


# A Qualitative Study on the Perspectives of Latinas Enrolled in a Diabetes Prevention Program: Is the Cost of Prevention Too High?

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## Abstract

**Introduction:** Latinas are among the groups most affected by diabetes health disparities, yet they often benefit less from diabetes interventions even when these are culturally adapted. The purpose of this qualitative study was to explore readiness of Latinas enrolled in a diabetes prevention program to adopt recommended preventive behaviors, and to identify factors associated with the adoption and maintenance of these recommended lifestyle changes. Insights gained will be used to inform future efforts at reducing diabetes disparities and the burden of chronic diseases among Latinas. **Methods:** Nine focus group discussions (FGDs) and 3 key informant interviews (KIs) were conducted after the completion of a culturally adapted diabetes prevention program led by Latino community health workers. A grounded theory approach by Charmaz informed by the transtheoretical model guided the questions. Discussions and interviews were audio-taped with participants' permission, transcribed, coded, and themed. **Results:** Forty low-income Latinas contributed to FGDs and KIs. Baseline readiness to engage in new behaviors varied. Negative personal and family health events and physician referral impacted most readiness to enroll and to adopt preventive behaviors. Built environment, financial constraints, and threat of social alienation constituted major barriers to behavior adoption and maintenance, while physician involvement, awareness of diabetes complications, and social support partially mitigated these impediments. **Conclusions:** Our results suggest that timing of enrollment, physician-patient dynamics, and the emotional personal/family cost of behavior modification should all be considered when planning diabetes prevention programs for low-income Latinas. Besides appropriately timing referrals to accessible culturally informed prevention programs, health educators and health care providers should be aware of the potentially negative impact of behavior modification on family dynamics and be prepared to address resulting repercussions. Future research on Latinas should also include and report data on physician involvement, family context, and social determinants of health for more consistent program comparisons.

## Keywords

prevention, Latinx, type 2 diabetes, community health workers, lifestyle change, readiness, behavior modification, social determinants of health, health disparities, underserved communities

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## Introduction

Of the 30.3 million afflicted by the diabetes epidemic in the United States, Latinos are among the most affected. More recently, with the COVID-19 (coronavirus disease 2019) pandemic, being Latino and having diabetes has been associated with a higher mortality rate.<sup>1,2</sup> Despite nationwide interest in reducing type 2 diabetes through nationwide promotion of the Centers for Disease Control and Prevention (CDC) approved National Diabetes Prevention Program (NDPP), Latinos, especially low-income Latino women

(“Latinas”), continue to experience diabetes health disparities.<sup>3,4</sup> The NDPP promotes the adoption of “preventive behaviors” (healthy eating, moderate physical activity) through weekly classes held for 16 weeks followed by

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bimonthly or monthly meetings for the remainder of a year. The program has been culturally adapted and translated for low income individuals and those with minimal formal education, but in most cases, enrollment and results among Latinos continue to lag behind those of non-Hispanic Whites.<sup>5</sup> Even when attending at no cost, only 30.8% of Latinos achieve the weight loss goal (losing 5% of initial weight) compared to 43.2% of non-Hispanic Whites, and their attendance is minimal.<sup>6</sup> Based on this success gap between Latinos and non-Hispanic Whites, reducing the diabetes health disparity and the subsequent COVID-19 disproportionate mortality affecting Latinos seems elusive.

Several studies have partially attributed unhealthy behaviors and the resulting health disparities among low-income Latinos to lack of access to healthy food, transportation, and childcare,<sup>7,8</sup> while recent studies indicate “food deserts” (areas with reduced access to affordable healthy food, if any) have little impact on eating behaviors of low-income communities.<sup>9</sup> Still other studies have credited successful adoption of preventive behaviors to readiness to change (RTC) behaviors.<sup>10-12</sup> Assessing RTC is important enough that healthcare providers are strongly advised to assess RTC before recommending behavior modification to their patients.<sup>13</sup> In the context of diabetes prevention, participants in the landmark Diabetes Prevention Program (DPP)—after which NDPP programs are modeled—were highly screened for RTC and for their ability to adopt and maintain healthy behaviors.<sup>14</sup>

The concept of RTC stems from the transtheoretical model (TTM) of behavior change, which posits that individuals gradually progress through mental and emotional stages before engaging in any behavior.<sup>15</sup> According to the TTM, individuals weigh pros and cons—“decisional balance”—before adopting new behaviors, and changes only happen once the perceived benefits outweigh the perceived disadvantages of retaining the current behaviors.<sup>16-18</sup> To apply this concept to Latinas enrolled in a program, they would have to arrive at a “decisional balance” whereby the perceived advantages of engaging in “preventive behaviors” outweigh the disadvantages of retaining the current behaviors.

