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Folic Acid-Related Dietary Preferences and Health Interests of Latino Women Living in North Carolina

by

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ABSTRACT

Objectives: Women of childbearing age are strongly encouraged to take a daily multivitamin containing folic acid in order to decrease their risk of having a pregnancy affected by a neural tube defect (NTD). While multivitamins offer an effective means for obtaining adequate amounts of folic acid, there are dietary options (e.g., fortified grain products) for obtaining this important vitamin. In the current study, the willingness of Latino women living in North Carolina to use these options was examined.

Methods: A total of 115 Latino women participated in the study. The participants ranged in age from 18 to 48 years (mean=29.5 years, SD=7.9 years). A 22-item questionnaire was used to collect data about the participants' current folic acid-related dietary behaviors, their willingness to make dietary modifications, and their interest in learning about health conditions that are believed to be affected by folic acid consumption. Data collection sites included 13 English as a Second Language (ESL) classes, a parenting class, and two Latino community resource centers.

Results: Half of the participants did not use multivitamins, yet most of the non-users indicated a willingness to begin taking multivitamins. There was a significant relationship between multivitamin use and age and income; the younger participants and those with lower household incomes were less likely to use multivitamins. Cereal was a popular food item, and many of the participants (65.8%) indicated a willingness to increase their weekly intake of this food by four or more times a week.

Conclusions: There are a variety of cereals that offer 100% of the daily-recommended amount of folic acid. This food might be a valuable alternative for Latino women who, for whatever reason, do not use multivitamins. Furthermore, promoting the overall health benefits of folic acid could serve as an important motivator for Latino women who are reluctant to increase their consumption of this vitamin for the sole purpose of NTD risk reduction.

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Introduction

A neural tube defect (NTD) is a birth defect that occurs when there is incomplete formation of the brain and/or spinal cord in early pregnancy. The most common NTDs are anencephaly, encephalocele, and spina bifida. These defects can be lethal or may involve other complications such as hydrocephaly, clubfoot, and muscle weakness/paralysis. Each year in North Carolina, nearly 200 pregnancies are affected by NTDs, and approximately half of these pregnancies result in live births.¹ There has been a gradual decline in NTD prevalence in North Carolina over the past few years; however, the rates among Latinos living in the state are 2.0-2.5 times higher when compared to non-Latinos (see Table 1).

Table 1
Rate of NTDs per 10,000 Live Births
North Carolina, 1995-1999

Group	n ^a	Rate	Total births
Latino	63	18.4	34,159
Non-Latino White	307	8.8	347,573
Non-Latino Black	99	7.2	137,606

^aNumber of live born NTD cases. The total number of NTD cases is approximately twice the number of live born cases and includes fetal deaths of 20 weeks gestation and older.²

The etiology of most cases of NTDs is unknown; however, consuming folic acid for at least three months prior to and following conception can decrease the risk of having an NTD-affected pregnancy by 70%.³ The protective effect folic acid offers against NTD risk has been demonstrated in numerous studies.⁴⁻⁷ Since 1992, the U.S. Public Health Service has recommended that all women of childbearing age consume 400 micrograms of folic acid each day in order to reduce their risk of having an NTD-affected pregnancy.³ This recommendation targets *all* women of childbearing age, regardless of pregnancy intendedness, because (a) half of all

pregnancies in the United States are unplanned and (b) the development of the neural tube occurs during the first four weeks of pregnancy, often before a woman realizes that she is pregnant.⁸⁻⁹ Daily intake of multivitamins is strongly recommended in order to ensure the consumption of 400 micrograms of *synthetic* folic acid, which is 1.7 times more bioavailable than the natural form (folate) found in unfortified foods (e.g., spinach, orange juice).¹⁰⁻¹¹

The results of a study by Martínez de Villarreal et al. (2002) strongly suggested that vitamin supplements containing folic acid are effective at lowering NTD rates among Latinos.¹² However, factors such as income and language may present challenges for some Latino women who are interested in taking multivitamins. The median family income for Latinos living in North Carolina is \$14,030, compared to \$32,460 for non-Latino whites.¹³ The Third National Health and Nutrition Examination Survey stated that individuals with low incomes tend to use vitamin supplements less often than individuals with middle or high incomes.¹⁴ Furthermore, Latino women who do not read English may be less inclined to purchase multivitamins in North Carolina because virtually all vitamin supplement labels are printed in English only.

