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Sociodemographic and dietary profile of 4,471 childbearing-age women planning a pregnancy

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Abstract

Background: The maintenance of healthy lifestyles is of great importance to prevent pregnancy-related diseases at early stages. For this reason, the knowledge of the overall wellbeing of women at childbearing-age is necessary to provide appropriate advice to maintain or improve the nutritional status. The aim of this research was to assess the lifestyles of childbearing-age women planning a pregnancy and to examine the difference between primiparae and multiparae women on these lifestyles.

Methods: This cross-sectional survey involved 4,471 Spanish women at childbearing-age that were planning a pregnancy. Information was collected through a questionnaire by community health professionals.

Results: The profile of childbearing-age recruited women planning a pregnancy were in her early thirties (31.4 ± 4.8 years) and 72.5% were seeking for her first baby. They had a good self-perception of their nutritional and health status and followed a balanced diet. Interestingly, primiparae women had lower risk of health complications but they were greater consumers of tobacco and alcohol (p < 0.001), and consumed less fortified milk, iodine and iron supplements than multiparae women. Additionally, the examined population showed a more sedentary pattern in primiparae women as compared to the remaining group concerning hours/day lying, sitting and standing.

Conclusion: Differences between both preconceptional conditions (primiparae and multiparae women) bring a great opportunity to promote healthy habits among childbearing-aged women, according to the personal profile, in order to prevent burdens in future pregnancies underlying modifiable or preventable factors.

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Key words: Preconception. Parity. Lifestyles. Food habits.
Introduction

There is a lot of information available about the most suitable type of feeding regarding the stages of pregnancy and lactation, but it is not so easy to find feeding advice specifically aimed at women who are planning a pregnancy. However, it is assumed that an adequate nutritional status prior to and around conception period is of great importance for the later stages of pregnancy and birth outcomes. Formation of most organs and important maternal changes occurs between the third and the seventh week after the last menstrual period, when the woman is not yet aware of being pregnant, and several teratogenic effects may happen during this time. In addition, it has been reported that well-nourished women require an extra amount of energy to cope with the new demands at the beginning of a pregnancy. For these reasons, nutritional care from the preconception period seems a good strategy to prevent malnutrition in early pregnancy.

However, there are still no specific and definitive nutritional recommendations for the preconception period, so that it is generally assumed that the general references for women of childbearing-age in the different age groups can be used for women seeking a pregnancy. Moreover, even these guidelines, including those specific to the different stages of pregnancy and lactation, differ from country to country and depend on the board/organism/institution that design them.

Although human studies are scarce and conclusive evidence is provided solely for periconceptional folate and prevention of Neural Tube Defects (NTDs), the overall data indicate that other micronutrients may affect fertility, embryogenesis and placentation, while the prophylactic use of them may be useful in preventing several adverse pregnancy outcomes. All vitamins, minerals and other nutrients can be found in food, but some higher physiological demands at early pregnancy may require supplementation, due to the difficulty in obtaining the extra nutrients needed. In that context, folic acid dietary levels can be increased by consuming folate rich foods, fortified foods or through supplementation. Adequate dietary levels of vitamin A are needed for reproduction and good fetal growth. However, very high doses of vitamin A could be teratogenic, although it is difficult to reach excessive intakes consuming only foods. Vitamin D deficiency may predispose to a multitude of diseases not only related to fetal growth and bone metabolism, but also including diseases of the fetal immune system. During pregnancy, fetal calcium needs are covered by sources from the mother, so maternal calcium levels prior to pregnancy should often be repleted, conjointly with an adequate level of vitamin D to facilitate calcium absorption. Maternal anemia is associated with premature birth and intrauterine growth restriction. Furthermore, a good iodine status in the preconception period could prevent from cognitive impairment, permanent mental retardation and cretinism. There is an increase in requirements for other nutrients including vitamin B12, B6 and C, and minerals such as phosphorus, magnesium and zinc, and some essential fatty acids during pregnancy. These nutrients should be monitored in the preconceptional diet by the intake of foods rich or fortified with them. Thus, maternal body stores should be sufficient to meet the beginning of a healthy pregnancy for both the fetus and the mother.

