



Folic acid promotion for Hispanic women in Florida: A vitamin diary study

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Abstract

Objective: To assess the barriers and benefits of taking multivitamins among Hispanic women exposed to a folic acid social marketing campaign in Florida, USA.

Design and setting: Evaluation of non-pregnant women aged 18–35 from multiple Hispanic subgroups.

Method: For 6 months, participants exposed to social marketing campaign educational materials were given a supply of vitamins and reported, on a daily basis, how often they took a multivitamin with folic acid and reasons why they may not have taken the multivitamin.

Results: Forty-one women participated in the study and 65 per cent missed 10 days or less of taking the supplement. The most common reason for not taking the vitamin was forgetting.

Conclusion: Compliance with multivitamin intake has numerous barriers. Therefore, continued educational efforts by public health practitioners are necessary in order to reach Hispanic/Latino populations known to have a high risk of neural tube defects.

Keywords

evaluation, folic acid, health disparities, Hispanic women's health, social marketing

Introduction

Folic acid has been shown to reduce the risk of neural tube defects (NTD) when taken periconceptionally^{1,2}. In 1992, the United States Public Health Service recommended that all women of child-bearing age in the USA consume 400 µg of folic acid in order to reduce their risk for having a pregnancy affected by NTDs¹.

National surveys indicate that health communication campaigns increased awareness of folic acid among reproductive-age women from 52 per cent in 1995 to 84 per cent in 2005, although increases in use of folic acid-containing vitamins were modest, from 28 per cent to 33 per cent³.

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However, an increase in knowledge is an intermediate outcome and may not be directly related to an increase in intake of folic acid or a decrease in the occurrence of NTDs. To overcome these barriers, women need both knowledge and resources to make and sustain behavioural change, particularly for an active modification such as daily vitamin consumption⁴. The use of supplements containing folic acid, even though it requires a behaviour change, remains a convenient way to assure consumption of 400 µg daily.

As up to 50 per cent of pregnancies in the USA are unintended (either mistimed or unwanted), interventions that promote folic acid use must target all women of childbearing age, not just those planning a pregnancy^{5,6}. However, these broad-based interventions often fall short of reaching the intended audience. National, state, and local interventions promoting the use of supplements containing folic acid among women of childbearing age have been sponsored by the Centers for Disease Control, the March of Dimes, and other organizations. Interventions have included media campaigns, point-of-purchase advertising, and other approaches.

National and state-wide folic acid promotion activities, including media campaigns, have had modest success in increasing folic acid awareness among women of reproductive age, but pre-conceptional folic acid consumption remains disappointingly low⁶. According to a series of Gallup polls commissioned by the March of Dimes, knowledge among US women aged 18 to 45 years that folic acid supplements prevent birth defects increased from 4 per cent in 1995 to 21 per cent in 2003. Among non-pregnant women, intake of a daily folic acid-containing multivitamin increased only from 25 per cent to 30 per cent during this same timeframe⁶.

A number of studies have reported lower awareness and/or use of folic acid supplements among low-income and minority women, suggesting that innovative multi-pronged strategies may be necessary to target these special populations. An analysis of the Pregnancy Risk Assessment Monitoring Systems (PRAMS) data, a survey of US postpartum women, found that low education and minority status were associated with less knowledge about the benefits of folic acid in preventing NTDs⁷. In a study among a patient population in Arizona, Perlow found that Spanish-speaking patients had significantly less knowledge about the benefits of folic acid and were significantly less likely to be using multivitamins than English-speaking women⁸.

Surveys of women of childbearing age show that women of Hispanic origin have even less knowledge and lower use of folic acid than their non-Hispanic counterparts⁹⁻¹¹. A survey of 1884 Florida women aged 18 to 35 conducted by the University of South Florida Birth Defects Surveillance Program illustrated that awareness and knowledge of folic acid among Hispanic women was inadequate¹². Compared with non-Hispanic women, Hispanic women were less likely to be aware of folic acid and less informed about the role that pre-conceptional folic acid plays in the prevention of certain types of birth defects¹². It is important that folic acid educational materials targeted at specific populations increase both knowledge and daily consumption. This is especially true for Florida, because in 2005 28 per cent of all live births in the state were to women of Hispanic ethnicity¹³. Florida also has the third largest Hispanic population in the USA.