Fortunately, multivitamins are not the only source of synthetic folic acid; fortified foods, such as pasta, cereal, and white rice, provide the more bioavailable form of folic acid. For example, two ounces of enriched dry pasta and enriched dry white rice each provide 20% or more of the recommended daily amount of folic acid, while most cereals provide 25-100% of the recommended daily amount in a one-cup serving. Greater awareness of these foods might be useful for Latino women who are unable to take or are not interested in taking multivitamins. The primary objective of this study was to gather information from Latino women living in North Carolina regarding their current intake of multivitamins and foods fortified with folic acid and their willingness to increase their intake of these foods.

Methods

The population examined in this study was a convenience sample of Latino women between the ages of 18 and 50. Eighteen was chosen as the lower age limit based on the belief that women this age are more likely to be responsible for household food purchases than younger women. Furthermore, parental consent to participate in the study was not required for women age 18 and older. Given that adequate folic acid intake is particularly important for women of childbearing age, questionnaires completed by women considered to be beyond their childbearing years (i.e., over age 50) were not analyzed.

The participants were recruited from agencies that serve the Latino population. Agencies located throughout the state were contacted via e-mail; however, the four agencies that agreed to participate in the study were located in central North Carolina. Data collection sites included 13 English as a Second Language (ESL) classes (all taught within the same agency), a parenting class, and two Latino community resource centers. Approval to conduct the study was obtained from the Institutional Review Boards at the University of North Carolina at Greensboro and the North Carolina Division of Public Health.

An investigator-designed 22-item questionnaire was used to collect data. The participants were asked to provide information regarding their use of multivitamins, as well as their current weekly intake of foods fortified with folic acid, specifically cereal, pasta, white rice, and flour tortillas. These foods were included in the questionnaire because they are considered “excellent” sources of folic acid.¹¹ The participants were also asked to indicate their willingness to increase their intake of the previously mentioned foods if they knew that these foods may help lower the risk of health conditions believed to be affected by folic acid consumption (i.e., heart disease, depression, breast, cervical, and colon cancers, and certain birth defects).¹⁵⁻²¹ Questions regarding age, nationality, household/family

income, the ability to read English, and the highest level of school completed were also included.

The questionnaire and consent form were translated into Spanish and evaluated by two bilingual, native Spanish-speaking people in order to ensure consistency between the English and Spanish versions. The questionnaire was not pre-tested; however, the appropriateness of the questionnaire for use among Latino women was evaluated by a social worker, who was Latino, and whose clients were primarily Latino women.

Testing materials were mailed or personally delivered to each of the participating agencies. Class instructors distributed the questionnaires at the ESL and parenting classroom sites, and employees at the two Latino community resource centers distributed the questionnaires to women when they came in for services. The Latino women were asked to read an attached consent form and decide whether they wished to participate in the study. Each data collection site was given two to three weeks to distribute and collect the questionnaires.

SPSS software (version 11.5) was used to analyze the data. Frequency analyses were used to identify the participants’ current folic acid-related dietary behaviors, their willingness to modify these behaviors, and their interest in learning more about health conditions that are believed to be affected by folic acid consumption. Crosstabulation and Chi-square were used to investigate possible differences in multivitamin use related to age, income, geographic region of descent, and the ability to read English.

Results

A total of 122 Latino women responded to the questionnaire. However, six questionnaires were not analyzed due to age: five respondents were over the age of 50, and another respondent was under the age of 18. An additional questionnaire was not analyzed due to an insufficient number of responses. The remaining sample of 115 respondents ranged in age from 18 to 48 years (mean=29.5 years, SD=7.9

years; see Table 2). Slightly more than half (54.8%) of the participants were of Mexican descent, while nearly one-fourth (24.0%) were of Central American/Caribbean descent; approximately one-fifth (21.2%) of the participants were of South American descent. Approximately half (49.1%) of the participants could read English, and the majority (64.7%) of the participants had an annual household/family income of less than \$20,000.