On the other hand, there is controversy whether the use of or exposure to toxic drugs can induce deficiencies in nutritional and fertility status. Thus, smoking may increase the turnover of folic acid, vitamin C, vitamin B6, vitamin B12 and beta-carotene, which also decreases bioavailability. Moreover, alcohol and some nutrients interact at many levels determining the intake and modifying digestion, absorption and metabolism processes, specially during pregnancy. Also, prenatal alcohol exposure has been associated with fetus impairments and adverse later childhood behavior. Finally, addictive drug use has clear health risks to the health of childbearing-age women and their children with and impact on nutritional status.

For all these reasons, it seems clear that efforts to increase awareness of a healthy lifestyle should be strengthened not only throughout pregnancy, but also prior to pregnancy. Therefore, the two main aims of the present study were to assess the lifestyle habits, including dietary intake, sedentary behavior and drug use of childbearing-age women, who are planning a pregnancy in a large Spanish population sample (n = 4,471), and to analyze the influence of having previous offspring on these lifestyles.

Methods

Participants and recruitment

This cross-sectional study was carried out for four months ending in March 2010. The study population included women from all regions of Spain, who self-declare that were attempting conception, being the status of childbearing age the only criteria for inclusion. Pregnancy intention was assessed by response to the following question: “Time looking for pregnancy: less than 6 months, between 6 and 11 months or more equal to 12 months”. Volunteers were recruited by community pharmacists, who had contact with women who went into the pharmacy. All the participants were specifically asked if they would be willing to take part in the study. After ensuring that participants have understood the information, only those who voluntarily accepted were enrolled. Participant’s voluntary completion of the questionnaire constituted the informed consent, which is in agreement to Declaration of Helsinki. The survey, which involved an observational questionnaire but not intervention, was conducted with the approval of the Spanish Council of Pharmacist and the Board of the Institute of Food.
The nutritional status and food habits study of women who were planning a pregnancy was carried out through a questionnaire that included a total of 45 items, grouped into 6 sections: general information, obstetric data, breastfeeding intention (type and duration), unhealthy lifestyles, pathophysiological state and dietary habits. Weight, height and arm circumference were directly measured by the pharmacists. Arm circumference was measured between the acromion process of the humerus and the olecranon process of the ulna, with the arm relaxed alongside the body. Body mass index (BMI) was calculated from measured weight (kg) and height (m), dividing weight by the square of height. Age and physical activity data were obtained through self-declared questions. Physical activity was measured according to the number of hours spent in lying, sitting and moving activities, paying special attention so that the sum of the hours a day were 24 in total.

Information on educational level, obstetric data, breastfeeding intention, self-perception about health status and diet, and unhealthy lifestyles, was obtained from self-declared information, using categories. Snuff consumption included self-declared active or passive exposure. Alcohol and drug use were considered from self-declared information, using categories. Snuff consumption was defined as daily, weekly, monthly or never. Daily or weekly frequency of food consumption was calculated to know every group approach to meet the recommendations. Quantitative information on the use of supplements, fortified or functional foods was assessed with the baseline questionnaire.

From this questionnaire, anthropometrical variables and questions about physical activity and food habits have been validated. The validation of anthropometrical measurements was assessed comparing the measurements collected by pharmacists and trained research staff. The validity of the physical activity questionnaire was compared with another validated physical activity questionnaire. The food frequency questionnaire had demonstrated validity against the food frequency questionnaire of the SUN project "Seguimiento Universidad de Navarra".