The RTC of participants in the NDPP and translations of the DPP is seldom reported, and studies addressing readiness among Latinas at risk of diabetes have been far and few in between.<sup>14</sup> Instead, DPPs enroll individuals based on referrals and mostly biometric criteria, and impart knowledge and skills, expecting behavior modification to follow soon after enrollment, as if all individuals enrolled are “ready” to immediately adopt recommended behaviors.<sup>19,20</sup> Indeed, limited research is available on RTC of Latinas enrolling in prevention programs and even less on factors associated with their readiness to adopt and retain the “preventive behaviors.”<sup>8,19</sup> However, there is reason to believe that this information could help predict the success of interventions in this population.<sup>21</sup>

The objective of this study is to first explore readiness to adopt preventive behaviors of low-income Latinas who enroll in a DPP, and then to identify factors associated with adoption of, and adherence to, recommended preventive behaviors.

## Methods

### Research Design and Sample

This qualitative study was completed with forty Latinas residing in San Bernardino County, California, an area with the third highest rate of diabetes-related mortality in California and one of the largest Hispanic populations in the nation.<sup>22,23</sup> The county is also largely considered a “food desert.”<sup>24</sup> Besides self-identifying as Latina, eligibility criteria included (1) attending and completing the *Vida Vibrante DPP* (see Supplement 1 for program overview); or (2) being a peer educator (*promotora*) who taught *Vida Vibrante*. Immediately following program completion, all program participants (3 separate cohorts) were invited to the focus group discussions (FGDs) (n = 37). Key informants (n = 3) completed interviews within 10 days of course completion.

The authors felt that using FGDs would be the most effective method to elicit honest feedback from all participants because it would allow them to express their lived experiences without the constraint of writing, and allow the research team to better capture their perspectives.<sup>7,25</sup> Key informant interviews (KIIs) with the *promotoras* were included for triangulation reasons.

Prior to the FGDs and KIIs, all participants were asked to read and sign an informed consent form in Spanish reviewed and approved by the Loma Linda University Institutional Review Board (Ethics Committee reference #5150145). A \$10 gift certificate to a local supermarket was given as compensation for participation.

### Data Collection

On program completion, 9 FGDs, each consisting of 3 to 7 participants, and 3 KIIs—all lasting between 15 and 55 minutes—were held in Spanish by 3 bilingual interviewers at the 2 community centers where the interventions had been held, using the consecutive sampling method. Interviewers were trained in qualitative research methods and were familiar with all participants. The interview guide for the semistructured KIIs and FGDs was based on a grounded theory approach by Charmaz informed by the TTM.<sup>15,26,27</sup> Probes were used to expand the exploration and allow new issues to be identified. The FGDs and KIIs explored the following 2 topics: (1) baseline readiness level and (2) factors associated with readiness to adopt and adhere to lifestyle preventive behaviors (see Supplement 2 for FGDs and KIIs guides).

**Table 1.** Participants' Baseline Characteristics (N = 37).

Characteristics	n	%
Age, years (N = 34), mean $\pm$ SD	48.44 $\pm$ 10.78	
Recruitment source (N = 37)		
Community	30	81.1
Clinic (Latino physician referral)	7	18.9
Marital status (N = 34)		
Single	3	6.7
Married/living with partner	26	86.6
Divorced/separated/widow	2	6.7
Education level (US/other country) (N = 30)		
No formal schooling	1	3.3
Elementary/secondary	20	66.7
High school diploma	7	23.3
College coursework	2	6.7
Language spoken at home (N = 34)		
English only	0	0
Spanish only	30	88
Both equally	4	12
Hemoglobin A1c (N = 34), mean $\pm$ SD		
%	5.9 $\pm$ 1.15	
mmol/mol	41 $\pm$ 10.93	
Body mass index, kg/m <sup>2</sup> (N = 34), mean $\pm$ SD	30.50 $\pm$ 7.85	
Weight status (N = 29), mean $\pm$ SD		
Pounds	172.91 $\pm$ 51.72	
Kilograms	78.43 $\pm$ 23.46	
Normal weight	5	17.2
Overweight	15	51.8
Obese	9	31.0

All interview questions and FGDs were digitally recorded and transcribed verbatim by bilingual students and faculty experienced with qualitative data analysis immediately after the recordings were obtained. Debriefing sessions were held and field notes recorded. Confidentiality was protected by neither identifying interviewees nor third parties mentioned in the interviews and by de-identifying the transcripts. After research completion, the then anonymous interviews were stored permanently for research purposes at the Institute of Community Partnership (ICP).

### Data Analysis

FGDs and interviews transcripts were analyzed for emergent themes supported by critical quotes using the 2017 computer software program MaxQDA (version 12)<sup>28</sup> to code the transcript using an a priori code book. A team of 3 students developed the codebook, which was later expanded as emergent themes were identified and organized. All analyses were done in Spanish. Only quotes included in this article (Table 2) were translated from Spanish into English. Demographic and biometric data, and baseline readiness to change specific behaviors were accessed from *Vida Vibrante* program database.

