

Periconception Diet does not Vary by Duration of US Residence for Mexican Immigrant Women

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ABSTRACT

This cross-sectional study assessed the influence of duration of residence in the United States on periconception dietary intake of pregnant Mexican immigrant women, using baseline data from Healthy Mothers on the Move, a randomized control trial conducted with 234 women from 2004 to 2006 in Detroit, MI. Average maternal age was 27.3 ± 5.2 years (range=18 to 41 years) with 5.99 ± 4.76 years of US residence (range=0 to 36 years). Women's usual dietary intake during the past 12 months was recorded on a validated food frequency questionnaire (17.3 weeks average gestation). Intakes of selected micronutrients, macronutrients, and food groups were compared by US residence categories (≤ 5 , 6 to 10, or ≥ 11 years) using analysis of covariance. The percent of women with intakes below the Estimated Average Requirement and the percent not meeting US dietary guidelines were calculated. There was no association between dietary intake and duration of US residence in this population. Percentages of women with dietary intake below the Estimated Average Requirement were: 12.0% for folate, 7.7% for vitamin C, 23.9% for calcium, 11.2% for protein, and 5.1% for carbohydrates. US dietary guidelines were not met for fruit by 17.5% and for vegetables by 74.8% of women. Typical diets were high in saturated fat and cholesterol. Of the 2,195 kcal average daily energy intake, >25% came from saturated fats, *trans* fats, and added sugars that may replace nutrients important for healthy fetal growth and development and women's health. Interventions to improve intake before, during, and after pregnancy are important in this population, regardless of duration of US residence.

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MATERNAL NUTRITIONAL STATUS DURING pregnancy is an important influence on fetal development and may also influence birth outcomes and maternal health during and after pregnancy.¹⁻⁵ Dietary intake is associated with insulin resistance and glucose intolerance during pregnancy^{6,7} and risk of type 2 diabetes in women.⁸ These conditions,⁹⁻¹² and obesity,^{10,13,14} are prevalent among women of Mexican ancestry in the United States during their childbearing years. However, few studies during the past 20 years have assessed the dietary behaviors of Latinas in the months before or during pregnancy.^{5,15-18} Although immigrant women represent 60% of US births to women of Mexican ancestry,¹⁹ only three cross-sectional studies, all conducted in California, considered this population.^{15,16,18} Schaeffer and colleagues¹⁶ compared the dietary intake 3 months before pregnancy of 93 Latina immigrant women with US-born Latinas and non-Latina white women who were interviewed following the birth of their infants between 1989 and 1991. Immigrant Latinas consumed less fat as a percent of energy and more carbohydrates, cholesterol, fiber, folate, vitamin C, iron, and zinc than US-born Latinas. Harley and colleagues studied the midpregnancy dietary intakes of low-income Mexican women living in rural California during 1999-2000, comparing those born in Mexico

(mean age=25.9 years) to those born in the United States (mean age=22.8 years).¹⁵ Among Mexico-born women, 60% of whom had resided in the United States for <6 years, increasing duration of US residence was inversely associated with intakes of fiber, folate, iron, and zinc. A study conducted with 36 Mexico-born and 10 United States-born pregnant adolescents did not report intake of specific nutrients by immigration status but found no effect of length of US residence on adequacy of diets.¹⁸

During the past decade, the Mexican population has grown rapidly in both urban and rural areas throughout the United States, especially in the Midwest and South.²⁰ To the authors' knowledge, no studies have assessed the dietary intake of Mexican immigrant women living in the Midwest, where migration patterns and access to nutrient-rich foods may differ from the earlier California studies. Our study examined the dietary intake of a cohort of Mexican immigrant women living in Detroit, MI, during the year surrounding conception and early pregnancy. The study hypothesis was that length of US residence would be associated with differences in dietary intake.

METHODS

This cross-sectional study used baseline data collected before randomization from all consenting participants in Healthy

Mothers on the Move (Healthy MOMs), a randomized controlled trial planned and conducted in Detroit, MI, during 2004–2006 using community-based participatory research principles.²¹ Healthy MOMs protocols were approved by the University of Michigan Institutional Review Board. The Healthy MOMs study design and methods are described elsewhere.^{22,23} Participants were recruited from community prenatal and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) clinics. They were aged ≥ 18 years, southwest Detroit residents, and < 20 weeks gestation at eligibility screening. Women with multiple gestations were ineligible. Women who reported their birthplace as Mexico and self-identified as Mexican, Mexican American, or Chicana ($n=244$) were included in this analysis. Eight women were subsequently excluded due to violating eligibility criteria ($n=1$), unreasonable daily nutrient consumption ($> 8,700$ kcal/day; $n=1$), and no baseline food frequency questionnaire (FFQ) ($n=6$).