**Data Collection**

The questionnaire was developed online, through a platform located in the website created for the survey (under password), for the pharmacist to enter the information gathered in the face to face interview, and to send the data to the University of Navarra, where data were refined, processed and analyzed in an anonymous and confidential manner. The number of questionnaires received from women planning a pregnancy was 4,666, of which 195 were excluded because of missing values on important variables, so the final sample for the analysis was 4,471.

**Data Analysis**

Statistical analysis was performed with the Statistical Package for Social Sciences (SPSS) for Windows XP (Chicago, version 15.0). Means and standard deviations were used such as descriptive statistics. Student t tests were performed to compare means for age, weight, height, BMI, arm circumference, physical activity and food habits between childless women and those with one or more children.

Frequencies and $\chi^2$ tests were applied to compare different proportions of global, health, toxic habits and other food variables between both groups. All P values presented are two-tailed and the statistical significance was defined at $P < 0.05$.

**Results**

Of the 4,471 Spanish women seeking a pregnancy in the study sample, 72.5% did not have offspring yet (primiparae women) versus 27.5% who already had at
least one child (multiparae women). Baseline values concerning age and anthropometrical measurements of weight, height and arm circumference are reported (Table I). The average age of women seeking pregnancy was 31.4 ± 4.8 years (30.5 ± 4.7 primiparae, 33.9 ± 4.2 multiparae). Primiparae women showed lower values for weight (61.0 ± 9.5 vs 62.4 ± 9.8 kg) and arm circumference (27.4 ± 5.8 vs 27.9 ± 6.1 cm).

The collected information about the previous use of contraceptives, health status and other related nutritional issues is also reported (Table I). As expected, previous miscarriage prevalence was lower in primiparae women as compared to multiparae ones. Also, some statistical differences were identified for the period of time seeking to be pregnant, educational level and a good self-perception of the health status in those two groups (Table I).

According to the available information, the analysis of some lifestyle features also revealed that multiparae women smoked less (37.9% vs 45.9%), took fewer alcohol beverages and spirits (38.3% vs 53.1%), were more likely to follow a special diet (18.2% vs 15.5%) and evidenced more active patterns than those with no previous pregnancies (Table II).

Table I
Baseline characteristics of the 4,471 women at childbearing-age depending on the offspring status

<table>
<thead>
<tr>
<th></th>
<th>All (n = 4,471)</th>
<th>Planning 1st pregnancy (n = 3,240)</th>
<th>Planning 2nd or more pregnancies (n = 1,231)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>31.4 ± 4.8</td>
<td>30.5 ± 4.7</td>
<td>33.9 ± 4.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>61.4 ± 9.6</td>
<td>61.0 ± 9.5</td>
<td>62.4 ± 9.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>164.0 ± 6.1</td>
<td>164.0 ± 6.0</td>
<td>164.0 ± 6.4</td>
<td>0.811</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>22.9 ± 5.9</td>
<td>22.8 ± 3.8</td>
<td>23.3 ± 4.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Arm circumference (cm)</td>
<td>27.5 ± 5.9</td>
<td>27.4 ± 5.8</td>
<td>27.9 ± 6.1</td>
<td>0.13</td>
</tr>
<tr>
<td>Previous use of contraceptives</td>
<td>2,918 (65.3%)</td>
<td>2,114 (65.2%)</td>
<td>804 (65.3%)</td>
<td>0.967</td>
</tr>
<tr>
<td>&gt;6 months looking for a pregnancy</td>
<td>1,815 (40.6%)</td>
<td>1,279 (39.5%)</td>
<td>536 (43.5%)</td>
<td>0.013</td>
</tr>
<tr>
<td>Higher education (university degree)</td>
<td>2,286 (51.1%)</td>
<td>1,712 (52.8%)</td>
<td>574 (46.6%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Self-perception health status good or very good</td>
<td>3,833 (85.7%)</td>
<td>2,808 (86.7%)</td>
<td>1,025 (83.3%)</td>
<td>0.004</td>
</tr>
<tr>
<td>Self-perception nutritional balance good or very good</td>
<td>3,638 (81.4%)</td>
<td>2,656 (82.0%)</td>
<td>982 (79.8%)</td>
<td>0.091</td>
</tr>
<tr>
<td>Previous miscarriage</td>
<td>719 (16.1%)</td>
<td>371 (11.5%)</td>
<td>348 (28.3%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Dietary information about food consumption (Table III) found no statistical differences concerning dairy products, salads/vegetables, fresh fruits, bread, rice/pasta/potatoes, nuts, legumes, fish, eggs, meat, sausages and buns/pastries intake between both preconceptional conditions. However, multiparae women took more care about the consumption of enriched or fortified foods such as milk (23.3% vs 20.3%), iodine or iodined salt (29.9% vs 24.7%) or iron supplements (18.1% vs 15.2%) than primiparae women (Table IV).