## Results

### Participant Characteristics

Participants ranged in age from 37 to 59 years (mean age 48  $\pm$  11 years), were of lower socioeconomic status, and most had no more than a high school education. Most lived with a spouse/partner and were overweight or obese. These Latinas lived in permanent housing (house, mobile homes, or apartment) and were neither migrant farm workers nor had worked in an agricultural setting. Culturally, all were first-generation immigrants and only 7 (4 from El Salvador and 2 from Guatemala) were not from Mexico. Although Latinas from Central America may not hold the same beliefs about the etiology of diabetes as do Mexicans, they hold similar family values. In most households, only Spanish was spoken (only 4 spoke both English and Spanish). In none of the homes was English the only language spoken. Key informants had some years of education beyond high school but only one had completed college (in her home country). Table 1 displays participants' baseline characteristics (educational level of key informants not included).

Four central themes emerged from the FGDs and KIIs: (1) readiness to enroll in program is associated with

awareness of health deterioration (personal or family) and physician referral; (2) not everyone enrolling is ready to immediately adopt preventive behaviors; (3) factors associated with adoption of, and adherence to, preventive behaviors include family health concerns, better awareness of diabetes complications, and the presence of strong social support; and (4) most barriers to behavior modification were deemed nearly insurmountable. Themes are presented below, and corresponding quotations are included in Table 2.

***Theme 1: Readiness to enroll in program is associated with awareness of health deterioration (personal or family), and physician referral***

Enrolling in the program was clearly associated with the timing of negative news about personal and family health, and the realization that the consequences would have an immediate negative impact on daily personal or family life. While many participants were at risk of developing diabetes due to their body mass index, laboratory results and family history, a frequently cited motivation for enrolling was having a family member, especially a younger family member, recently diagnosed with diabetes or at risk of diabetes. When personal health was mentioned as a reason for enrollment, it was often associated with a desire to make changes for the sake of loved ones and less for personal health concerns. Personal health concerns were usually associated with fear of losing quality of life. Last, a diagnosis leading to health concerns (as mentioned above) or specific lifestyle advice and referral to the prevention program from a physician, also triggered enrollment.

***Theme 2: Not everyone enrolling is ready to immediately adopt preventive behaviors***

For several participants there was a delay between enrollment, knowledge acquisition, and RTC. As enthusiastic as they may have been to enroll and participate, Latinas in our study were at different levels of readiness for adopting one or more behaviors at baseline. Sixteen (43.2%) of the participants were eager to engage in preventive behaviors within 1 week of enrollment, while another 9 (24%) stated that they did not feel ready to start making changes until 2 to 4 weeks following enrollment. All others except one were either ready after 1 month or could not specify the timing of the delay. One participant finally expressed being RTC at the end of the program. Readiness also varied based on behavior sought: all expressed high baseline readiness to engage in physical activity, but this was not the case with eating habits. Figure 1 depicts baseline readiness levels for moderate physical activity, fruits and vegetables consumption, and sugar-sweetened beverages reduction.

***Theme 3: Factors associated with adoption of, and adherence to, preventive behaviors include family health concerns, better awareness of diabetes complications, and the presence of a strong social support***

The factors most associated with the adoption of, and adherence to preventive behaviors, were health concerns (personal and familial) coupled with understanding that behavior modification would deter diabetes complications. Awareness of those complications provided a powerful incentive to adopt new behaviors, and presumably accelerated the transition to action.

As the program progressed, adoption of, and adherence to, new behaviors became largely attributed to social support within and outside of the program setting. Support from fellow participants was the most frequently stated source of social support for behavior adoption and retention: for several, other participants at more advanced levels of readiness became role models and provided the quality of social support to compensate for the lack of family support. Next was the support and engagement of a physician. Being told by the physician about one's diagnosis was considered key to behavior change. Those referred by a physician credited the adoption of, and adherence to, healthy behaviors, to their physician's recommendation and support, while several of the women not referred by physicians lamented their physicians' limited time and guidance, and attributed the impact of a health care provider more to the quality of the patient-physician relationship. *Promotoras* and some family members were also credited for important social support and encouragement.

***Theme 4: Most barriers to behavior modification were deemed nearly insurmountable***

Even after participants acknowledged the strong impact of learning about diabetes complications, and while still expressing concern for family members, circumstances beyond their control seemed to create insurmountable hindrances to behavior modification, thereby threatening to tilt their "decisional balance" away from behavior modification. These barriers consisted mostly of external factors such as the built environment, and lack of childcare, financial resources and family support.