Building on the health concern in the Hispanic community regarding risk of NTD and our expertise in developing culturally sensitive, targeted social marketing campaigns, we developed the social marketing campaign entitled, 'The Story of Three Sisters/La Historia de Tres Hermanas'. This project consists of a brochure, photo-essay, and DVD that provide tailored messages to Hispanic women about their risk of NTDs and a way to lower that risk through the use of daily folic acid supplements.

The campaign began with an exploration of migrant Hispanic women's knowledge of birth defects, genetics, and the use of vitamins, using a social marketing approach. Fifty-eight Hispanic women of childbearing age participated in individual interviews ($n = 14$) and six focus groups ($n = 44$) to identify their perceptions of NTDs and folic acid. Additionally, the individual interviews and

focus groups sought to define barriers and benefits to folic acid consumption as perceived by this specific demographic audience. The most relevant findings for this population, which infused the development of the social marketing campaign included: (1) aiming awareness and intervention campaigns at women who were not planning a pregnancy but wanted children in the future; and (2) promoting the idea that a woman's body must prepare for a healthy baby by 'stocking up' on important vitamins such as folic acid. The full description of the formative research methods and results for this project is described elsewhere¹⁴.

Formative research for the social marketing campaign also examined women's preferences for receipt of educational health information. This formative research resulted in the development of several media products: a photo-novella and brochure in English and Spanish, a radio message in both languages, and an educational video, also in both languages. All materials and concepts were tested with an advisory group who also selected the talent for the brochure and DVD. Formative and summative findings from the evaluation showed increased knowledge and awareness of folic acid after viewing the materials¹⁵.

The goal of this project was to continue providing folic acid education to Hispanic women of childbearing age and to encourage daily use of multivitamins among this group. These goals were assessed through two objectives. The first objective was to test the utility of the materials among Hispanic populations. Results show that before exposure, 63 per cent of women knew about folic acid; however, only 26 per cent reported taking a multivitamin and 66 per cent were not aware that Hispanic women had a higher risk of having a NTD-affected pregnancy. After exposure to the materials these rates showed a statistically significant increase in knowledge between pre and post testing. A summary score was created to measure overall change in knowledge. The average pre-test score was 52.4 and the average post-test score was 80.9 ($p < 0.0001$)¹⁵.

The second objective was to gain insight into the barriers to daily vitamin use after exposure to the materials. Thus, the purpose of this phase of the project was to identify women's rate of daily vitamin use when receiving free vitamins and to document the main reasons for not taking a daily multivitamin through the use of a *Vitamin Diary*.

Methods and materials

Health diaries

The health diary is an instrument that allows participants to record events as they occur¹⁶. They have been in use since the late 1930s and can be constructed using a journal or ledger format^{16,17}. The journal format is similar to a calendar in that health events are entered daily on the same page¹⁶.

Each page included a calendar for the month. For each day a multivitamin was taken, participants placed a check mark or X on the corresponding day on the calendar.

If a multivitamin was not taken on a particular day, participants indicated the reason(s) using the following codes: (a) I forgot; (b) I did not have any more vitamins; (c) I was sick/ill; (d) the vitamins make me feel nauseous; (e) I did not want to take the vitamin today; (f) I was taking other medications; (g) I ate healthy today; and (h) other. These choices were selected as a result of the data obtained from focus groups conducted during the development phase of 'The Story of Three Sisters' social marketing campaign. The focus groups results cited the reasons above as common barriers to daily multivitamin intake.

There was also space below the calendar where participants described symptoms or thoughts about taking the multivitamin. When creating a health diary, it is advised to keep the record as open-ended as possible while retaining structure^{16,17}.

Recruitment

The University of South Florida Institutional Review Board approved this study. Recruitment materials included fliers posted at health fairs, community clinics, churches, and community business such as pharmacies and grocery stores and word-of-mouth. In addition, health and nutrition service providers such as Healthy Start, Head Start, and Early Head Start assisted by distributing fliers to potential study participants. Interested women were instructed to call a toll-free number in order to be pre-screened for eligibility.

Participants

Non-pregnant women aged 18–35 from multiple Hispanic subgroups were eligible to participate in the *Vitamin Diary* project. Data were collected in four Florida counties with large Hispanic migrant populations. Pregnant women or women who stated their health care provider advised them not to take multivitamins or who self-reported their health as ‘poor’ were excluded from the study.

