Association of Prepregnancy Dietary Patterns and Anxiety Symptoms from Midpregnancy to Early Postpartum in a Prospective Cohort of Brazilian Women

Ana Amélia F. Vilela, MSc; Thatiana de J. P. Pinto, MSc; Fernanda Rebelo, MSc; Camila Benaim, RD; Jaqueline Lepsch, MSc; Christian Henrique Dias-Silva; Maria Beatriz T. Castro, PhD; Gilberto Kac, PhD

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ABSTRACT

Background Adherence to unhealthy dietary patterns may alter the risk of mental disorders during pregnancy and the postpartum period.

Objective To analyze the association between prepregnancy dietary patterns and prospective variations on anxiety symptoms from midpregnancy to early postpartum.

Methods A prospective cohort of 207 healthy pregnant women was followed at 5 to 13, 20 to 26, and 30 to 36 gestational weeks, and once at 30 to 45 days postpartum. The State-Trait Anxiety Inventory was used to evaluate anxiety symptoms at the second and third gestational trimesters and during the postpartum period. Dietary intake was assessed using a food frequency questionnaire administered during the first trimester of pregnancy that referred to the 6 months before pregnancy. Principal components analysis was used to identify dietary patterns and three prepregnancy dietary patterns were identified: common-Brazilian, healthy, and processed. Three longitudinal mixed-effect models were estimated to verify the association between dietary patterns and anxiety symptoms, adjusted for confounding variables.

Results The mean anxiety symptom scores were 40.4, 40.5, and 37.2 for the second trimester, third trimester, and postpartum, respectively. The rate of variation of the State-Trait Anxiety Inventory score was 0.535 (95% CI −0.035 to 1.107; P=0.066) and −0.010 (95% CI −0.018 to −0.002; P=0.019) when accounting for gestational age and quadratic gestational age, respectively. The common-Brazilian pattern, comprised mainly of rice and beans (β=−1.200, 95% CI −2.220 to −0.181; P=0.021), and the healthy pattern comprised mostly of vegetables, fruits, fish, and tea (β=−1.290, 95% CI −2.438 to −0.134; P=0.029), were negatively associated with prospective changes in anxiety symptoms.

Conclusions High adherence to the common-Brazilian or healthy patterns was negatively associated with higher anxiety symptom scores from mid-pregnancy to early postpartum in this group of Brazilian women.
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ANXIETY IS CONSIDERED A COMMON MENTAL health disorder during pregnancy and has been associated with adverse outcomes for the mother and the fetus, such as inadequate weight gain, premature birth, obstetric complications, and postpartum depression.[1-4] The prevalence of anxiety during pregnancy may vary from 9% to 33.3% worldwide.[5-8] In Brazil, it ranges from 16.9% to 33.3%.[7-9] The mean prevalence of anxiety symptoms in Brazilian pregnant women is higher than the prevalence in other countries. For instance, in Peruvian women, anxiety during pregnancy ranges from 8.1% to 19.6%[10]; for North Americans[11] and Swedish pregnant women,[12] the mean prevalence is 13% and 11.4%, respectively. Prospective studies have shown that anxiety symptoms increase during pregnancy and decrease after birth.[3,13,14]

Some studies have reported that socioeconomic, demographic, nutrition-related, and lifestyle factors are associated with the occurrence of anxiety during pregnancy.[15,16] A cross-sectional study with 165 pregnant women from Athens, Greece, found a positive association between unfavorable social conditions (ie, low level of education and unstable marital status) and anxiety.[17] Hurley and colleagues[18] showed that the high intake of carbohydrates, fats, and protein were positively associated with anxiety symptoms in pregnant women from Baltimore, MD. These studies have assessed maternal diet by micro- and macronutrient intake.[19,20] However, in nutritional epidemiology, dietary patterns have been used in some studies to assess the relationship between diet and health outcomes.[21,22]

Dietary habits have been associated with several outcomes, including psychological illness.[23-25] The Avon Longitudinal Study of Parents and Children (ALSPAC) conducted in southwest England with women at 32 weeks' gestation, found that high adherence to "health-conscious" and "traditional" patterns, consisting of healthy foods such as vegetables, fruits, fish, and red meat, were shown to be inversely associated with anxiety symptoms.[24] Adherence to the "Western" pattern characterized by processed or fried foods, refined grains, sugary products, and beer, was shown to have a positive association with anxiety symptoms in Norwegian adults and elderly women.[26] Furthermore, the consumption of processed foods was associated with state and trait anxieties in adult women aged 18 to 35 years living in Tehran, Iran.[27]

Therefore, considering the high prevalence of anxiety symptoms during pregnancy/postpartum and the association of dietary intake with this outcome, the aim of this study was to evaluate the association between prepregnancy dietary patterns and anxiety symptoms from mid-pregnancy to early postpartum using a prospective cohort study design. We hypothesized that adherence to dietary patterns with healthy foods would be associated with lower anxiety symptoms during the study period. In a recent study from our research group,[28] we observed that the higher adherence to a healthy pattern before pregnancy was associated with lower depressive symptoms during pregnancy, but little is known about the influence of diet on other mental illnesses during gestation, including anxiety. Findings from our study may contribute to closing this gap and provide insights to guide the enrichment of maternal nutrition to improve mental health during the perinatal period.