Family conflicts resulting from husbands or children resisting changes at home were a common complaint. Indeed, close to half of the participants reported resistance from spouses/partners. Weighing decisional balance factors was expressed as a dilemma: adopting and promoting preventive behaviors or resigning themselves to peace at home. Expressions used to describe their realities included "tug-of-war," "divorce," and "family units split." Eventually, the

**Table 2.** Themes and Subthemes Derived From Focus Group Discussions and Key Informant Interviews.<sup>a</sup>

Theme/subtheme	Supporting quotes
<ul style="list-style-type: none"> <li>○ Theme 1: Readiness to enroll in program illness among loved ones (13)</li> <li>○ Personal health (17) <ul style="list-style-type: none"> <li>● for the sake of loved ones (8)</li> <li>● fear of less quality of life (9)</li> </ul> </li> <li>○ Physician diagnosis and referral or lifestyle recommendations (2)</li> <li>○ Theme 2: Not everyone enrolling is ready at baseline <ul style="list-style-type: none"> <li>○ Ready within 1 week (16)</li> <li>○ Ready 2 to 4 weeks after enrollment (9)</li> <li>○ Ready 1 month or more (5)</li> <li>○ Time not specified (7)</li> </ul> </li> <li>○ Theme 3: Factors associated with behavior adoption and adherence <ul style="list-style-type: none"> <li>○ Health issues among family members (8)</li> <li>○ Personal health (7)</li> <li>○ Understanding of diabetes <ul style="list-style-type: none"> <li>● Preventive behaviors (17)</li> </ul> </li> </ul> </li> </ul>	<p><i>Theme 1: Readiness to enroll in program is associated with awareness of health deterioration (personal or family), and physician referral. Illness (negative health changes) among loved ones</i></p> <ul style="list-style-type: none"> <li>– “It was about one month since my friend’s eight-year-old child was diagnosed with type 1 diabetes. That’s when I found out about this course and I said ‘I’m going.’”</li> <li>– “I knew I had to do something because everyone in my family has diabetes and some have died of it. That’s the reason I was interested in taking this course.”</li> <li>– “One week before, they told him [my 11-year-old] he has prediabetes. I got scared and enrolled in this course.”</li> </ul> <p><i>Personal health: Desire to be healthy for the sake of loved ones</i></p> <ul style="list-style-type: none"> <li>– “I want to be around to see my grandchildren and the future generations and I want to do something to reach that age . . . I wasn’t doing anything to make this a reality.”</li> <li>– “My motivation was being healthy so I can see my children grow up. My daughter was very big”</li> </ul> <p><i>Personal health: fearing reduction in quality of life</i></p> <ul style="list-style-type: none"> <li>– “On January 1st, I had a heart attack. That’s when I was diagnosed . . . I told myself: ‘Now I won’t be able to eat anything. What am I going to do?’ That’s when I went to look for a course.”</li> <li>– “I didn’t know it was such a serious disease. Before I was diagnosed with pre-diabetes, I was applying for life insurance and they gave me an estimate. When they saw that I had prediabetes, they increased it by 3 times.”</li> </ul> <p><i>Physician diagnosis and referral/lifestyle recommendations</i></p> <ul style="list-style-type: none"> <li>– “The physician told me I had to take the program seriously because my A1c was high . . .”</li> <li>– “I had just had a check-up and was diagnosed with prediabetes. Someone at the clinic told me about this course.”</li> </ul> <p><i>Theme 2: Not everyone enrolling is ready to immediately adopt preventive behaviors</i></p> <p><i>Ready within 1 week of enrollment</i></p> <ul style="list-style-type: none"> <li>– “For me, the first week I said ‘No. Now is the time to make drastic changes!’ because I didn’t want to get worse. So the first week.”</li> <li>– “For me too it was the first week, because I came with the idea of starting something flexible.”</li> </ul> <p><i>Ready between 2 to 4 weeks after enrollment</i></p> <ul style="list-style-type: none"> <li>– “The changes began, ‘mentally’ so-to-speak around two weeks. After I had been learning [in the program], I realized the need to make some changes.”</li> <li>– “After the course began, around three weeks later, I started doing some learning and to be more careful.”</li> <li>– “I thought I would be making changes around one month [into the program]. Because after approximately two weeks, I realized I wasn’t ready to make changes.”</li> </ul> <p><i>Around 1 month or more after enrollment</i></p> <ul style="list-style-type: none"> <li>– “Mmm, I think it was more like . . . about one month [into the program].”</li> <li>– “Then, hey, some time went by, like . . . like one month, before I decided to start making changes little by little.”</li> </ul> <p><i>Not specified</i></p> <ul style="list-style-type: none"> <li>– “No. I wasn’t ready either [to make change], because it cost me a lot to start adjusting.”</li> <li>– “I have learnt a lot, I remember a lot of information, but I haven’t begun making changes yet. Since I’m on vacation and I feel I’m spending a lot of time on the road, no, not yet.”</li> </ul> <p><i>Theme 3: Factors associated with adoption of, and adherence to, preventive behaviors include family health concerns, better understanding of diabetes and strong social support</i></p> <p><i>Health issues among family members</i></p> <ul style="list-style-type: none"> <li>– “The pediatrician said my [11-year-old] son is obese. If I don’t do it for myself—though I’m getting old—I’m going to do it for him. Because I don’t want him to have diabetes. This is my motivation to eat better, take care of him and exercise.”</li> <li>– “When it comes to me, I feel that I was ready to make changes because my mom has diabetes”</li> <li>– “For the majority it was the mom, the sister, the brother, someone in the family that was already ill with diabetes. And they had heard about the genetic tendency and they wanted to be able to avoid it in themselves and in their children.” Kl</li> </ul> <p><i>Personal health</i></p> <ul style="list-style-type: none"> <li>– “Little by little we changed: a salad, some cactus. I realized then that I had more energy and I was starting to feel better about myself. Then I really became interested in getting more informed . . .”</li> <li>– “When someone has had a serious health problem that’s when changes start happening. As long as there is no problem or something, or a serious health issue, there will not be any changes. Once people go through something, that’s when changes occur” Kl</li> </ul> <p><i>Understanding of diabetes prevention and complications</i></p> <p><i>Preventive behaviors</i></p> <ul style="list-style-type: none"> <li>– “Well, as the weeks went by I learned more and I started to put them [the new behaviors] into practice”</li> <li>– “As a result of attending these classes . . . I began exercising seriously. Yes, this [information] helped me a lot!”</li> </ul>