Procedures

Women who were interested in participating met with the research assistant at a local health department, a Women Infant and Children clinic, or another location of their choice. Participants were required to view ‘The Story of Three Sisters’ video on a portable player and read the photo-novella and brochure in either English or Spanish. They also received copies of each educational material to keep. Women also completed a pre test about knowledge of folic acid and a post-test of knowledge and behavioural intention to use multivitamins. Participants were given one bottle of multivitamins and 6 months of vitamin diaries with instructions on completing the forms and stamped, pre-addressed envelopes to return the diaries. Participants were told that each time they returned the monthly diary they would receive a new bottle of vitamins and a US\$10 gift certificate.

Participants were asked to keep a daily diary and mail or fax the completed diary to researchers at the end of each month (pre-stamped, addressed envelopes were provided). Two follow-up phone calls were made to any woman who failed to mail in her monthly diary. If a woman did not respond after two phone call attempts a letter was mailed asking her to contact the researchers. If there was no response to the letter, the woman was dropped from the study.

The diary took about 2 minutes per day to complete and the monthly phone call (when required) lasted no more than 10 minutes.

Incentives

All women who participated in the 6-month *Vitamin Diary* study received one bottle of multivitamins (30) per month of participation. They also received a US\$10 gift certificate to Wal-Mart or a grocery store for each month a completed monthly diary was mailed or faxed. Thus, women who completed all 6 months of the study received US\$60 in gift certificates and six bottles of multivitamins. The multivitamins and gift certificates were mailed to their home address or a preferred address.

Data analysis

The quantitative responses from the vitamin diaries were uploaded into the Statistical Package for the Social Science (Cary, NC, SPSS Inc.) and analysed for frequencies and percentages.

The qualitative comments were placed under subject headings in an Excel spreadsheet and direct quotes were extracted to supplement the quantitative findings. Qualitative analysis using hand coding was used to assess key themes among the responses.

Results

Participation

A total of 59 women expressed an interest to participate in the research study. Forty-one of the women were found to be eligible to participate. Four women were dropped from the study due to non-return of diaries. The final total number of participants analyzed was 37, yielding a 63 per cent response rate. More than half (57 per cent) of the total participants had a 100 per cent compliance rate meaning there was an entry for every day during the 6-month period ($n = 21$). Forty-six per cent ($n = 17$) had a 75 per cent diary compliance rate meaning there was an entry for at least 3 weeks out of every month of the study. Eight per cent ($n = 3$) completed an average of 2 weeks of each month of the vitamin diary.

Country of origin

Thirty-five per cent of the participants were from Mexico ($n = 13$). Columbia, Puerto Rico, and Guatemala each had 11 per cent ($n = 4$) of participants. Cuba and the United States each had 8 per cent ($n = 3$) of participants. The Dominican Republic, El Salvador, Honduras, Ecuador, Venezuela, and Bolivia, each had one participant ($n = 1$), comprising 3 per cent of participants.

The majority of the participants spoke Spanish only (68 per cent). Twenty-four per cent were bilingual, speaking both English and Spanish, and 8 per cent spoke English only.

Reasons for missing a day of vitamin use

Sixty-five per cent of the participants missed 10 days or less and 22 per cent of the participants missed no days of taking a multivitamin. The most common reason for missing a multivitamin was 'I forgot'. Sixty-eight per cent of the women who missed taking a vitamin on any given day cited forgetting as the main reason. Additional reasons for missing a day of vitamin use are listed in Table 1.

'It is important for us women to take vitamins. At first the routine was hard for me. Now I feel more active, but I still forget sometimes.'

Table 1. Reasons for missing a day of vitamin use on any given day.

Reasons	Frequency ($n = 37$)	Percentage
I forgot	28	76
I did not have anymore vitamins	2	5
I was sick/ill	11	30
The vitamins make me feel nauseous	0	0
I did not want to take a vitamin today	4	11
I was taking other medications	7	19
I ate healthy today	0	0
Other	8	22

Thirty per cent of women listed 'I was sick/ill' as a reason for not taking a vitamin. Some of the illness reported included heartburn, upset stomach, sneezing, headache, nasal congestion, constipation, and acne. Vitamin Diary entries included:

'Headache (1st few days – later ok) .'

'Headache (1st month – for 10 days), heartburn, hungrier (eat more) .'

'Constipation.'

Although none of the women chose 'the vitamins made me nauseous' as a reason for not taking a vitamin, five women wrote in their diary about how the vitamins upset their stomach or gave them nausea. Vitamin Diary entries included:

'1st month – 1 day – didn't feel well after taking vitamin – didn't take with food and got nauseous.'