Characteristic	n	%
Age		
18-29 years	59	54.1
30-39 years	35	32.1
40-48 years	15	13.8
Geographic region of descent		
Mexican	57	54.8
Central American/Caribbean ^a	25	24.0
South American ^b	22	21.2
Education		
Less than a high school diploma	46	42.6
High school diploma	22	20.4
Beyond high school	40	37.0
Ability to read English		
Yes	55	49.1
No	57	50.9
Annual household/family income		
Less than \$20,000	55	64.7
\$20,000 or greater	30	35.3
Total Sample	115	100.0
^a Honduras, n=7; Puerto Rico, n=5; El Salvador, n=5; Dominican Republic, n=3; Guatemala, n=2; Costa Rica, n=1; Nicaragua, n=1; Panama, n=1. ^b Columbia, n=10; Venezuela, n=5; Peru, n=5; Ecuador, n=2. NOTE: Due to missing data, the categories add to less than 115 respondents.		

Half of the participants (50.9%) were not taking multivitamins, while slightly more than one-fourth (26.4%) were taking multivitamins 4-7 days a week (see Table 3). It is important to note that most of the participants (91.8%) who were not taking multivitamins indicated that they were interested in adopting this behavior. There was no significant difference in multivitamin use based on geographic region of descent ($\chi^2=0.3$) or the ability to read English ($\chi^2=1.2$); however, there was a significant relationship between multivitamin use and household/family income, as well as age.

Number of days taken	n	%
0	54	50.9
1-3	24	22.6
4-7	28	26.4
NOTE: Intake was not reported for nine survey respondents.		

Among the participants who had an annual household/family income of \$20,000 or more, 53.6% took a multivitamin 4-7 days a week, while only 20.8% of those with an annual household/family income of less than \$20,000 practiced this same behavior ($\chi^2=9.9$, $p<.01$; see Table 4). A higher percentage of the participants with annual household/family incomes of less than \$20,000 did not take multivitamins when compared to the participants with higher annual household/family incomes, 60.4% and 28.6%, respectively.

	n	%
Income		
<i>Less than \$20,000</i>		
No use	32	60.4
1-3 days per week	10	18.9
4-7 days per week	11	20.8
<i>\$20,000 or greater</i>		
No use	8	28.6
1-3 days per week	5	17.9
4-7 days per week	15	53.6
Age		
<i>18-39 years</i>		
No use	47	53.4
1-3 days per week	21	23.9
4-7 days per week	20	22.7
<i>40-48 years</i>		
No use	5	33.3
1-3 days per week	2	13.3
4-7 days per week	8	53.3
NOTE: Due to missing data, the categories add to less than 115 respondents.		

Age was also significantly related to multivitamin use. A comparison was made examining multivitamin use among the participants who were more likely to become pregnant (i.e., those less than age 40) and those who were not as likely to become pregnant (i.e., those age 40 and older). More than twice as many participants who were age 40 or older took a multivitamin 4-7 days a week when compared to the participants who were younger than age 40, 53.3% and 22.7%, respectively ($\chi^2=6.1$, $p<.05$; see Table 4). More than half of the participants (53.4%) who were less than age 40 did not use multivitamins, while 33.3% of those age 40 or older did not use multivitamins.

Weekly pasta and flour tortilla intake was low among the participants; however, white rice and cereal were popular among many of the participants (see Table 5). When asked about their willingness to increase their intake of these foods, most of the participants (65.8%) indicated that they would be willing to increase their intake of cereal four or more times a week, followed by white rice (51.5%), flour tortillas

(40.9%), and pasta (38.8%). (The data for flour tortillas represents the participants' willingness to eat *four or more flour tortillas* each week, not their willingness to eat flour tortillas *four or more times* each week.)

The majority of the participants were "very interested" in learning about the folic acid-related health benefits mentioned in the questionnaire. The participants were most interested in learning more about the ways diet may help lower their risk of breast, cervical, and colon cancers (89.3%). Interest in learning about the ways diet may help reduce the risk of birth defects in future pregnancies, depression, and heart disease was also high, 80.5%, 79.6%, and 74.6%, respectively.

Discussion

Approximately half of the participants (49.1%) were taking multivitamins at least once a week. In comparison, data from the 1994-96 Continuing Survey of Food Intake by Individuals revealed that the use of vitamin supplements among Latino women was 45%.²² Most of the participants in the current study who were not taking multivitamins indicated a willingness to begin taking them. This finding is encouraging due to the quick and efficient means multivitamins offer for obtaining adequate amounts of folic acid. However, there was a significant relationship between age and income and the *actual use* of multivitamins among the participants. This finding might be somewhat discouraging for those promoting multivitamins as a means of reducing the risk of birth defects, given that the women most likely to take a multivitamin on a regular basis were in the late stages of their childbearing years.