(continued)

Table 2. (continued)

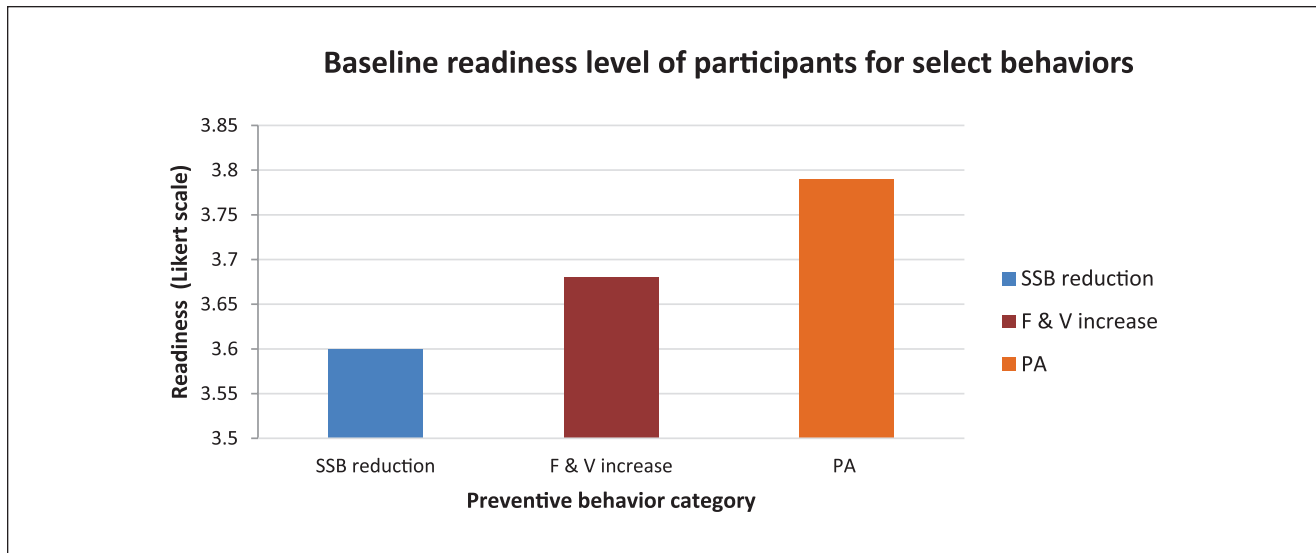
Theme/subtheme	Supporting quotes
<ul style="list-style-type: none"> <li>Complications (11)           <ul style="list-style-type: none"> <li>Strong social support from               <ul style="list-style-type: none"> <li>Physician (19)                   <ul style="list-style-type: none"> <li>Complications                       <ul style="list-style-type: none"> <li>"[Before] didn't care; I didn't know the consequences; I didn't know how serious it [diabetes] was."</li> <li>"As soon as I heard about my friends and their trouble with relatives and friends, I thought 'it's time to make changes.'"</li> <li>"So the information that we give them makes them think, take things more seriously; it helps them understand that it's a process and if they are not careful with what they eat, if they don't change, change their level of physical activity, this will progress and will be part of the consequences in the future. And yes, that motivates them." Kll</li> <li>"For many of them it was because they had seen the illness [diabetes] in the family and had suffered themselves . . . More than anything else because they have seen it in their family." Kll</li> <li>"Being aware of people who have had diabetes for several years, I took advantage of the opportunity to ask them to share their experiences." Kll</li> </ul> </li> </ul> </li> </ul> </li> </ul> </li> </ul>	<p>Strong social support</p> <p>Physician engagement/support—<i>impact varies</i></p> <ul style="list-style-type: none"> <li>Yes, it impacts healthy behavior adoption and adherence</li> <li>"My physician told me, 'keep walking, eat enough protein and vegetables' And yes . . . that helped me a lot."</li> <li>"My physician explained to me that I needed to take the program very seriously since I had a high A1c level, that's when I took it seriously."</li> <li>"I am more motivated because I know it comes from a health care professional"</li> <li>"When she [the physician] told me that my blood was intoxicated . . . that's when I took it seriously."</li> <li>"One puts more effort so that next time the results will come out better. So, yes, one is motivated, because one pays more attention."</li> <li>Yes, it impacts healthy behavior adoption and adherence, but it also depends on other factors</li> <li>I know there are physicians who care about their patients and when they get into their office to examine the patient, they listen to you. I've had that type of physician. But . . . unfortunately it depends on the type of insurance one has."</li> <li>"If one doesn't become aware of her status and doesn't do it for oneself, even if the physician refers her, it will come in one ear and go out the other ear."</li> <li>"I think that yes, it has a positive impact. But sometimes the patient feels obligated: 'it's because the physician said so,' 'it's because they told me to do it.'"</li> <li>"No, it does not impact behavior adoption or adherence"</li> <li>"Not always [do we pay attention to what the physician says]"</li> <li>"The <i>promotoras</i> spend more time with one, explaining; and the physician comes in a rush because he/she has another patient, and doesn't spend enough time."</li> </ul> <p>Social support from family member/spouse</p> <ul style="list-style-type: none"> <li>"My children motivate me. They tell me 'Mom, let's go to the park!' and if I don't get out after a while, they say 'Mom, let's go to the park! Mom, I want to go play soccer!' They've been taking me to the park now for two weeks . . . I was all tired but they kept me going."</li> <li>"My husband motivates me. As you may have noticed, he's not as big as I am. So, he keeps me motivated."</li> <li>"For example, one who already has diabetes has to eat healthy, then the family members have to come along too so they can understand and support you in this endeavor."</li> </ul> <p>Social support from <i>promotoras</i></p> <ul style="list-style-type: none"> <li>"Also [the <i>promotoras</i>] infused us with joy and encouraged us to improve and not give up. More importantly, she explains the course, the process and everything very well, with a lot of enthusiasm."</li> <li>"The <i>promotoras</i> paid a lot of attention to whether or not we were attending the classes"</li> <li>"About two weeks went by and I still didn't feel like making changes. I kept wanting to eat the same things, but the encouragement that the [promotoras] gave me . . . That was a source of motivation."</li> <li>"The <i>promotora</i> kept us motivated by encouraging us to exchange phone numbers, telling us to call other classmates when we didn't feel well, explaining how we felt; and that helped us to open up on many things."</li> <li>"Let me be honest. I can assure you that most of us, once we don't have this 'head[leader] anymore, we will not behave with the same consistency as we do now that we know we have to go because . . . [promotora] is there and she will educate us."</li> </ul> <p>Social support from fellow "classmates" / participants</p> <ul style="list-style-type: none"> <li>"Had I been by myself trying to do this at home I'd never do it. The networking: that was my motivation."