium, phosphorus, iron, zinc, sodium and potassium [30].

Statistical analysis of the data was performed with the software program Minitab for Windows, Release 12. Using 95% confidence intervals, we made a comparison of the dietary and total intake with the DRIs. If the DRIs were contained in the confidence interval, we considered that there was no significant difference between the DRIs and the observed intake.

3. Results

3.1. Demographic and described features

Eighty-three percent of the pregnant women were in the age group of 19–35 years ($\leq$18 years: 1%, $>$35 years: 16%). Thirty-seven percent had received a higher (university or technical institutes) education, whereas 48% had graduated from senior high school education. Fifty-seven percent were nulliparous, 31% had had a previous labour, 9% had had two previous labours and 3% had had three previous labours. Only 8% were on some kind of special diet, while 2% were exclusively vegetarian. Fifty-seven percent received some kind of nutritional supplement (iron 33.3%, iron + folate 15.74%, calcium 43.98%). One percent reported consuming enriched foods. In the vast majority of cases, pregnant women lived within family structures (96.5%). Regarding non-food consumption, 15.5% received some kind of medication, while 18.5% were smokers ($<$10 cigarettes/day: 16%, $\geq$10 cigarettes/day: 2.5%). Concerning the diet of the pregnant woman, 90.5% planned their diet on their own, 74.5% bought their food supplies themselves and 85.5%