Dietary data were collected by trained interviewers using the General Select–Spanish (GSEL-S) FFQ developed in Spanish by the Nutrition Assessment Shared Resource of the Fred Hutchinson Cancer Research Center.²⁴ It included food choices common to Mexicans, and has been validated in a Hispanic population.²⁵ The Food and Nutrient Data Base of the Nutrient Data System for Research (version 2008, Nutrition Coordinating Center, University of Minnesota) was used for nutrient calculations. Only baseline data (mean = 17.3 weeks gestation; range = 7 to 27 weeks) were used in this analysis. Women were told: “This form asks about your usual food intake during the last 12 months.” This period corresponded to approximately 8 months preconception through 4 months gestation for a typical study participant. Women were not asked to differentiate their intake before vs during pregnancy. Maternal age, years of US residence, and other demographic and service use data were collected by questionnaire by the same interviewers.

Nutrient intake from the FFQ report was based on diet alone, excluding consumption of vitamins and other supplements. Nutrients studied were: energy (kilocalories), carbohydrates (grams), added sugar (grams, % total energy), protein (grams), total fat (grams, % total energy), saturated fat (grams, % total energy), solid fats and added sugars (SoFAS) (% total energy), cholesterol (milligrams), fiber (grams), fruits (servings), vegetables (servings), folate (micrograms daily folate equivalents), vitamin C (milligrams), calcium (milligrams), magnesium (milligrams), iron (milligrams), and zinc (milligrams).

Data Analysis

Descriptive statistics on raw data, including mean and standard deviation, were calculated for selected nutrients. Nutrient values, except percent energy from saturated fat, were positively skewed; therefore, all skewed values were log-transformed before statistical analysis. The effect of years in the United States on nutrient intake was evaluated using linear regression, with years as a continuous variable, and one-way analysis of covariance with years in the following categories (≤ 5 , 6–10, and ≥ 11 years) to facilitate comparison with the study by Harley and colleagues.¹⁵

For selected nutrients, the proportion of study participants with intakes below the Estimated Average Requirement (EAR)

for nonpregnant or pregnant women was calculated based on age-group-specific guidelines.^{26–30} The distribution of iron requirements is not normally distributed; thus, iron intake for nonpregnant women was estimated using the probability approach,³¹ based on probability of inadequacy data for menstruating women.²⁸ Because no probability data are available for pregnant women, the percentage of pregnant women with intakes below recommended levels for iron could not be calculated. When the EAR was unavailable, the proportions of women meeting recommendations for macronutrients, and fruit and vegetable servings, were calculated using the Dietary Guidelines for Americans, 2010³² and 2005,³³ respectively. Data analyses were conducted using Statistical Analysis Software for Windows (version 9.2, 2008, SAS Institute Inc).

RESULTS AND DISCUSSION

At baseline, the mean age of the 234 Mexican immigrant women was 27.3 ± 5.2 years (range = 18 to 41 years). No English was spoken by 190 women (81.2%) and 66.2% had < 12 years of education. Ninety percent of women were homemakers and 61.1% were married and living with their partner. A quarter of women were primiparous and 76.1% began prenatal care during the first trimester. Two thirds of participants received prenatal care at a federally qualified health center. No study participants reported smoking. Seventy-eight percent of women were participating in WIC at baseline, with no variation by duration of US residence ($P=0.23$). More than one half of study participants had a prepregnancy body mass index of > 25.0 . Of the 232 women for whom years of US residence data were available, 54.7% had lived in the United States ≤ 5 years ($n=127$), 32.3% for 6 to 10 years ($n=75$), and 12.9% for ≥ 11 years ($n=30$).

Table 1 presents the mean and standard deviations for daily periconception dietary intake for the study population overall, and by categories of years lived in the United States, reported at a mean of 17.3 gestational weeks. Dietary intake for most nutrients was similar between Detroit women and immigrant women studied preconception by Shaeffer and colleagues.¹⁶ Detroit women may have consumed less total fat, saturated fat, and cholesterol, and more folate, but differences in reporting methods make direct comparisons difficult. Detroit women consumed 4.3 servings of fruit compared with 2.8 servings¹⁵ and 2.3 servings¹⁶ observed in the California studies of Mexican and Latina immigrant women, and the 1.07 servings reported for US adults during the period from 1999 to 2002.³⁴ Detroit women consumed 2.3 vegetable servings compared with the 2.3 servings¹⁵ and 2.8 servings¹⁶ in the California studies, and the 1.97 servings reported for US adults during the period from 1999 to 2002.³⁴ Cross-sectional studies of postpartum Latinas in Connecticut⁵ and Boston, MA,³⁵ found similar fruit and vegetable intakes to this Detroit study. Detroit women consumed 12.0% of daily energy from saturated fat compared with 10.9% by US women aged 20 to 39 years studied in the cross-sectional 1999–2000 National Health and Nutrition Examination Survey, and had higher dietary intakes than US women of cholesterol, calcium, and folate (US women: 241 mg, 797 mg, and 327 mg, respectively).³⁶ Detroit women also had higher intakes of iron and zinc than US women as a whole.³⁶

Nutrient intake for energy, macronutrients, vitamins, min-

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