</li> <li>"At home you're not understood: your husband is the nice guy because he buys junk food [for the children] . . . but when one comes to class, your classmates cheer you."</li> <li>"What was helpful to me was the social interaction, getting together with others: the way we treated each other, hearing about someone else's problem."</li> <li>"We all have different problems. Here we were like a family, I think."</li> <li>"Some were not motivated, but simply hearing someone else who was highly motivated impacted them." Kll</li> <li>"One of the things that I think worked well was creating support groups. Between themselves, we encouraged them to call each other . . . and if one person did not return the call they would call again. Also agreeing on doing something, for example, going out together for walks. I think this is what helped most. Because they would cheer each other: 'I saw you!', 'remember', 'I'll be calling you', 'I'll wait for you in the morning: we're going for a walk'" Kll</li> </ul>
<ul style="list-style-type: none"> <li>Fellow "classmates" (30)           <ul style="list-style-type: none"> <li>Family members, children (12)spouse (7)               <ul style="list-style-type: none"> <li>Promotoras (5)                   <ul style="list-style-type: none"> <li>Complications                       <ul style="list-style-type: none"> <li>"Also [the <i>promotoras</i>] infused us with joy and encouraged us to improve and not give up. More importantly, she explains the course, the process and everything very well, with a lot of enthusiasm."</li> <li>"The <i>promotoras</i> paid a lot of attention to whether or not we were attending the classes"</li> <li>"About two weeks went by and I still didn't feel like making changes. I kept wanting to eat the same things, but the encouragement that the [promotoras] gave me . . . That was a source of motivation."</li> <li>"The <i>promotora</i> kept us motivated by encouraging us to exchange phone numbers, telling us to call other classmates when we didn't feel well, explaining how we felt; and that helped us to open up on many things."</li> <li>"Let me be honest. I can assure you that most of us, once we don't have this 'head[leader] anymore, we will not behave with the same consistency as we do now that we know we have to go because . . . [promotora] is there and she will educate us."</li> </ul> </li> </ul> </li> </ul> </li> </ul> </li> </ul>	<p>Family members, children (12)spouse (7)</p> <ul style="list-style-type: none"> <li>"My children motivate me. They tell me 'Mom, let's go to the park!' and if I don't get out after a while, they say 'Mom, let's go to the park! Mom, I want to go play soccer!' They've been taking me to the park now for two weeks . . . I was all tired but they kept me going."</li> <li>"My husband motivates me. As you may have noticed, he's not as big as I am. So, he keeps me motivated."</li> <li>"For example, one who already has diabetes has to eat healthy, then the family members have to come along too so they can understand and support you in this endeavor."</li> </ul> <p>Promotoras (5)</p> <ul style="list-style-type: none"> <li>"Also [the <i>promotoras</i>] infused us with joy and encouraged us to improve and not give up. More importantly, she explains the course, the process and everything very well, with a lot of enthusiasm."</li> <li>"The <i>promotoras</i> paid a lot of attention to whether or not we were attending the classes"</li> <li>"About two weeks went by and I still didn't feel like making changes. I kept wanting to eat the same things, but the encouragement that the [promotoras] gave me . . . That was a source of motivation."</li> <li>"The <i>promotora</i> kept us motivated by encouraging us to exchange phone numbers, telling us to call other classmates when we didn't feel well, explaining how we felt; and that helped us to open up on many things."</li> <li>"Let me be honest. I can assure you that most of us, once we don't have this 'head[leader] anymore, we will not behave with the same consistency as we do now that we know we have to go because . . . [promotora] is there and she will educate us."</li> </ul> <p>Fellow "classmates" (30)</p> <ul style="list-style-type: none"> <li>"Had I been by myself trying to do this at home I'd never do it. The networking: that was my motivation."</li> <li>"At home you're not understood: your husband is the nice guy because he buys junk food [for the children] . . . but when one comes to class, your classmates cheer you."</li> <li>"What was helpful to me was the social interaction, getting together with others: the way we treated each other, hearing about someone else's problem."</li> <li>"We all have different problems. Here we were like a family, I think."</li> <li>"Some were not motivated, but simply hearing someone else who was highly motivated impacted them." Kll</li> <li>"One of the things that I think worked well was creating support groups. Between themselves, we encouraged them to call each other . . . and if one person did not return the call they would call again. Also agreeing on doing something, for example, going out together for walks. I think this is what helped most. Because they would cheer each other: 'I saw you!', 'remember', 'I'll be calling you', 'I'll wait for you in the morning: we're going for a walk'" Kll</li> </ul>