An alternative for Latino women who are unable to take or are not interested in taking multivitamins is increasing their intake of foods fortified with folic acid. Given the popularity of cereal among the participants in the current study, Latino women who do not take multivitamins may be willing to eat a fully fortified cereal (i.e., 400 micrograms per serving) six or seven times a week.

Food/times eaten per week	n	%
Cereal		
0	4	3.9
1-3	55	53.4
4+	44	42.7
White rice		
0	3	2.9
1-3	67	63.8
4+	35	33.3
Pasta		
0	19	19.4
1-3	76	77.5
4+	3	3.1
Flour tortilla^a		
0	51	53.1
1-3	23	24.1
4+	22	22.8

^aData for flour tortillas represent the number of *tortillas* eaten by participants' each week, not the number of *times* they eat flour tortillas each week.
NOTE: Due to missing data, the categories add to less than 115 respondents.

Obtaining folic acid through fortified cereals offers advantages over other fortified foods. Namely, cereal typically offers more folic acid per serving when compared to other fortified foods, and there are a variety of whole grain cereals that are fortified with folic acid, whereas whole grain rice and pasta are typically not fortified. Furthermore, research suggests that whole grain foods may decrease the risk of a variety of health conditions.²³⁻²⁵

It is important to clarify that the recommendation to increase the intake of cereal *is not* a recommendation for Latino women to increase their caloric intake. Rather, the recommendation would be for Latino women to *modify* their diet so as to include cereals that contain 100% of the recommended daily amount of folic acid. Increased caloric intake could lead to obesity, which is a risk factor for diabetes, as well as other health problems. It is important for Latinos to control this risk factor, particularly given the increased prevalence of both gestational and type 2 diabetes among this population.²⁶

The participants indicated an interest in learning about a variety of health conditions that are believed to be affected by folic acid consumption. This finding is encouraging for at least two reasons. First, the women in this study appear eager to learn more about ways of improving their health. Second, if health professionals provide a greater focus on the overall health benefits of folic acid, it might be easier to encourage Latino women to increase their intake of folic acid through the use of multivitamins and/or fortified foods.

There were several limitations of this study. First, the participants represented a convenience sample from central North Carolina; therefore, it is possible that the participants are not representative of other Latino women living in North Carolina, or Latino women in general. Another limitation of the study was that the principal investigator was not present during data collection. Hence, the results of the study may have been weakened if a participant was unclear about some aspect of the questionnaire. Other limitations had to do with questions that were not asked. In

retrospect, it would have been advantageous to include a question asking those participants who did not take multivitamins why they did not practice this behavior. The responses to this question would have provided a better understanding of the challenges Latino women may face regarding multivitamin use. Additionally, it would have been helpful to ask the participants how many individuals were present in their household/family in order to better evaluate the impact income has on the ability to purchase multivitamins. Finally, since folic acid fortification levels vary widely among cereal brands, it would have been useful to ask the participants to indicate the brand names and portion sizes of the cereals they eat.

Conclusions

Multivitamins are an effective means for obtaining folic acid, and their use should continue to be promoted to women of childbearing age. However, as the results of this study indicated, many Latino women are not taking daily multivitamins. It is important to understand the reasons why and to consider other alternatives and outreach approaches.

Fortunately, dietary options exist for obtaining synthetic folic acid. One of these options in particular (i.e., fully fortified cereals) might be a valuable source of folic acid for Latino women and other women who do not take daily multivitamins. Promoters of folic acid should provide Latino women with a list of cereals that contain 100% of the recommended daily amount of folic acid. Furthermore, Latino women who choose to increase their intake of cereal in order to obtain adequate amounts of folic acid should be encouraged to modify their diet in order to avoid unhealthy weight gain (e.g., replacing carbohydrates that consist mainly of simple sugars with whole grain cereals rich in folic acid).

Finally, highlighting the overall health benefits of folic acid, rather than focusing primarily on the benefits during pregnancy, might be more effective at reaching Latino women who do not wish to increase their intake of folic acid for the sole purpose of reducing NTD risk. This overall health approach

might be particularly useful for motivating young Latino women to use multivitamins. Furthermore, public health professionals who are working to lower NTD rates might consider partnering with organizations that are working to decrease the risk of other health conditions that are believed to be affected by folic acid consumption (e.g., cardiovascular disease, cancer, and depression).

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