'Nausea (take every other day to prevent nausea).'

'Stomach ache'.

Nineteen per cent listed 'I was taking other medications' as a reason for not taking a multivitamin. Many women noticed increased energy, changes in their appetites, and weight gain as a result of taking multivitamins.

'Everything is good. I feel like I have more energy – before I was more tired.'

'My daughters have even noticed the change. Before I would sleep a lot now I have more energy, I would also be in the dark a lot now I open the curtains.'

'I feel like I have more energy and I believe it has taken away my sleepiness on some days. I feel tired and really sleepy when I don't take the vitamins.'

'Everything is going well – noticed increase in weight but I still take them because I feel well.'

'I take them at night because it makes me hungry when I take them during the day. Some vitamins make you hungry, others don't, these do.'

General Comments

The women in the study primarily used the 'notes' section of the diary to expand on reasons for not taking the vitamins; however, some women used this section to make general comments. These included:

'I feel well and the vitamin is really good.'

'It is important for us women to take vitamins.'

'Very grateful for this project. I have felt well taking them and I feel it's important to keep taking them because it's good for me and to prevent any problems if I'm pregnant in the future.'

'I always take it in the morning. It's a habit now.'

Discussion

All of the participants had previously been exposed to the 'The Story of Three Sisters/Las Tres Hermanas'. Prior to exposure, 63 per cent of the women knew about folic acid but only 26 per cent reported taking a multivitamin, and 66 per cent were not aware that Hispanic women had a higher risk of having a NTD-affected pregnancy¹⁴. An evaluation of the campaign found that after exposure, significant increases in knowledge were found for all eight domains measuring knowledge¹⁵.

The results of the *Vitamin Diary* study indicate that the major barrier to taking a daily multivitamin after exposure to 'The Story of Three Sisters/Las Tres Hermanas' is forgetting to take the pill, followed by being sick or ill. This was true for all women regardless of Hispanic subgroup. This is consistent with Ahluwalia et al (2006), who found that as barriers increased (such as 'it is hard to remember to take a multivitamin every day' and 'taking multivitamin would upset my stomach'), multivitamin use decreased¹⁸.

Eleven per cent did not take a multivitamin on certain days because they did not want to take it. None of the participants cited not taking the vitamin because they had eaten healthy on that day. This can be considered a positive result, as the Three Sisters-Las Tres Hermanas materials were designed to help women understand that a healthy diet may not be sufficient for obtaining the necessary amount of folic acid, particularly in Hispanic women who may be considered high risk. Furthermore, it is common for dietary folic acid intake to be below the recommended amount and therefore inadequate¹⁹. In a study of 188 women, O'Rourke et al (2000) found that dietary folic intake ranged from 8–979 mg/day, with a mean of 269 mg/day, well below the recommended 400 mg/day and 500 mg/day for breastfeeding women¹⁹.

Perlow (2001) found that Spanish-speaking women were significantly less likely than English-speaking women to consume vitamins preconceptionally⁸. However, the results of the vitamin study evaluation indicate that exposure to 'The Story of Three Sisters', where the materials were designed to be culturally appropriate and tailored for this population, may be associated with consistent daily multivitamin intake among the majority of women in this Hispanic study population.

Limitations

The women who participated in the *Vitamin Diary* study self-selected themselves into the study. Self-selection was necessary in order for researchers to focus evaluation efforts on those women who were exposed to 'The Story of Three Sisters'. Therefore, those women with a strong interest in vitamin use may be over-sampled in this study population. In addition, social desirability bias may have affected diary entries

Conclusion

Compliance with multivitamin intake has numerous barriers. Therefore, continued educational efforts by public health practitioners are necessary in order to reach Hispanic/Latino populations known to have a high risk of NTDs. It is important for health professionals to acknowledge the historical and socio-cultural differences among Hispanic women from various ethnicities so that health messages are not misinterpreted. Research has been found that the lumping of subgroups into a single category may lead to the perpetuation of stereotypes²⁰.

The barriers and benefits selected by the women in this study reflect their actual experiences of taking a multivitamin with folic acid. The data suggest that the women are aware of the positive and negative results of multivitamin use. This information can be useful for designing successful

health promotion and maintenance programmes for Latino women. The findings of this *Vitamin Diary* study may also provide evidence for the effectiveness of the *Health Diary* as a useful tool, and of social marketing campaigns such as 'The Story of Three Sisters' that attempt to identify barriers and emphasize appropriate benefits for a population of interest.

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