METHODS

Design and Study Population

We included a prospective cohort of pregnant women from the Heitor Beltrão public health care center, located in the city of Rio de Janeiro, Brazil. Recruitment occurred between November 2009 and October 2011, and women who had an immune-positive pregnancy test and met the following eligibility criteria were invited to participate in the study: were between 5 and 13 weeks pregnant at the time of recruitment, were aged between 20 and 40 years, were free from any chronic diseases (except obesity, which was determined from self-reported prepregnancy weight and measured height at baseline; women with a prepregnancy body mass index [BMI] ≥30 were classified as obese), and were free from infectious diseases.

The pregnant women were evaluated at the following periods during pregnancy: 5 to 13, 20 to 26, and 30 to 36 gestational weeks, and once between 30 and 45 days postpartum. A total of 299 pregnant women were recruited for this study. However, after entering the study we excluded women who gave birth to twins (n=4), changed their prenatal care health unit (n=11), abandoned the prenatal care and follow-up (n=19), were diagnosed with an infectious or noncommunicable disease (n=12), were identified as more than 13 weeks of pregnancy based on the ultrasound at baseline (n=16), had missing data at baseline (n=15), had a miscarriage (n=25), or had a stillbirth (n=1). Following these exclusions, the final sample included 196 pregnant women at the second trimester.

Assessment of Dietary Intake

The food frequency questionnaire (FFQ) used on our study was validated in a sample of 88 employees from Rio de Janeiro State University who completed four 24-hour recalls, which is considered the gold standard. The authors observed that the correlation coefficients ranged from 0.18 (vitamin A) to 0.55 (calcium). The coefficients for energy, carbohydrate, protein, and fat were 0.44, 0.34, 0.44, and 0.41, respectively. Except for vitamin A, all the other nutrients have high significant agreements.[29]

Dietary intake was assessed using this validated FFQ[29] administered during the first trimester of pregnancy. The time frame to which the FFQ referred was 6 months before pregnancy. The FFQ included 82 food items and had eight frequency options: more than three times a day, two to three times a day, once a day, five to six times a week, two to four times a week, once a week, one to three times a month, and never or hardly ever. These data were transformed into daily frequencies by multiplying those quantities by 4, 2.5, 1, 0.79, 0.43, 0.14, 0.07, and 0, respectively. Daily energy intake (in kilocalories) was obtained using DietSys software, version 4.02 (National Cancer Institute). The Brazilian Food Composition Table[30] was the database used in this analysis, and we used the US Department of Agriculture food composition table[31] for those foods that were not found in the Brazilian Food Composition Table.[30]

To identify the dietary patterns, 77 of 82 items listed in the FFQ were grouped into 19 food groups. The food groupings were based on their nutrition-related characteristics. Items that were consumed by 80% or more of the subjects or had different nutritional composition were kept separate,[32] even if they had a nutritional composition similar to other items (eg, rice, beans, bread, and sugar). Lard, wine, beer, vodka, and dried meat/codfish had a lower consumption (<20% of frequency), so they were excluded from the dietary pattern analysis. The foods were grouped as: rice; beans; breads; cakes and cookies-crackers; pasta, roots, and tubers; gnocchi/lasagna/ravioli; baked/mashed potato; cassava/yam, cassava flour, and polenta; meats and eggs: pork, beef, chicken, barbecue, giblets (eg, gizzard, heart, liver, stomach/tripe, and kidneys), and eggs; vegetable spices: onion, garlic, and red/green/yellow pepper; dairy products: cheese, milk, cottage cheese, and yogurt; green vegetables and legumes: lentils/peas/chickpeas, lettuce, cabbage, kale, cauliflower/broccoli, tomato, cucumber, chayote, squash, zucchini, carrots, beets, okra, and pea pods; fruit and fruit juice: orange/tangerine, banana, papaya, apple, watermelon/melon, pineapple, grape, mango, and fruit juices/pulp; fish; sausages and deli meats: sausage/frankfurter, cold cuts (bologna, ham, fatty ham, and salami), and bacon; fat: butter and margarine; fast food and snacks: pizza, hamburgers, french fries/chips/straw potatoes, mayonnaise, snacks, popcorn, fried/baked salted pastries, canned vegetables, and peanuts; coffee; tea; sodas; candies: ice cream, candies/caramels, chocolate powder, chocolate bars/bonbon, fruit jam/jelly, and sweet dairy; and sugar.[28]

Dietary patterns were extracted using principal component analysis. Initially, the Kaiser-Meyer-Olkin test was used to measure sampling adequacy (Kaiser-Meyer-Olkin >0.6) and