Discussion

The results obtained in this research from 4,471 women of childbearing-age, who were seeking a pregnancy have allowed us to characterize sociodemographic features, weight status, eating habits and lifestyle of this population group, whose data come from a national survey.

The mean age of the Spanish woman seeking a pregnancy obtained in this observational study was 31.4 years old, which agrees with data from the Spanish National Institute of Statistics (INE) that point out that the mean age of the Spanish woman seeking a pregnancy is 31.4 years old.
the average age of motherhood has been rising in recent decades to a current age of 31.1 years, which gives support to the representativeness of the recruited sample. According to these results, the profile of Spanish women trying to get pregnant is a woman of normal BMI, with a weight and arm circumference in the 60th percentile and a height between the 70th and 80th percentiles, following the criteria established by Ricart et al. for the Spanish population.

Based on the screened profiles of Spanish women who were planning a pregnancy, some interesting differences were found in anthropometric, global, health and lifestyles variables in women, who were looking for their first baby versus those who already had offspring. This information has a great value for the care of preconceptional women and for specific advice depending on the number of gestations. Although BMI and arm circumference variables were in the normal range in both groups, primiparae women had lower figures than the other group. Taking into account that women, who are overweight or obese at the start of pregnancy is an increased risk for maternal and fetal complications and longer length of hospital stay, it could be hypothesized that in our sample, primiparae women present a minor risk of complications in a possible pregnancy compared with multiparae women, from a nutritional status point of view.

According to the educational level, more than half of the women who were attempting conception had higher education. Thus, women who sought their first baby were also who had the greatest proportion of university studies, despite being younger. This information is consistent to some recent findings in The Netherlands, which suggest that women who have a higher educated have a shorter duration time to pregnancy than those women of lower education.

### Table III

<table>
<thead>
<tr>
<th></th>
<th>All (n = 4,471)</th>
<th>Planning 1&lt;sup&gt;st&lt;/sup&gt; pregnancy (n = 3,240)</th>
<th>Planning 2&lt;sup&gt;nd&lt;/sup&gt; or more pregnancies (n = 1,231)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy products&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.0 ± 1.2</td>
<td>2.0 ± 1.2</td>
<td>2.0 ± 1.2</td>
</tr>
<tr>
<td>Salads/ vegetables&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.2 ± 1.0</td>
<td>1.2 ± 1.0</td>
<td>1.2 ± 1.1</td>
</tr>
<tr>
<td>Fresh fruit&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.8 ± 1.3</td>
<td>1.8 ± 1.3</td>
<td>1.8 ± 1.3</td>
</tr>
<tr>
<td>Bread&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.7 ± 1.2</td>
<td>1.7 ± 1.2</td>
<td>1.7 ± 1.2</td>
</tr>
<tr>
<td>Rice/ pasta/ potatoes&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.7 ± 0.7</td>
<td>0.7 ± 0.7</td>
<td>0.7 ± 0.7</td>
</tr>
<tr>
<td>Nuts&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.0 ± 3.9</td>
<td>2.1 ± 4.0</td>
<td>2.0 ± 3.5</td>
</tr>
<tr>
<td>Legumes&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.4 ± 3.5</td>
<td>2.4 ± 3.6</td>
<td>2.5 ± 3.2</td>
</tr>
<tr>
<td>Fish&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.1 ± 3.5</td>
<td>3.1 ± 3.5</td>
<td>3.2 ± 3.6</td>
</tr>
<tr>
<td>Eggs&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.7 ± 2.2</td>
<td>2.7 ± 2.3</td>
<td>2.7 ± 1.9</td>
</tr>
<tr>
<td>Meat&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.2 ± 4.0</td>
<td>4.2 ± 4.0</td>
<td>4.4 ± 4.2</td>
</tr>
<tr>
<td>Sausage&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.4 ± 4.0</td>
<td>3.4 ± 4.3</td>
<td>3.3 ± 3.4</td>
</tr>
<tr>
<td>Buns/ pastries&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.1 ± 6.1</td>
<td>3.1 ± 6.4</td>
<td>3.1 ± 5.2</td>
</tr>
</tbody>
</table>

<sup>a</sup>Daily consumption. <sup>b</sup>Weekly consumption.
young women’s diet\textsuperscript{30}, although this association was not found in our study.

Furthermore, women planning their first pregnancy seemed to show better self-perception of their global health status than those women seeking their second or subsequent pregnancy. However, no statistical differences were found in self-perception of their food habits between groups. This finding is in accordance with the results obtained later concerning the analysis of food habits, where there were no differences between groups in the frequency of consumption of any food groups analyzed. A greater adherence to certain dietary patterns, such as the Mediterranean diet, may improve the fertility of women of childbearing-age compared with a greater adherence to a western-type dietary pattern\textsuperscript{31}, but we did not find differences in the dietary intake between the screened groups. Moreover, multiparae women, with a poorer self-perception of their global health status, tried to improve it through a higher intake of fortified milk, iodized salt and iron supplements in comparison with nulliparae women. This dietary strategy was proven effective\textsuperscript{32}. This outcome may be due to a positive association between the intake of certain dietary supplements, such as iron supplements, and improving global health parameters, such as tiredness, weakness, headache, breathlessness, dizziness, irritability even fertility in women of childbearing-age\textsuperscript{6,32}. Additionally, iodine deficiency has been associated with a decreased fertility rate\textsuperscript{33}. Fortified milk is mainly enriched in vitamins A, D, E, B\textsubscript{12}, B\textsubscript{6}, B\textsubscript{9} (folic acid) or B\textsubscript{12}, minerals such as calcium, magnesium or iron, and in other dietary compounds such as dietary fiber or omega 3 fatty acids. Thus, it was found that daily consumption of 375 μg of folic acid through fortified milk intake increases blood folate and lowers homocysteine concentrations over 12 weeks in women of childbearing-age\textsuperscript{34}. Another possible explanation for the higher dietary supplementation among multiparae women than among primiparae ones, may be that the first group are more aware of the importance of good nutrition to reduce the risk of maternal and fetal complications, due to the recommendations received during a previous pregnancy\textsuperscript{34}.

On the other hand, the use of drug-toxicant substances was very different between the two groups of women analyzed. The primiparae group had greater consumption of tobacco and alcoholic drinks, two factors that have been related to adverse outcomes in offspring\textsuperscript{35}. The use of tobacco has been clearly associated with delay in conception, lower fecundity rate and both primary and secondary infertility\textsuperscript{36,37}, suggesting that perhaps the group of women planning their first pregnancy are less aware on the harms associated to smoking.

Regarding alcohol and addictive drugs consumption, there is no clear evidence that moderate consumption of any of them delayed conception or predisposed to lower rates of fertility\textsuperscript{38}. However, this consumption does not appear to be suitable for this population group because they have detrimental effects on fetal develop-