(continued)

**Table 2. (continued)**

Theme/subtheme	Supporting quotes
<p><i>Theme 4: Barriers</i></p> <ul style="list-style-type: none"> <li>o Lack of support from family members           <ul style="list-style-type: none"> <li>• Spouse (8)</li> <li>• Children (9)</li> </ul> </li> <li>o Lack of practical knowledge (5)</li> <li>o Lack of access to/money for food (7)</li> <li>o Insufficient time (5)</li> <li>o Lack of childcare(5)</li> <li>o Lack of transportation (4)</li> <li>o Unsafe outdoors (4)</li> <li>o Mental health (4)</li> </ul>	<p><i>Theme 4: Most barriers to behavior modification were deemed nearly insurmountable</i></p> <ul style="list-style-type: none"> <li>– “Making changes at home is hard, because [my husband] has an attitude and says ‘don’t give me that!’ ‘give me my salt!’ So one is in a ‘tug-of-war’ and eventually says ‘Oh well! That can’t continue!’ Not having support [for behavior change] is a barrier.”</li> <li>– “One wants to remain at peace with family members. That’s a good thing. But they don’t want it. How can we force them to eat something they don’t want?”</li> <li>– “This was about to cost me a divorce. Because I would go to classes and my husband didn’t like it.”</li> <li>– “My problem is that I have to walk by myself. My husband doesn’t like to go for walks. So then sometimes it’s already dark outside.”</li> <li>– “Sometimes if your partner hears it from you, he might get upset. And as I said before, family units split. This is something that we see all the time . . . The reality is that it’s rarely otherwise . . . I want to believe that the new generation is changing, but we see that a lot, especially with older women. They feel alone as they try to make healthy changes.” KII</li> <li><i>Lack of support from family members—children</i> <ul style="list-style-type: none"> <li>– “Since my children were already accustomed to eating what I used to give them, then when I would give them salad they would say, ‘Oh no! Not that! None of that!’ So it was very difficult for me to make changes.”</li> <li>– “Sometimes others make it hard . . . because sometimes one has already made changes but the other people, well . . . and then one falls back. Because one has to eat what they cook for you.”</li> <li>– “We saw how some people were affected by the home atmosphere because they were trying to the best of their ability to improve their health, they wanted to improve the health of their spouse and children.” KII</li> <li>– “If the program is going to be only for the person, it will not work. The entire family has to be involved.” KII</li> </ul> </li> <li><i>Lack of practical knowledge</i> <ul style="list-style-type: none"> <li>– “When they give you your diagnosis, I think clinics where physicians work should say: ‘look, here are some courses you can go to.’ We need that type of guidance from our leaders.”</li> <li>– “Physicians do not tell us about these things.”</li> <li>– “There were a lot of questions such as ‘instead of sodas . . .’ ‘What if I cannot find what I need?’ ‘Pizza? cake? What can I eat?’ ‘I cannot eat this. What can I eat?’” KII</li> </ul> </li> <li><i>Lack of access to/money for healthy food (unavailable or inaccessible)</i> <ul style="list-style-type: none"> <li>– “Another barrier is, well, I can tell you that there’s a lack of fresh produce nearby.” KII</li> <li>– “Everything nutritious is expensive. So, of course it’s costly. And since one is low-income . . .”</li> <li>– “I’m retired and don’t have a flexible income to eat a balanced meal. That’s a problem. Not having money is a problem because one cannot vary the dishes. Even without meat, vegetables are expensive.”</li> <li>– “Sometimes the reality is that organic and healthy food are expensive. And sometimes one doesn’t have enough money to pay for it . . . so one says: ‘let me see.’ . . . I know there are alternative ways to solve these problems but unfortunately I think that’s still an issue.”</li> <li>– “I want to emphasize the following . . . and please correct me if I’m wrong . . . : eating healthy is costly. So sometimes we go for the cheaper option and that’s a mistake.”</li> <li>– “The strongest barriers that were raised were finances: ‘I don’t have enough money to buy healthy food!’” KII</li> <li>– “I can’t be healthy because my income doesn’t allow it.’ So based on what I heard and saw that was a source of discouragement.” KII</li> </ul> </li> <li><i>Insufficient time</i> <ul style="list-style-type: none"> <li>– “Life here is very different [from the way it used to be], sometimes it’s work-home-work-home. And sometimes people do not have time to eat.”</li> </ul> </li> <li><i>Lack of childcare</i> <ul style="list-style-type: none"> <li>– “I think it would be necessary when we attend the course to have something for children because we do not have anyone with whom we can leave the children.”</li> </ul> </li> <li><i>Lack of transportation</i> <ul style="list-style-type: none"> <li>– “Sometimes one doesn’t have gasoline.”</li> <li>– “Or they do not have a car or have to ask for a ride.” KII</li> </ul> </li> <li><i>Unsafe outdoors (for physical activity)</i> <ul style="list-style-type: none"> <li>– “One goes to the park to exercise and . . . things happen . . . well, one gets assaulted. Then it’s scary.”</li> <li>– “Some didn’t have safe places where they could walk.” KII</li> </ul> </li> <li><i>Mental health</i> <ul style="list-style-type: none"> <li>– “Instead of encouraging yourself, you dig yourself into a hole. And then you don’t feel valued, you have a low self-esteem, you become sad or worried. All of that affects you.”</li> </ul> </li> </ul>

<sup>a</sup>Focus group discussions (FGDs) were conducted with 37 participants, all Spanish-speaking Latinas and key informant: interviews (KIIs) with 3 bilingual promotoras. All quotes are from FGDs unless followed by “KII.” Quotes are translations of Spanish statements. Numbers in parentheses indicate the number of times the topic/subject was mentioned in FGDs.



**Figure 1.** Participants' baseline readiness to engage in select preventive behaviors.

SSB reduction: readiness to reduce consumption of sugar-sweetened beverages. F & V increase: readiness to increase consumption of fruits and vegetables. PA: readiness to engage in the recommended amount of physical activity.

Note: Readiness to engage in behavior within 1 month was based on answers to a 4-point Likert-type scale (1 = not likely to engage in behavior; 4 = very likely to engage in behavior).

family tensions resulting from adopting preventive behaviors led several participants to abandon their initial efforts.

Last, for most participants, healthy food was too costly and not readily available. Although our participants admitted to previously serving themselves large portions of food, and liking high-fat, calorie-dense foods—a preference they attributed to the Latino culture—several participants described positive changes they had made in their food choices (content and portion size) during the intervention. These changes were corroborated by the quantitative data. Still many expressed frustration at not being able to afford healthy food due to the cost. Making a choice to eat “healthy” would mean redirecting critical resources (money, time) previously allocated to supplying the family’s basic needs (such as gasoline for transportation) and running the risk of being judged. Lack of time, childcare and information to make practical decisions, in addition to environmental factors such as living conditions, lack of safe walkable areas and of reliable sources of transportation compounded the difficulties.

## Discussion

To our knowledge, this is one of few studies to explore readiness among low-income, low educational level Latinas enrolled in a free DPP led by *promotoras*. While several factors identified in this study have previously been mentioned and published, our findings provide perspectives from a variety of sources.

According to our findings, Latinas of low-income and low educational level enrolling in prevention programs are

highly motivated to adopt and maintain preventive behaviors when confronted with a negative personal or family health event and when referred by a trusted physician. They may not necessarily be ready to engage in one or more recommended behaviors on enrollment but, eventually, most adopt and at least temporarily retain recommended behaviors, especially in the presence of strong social support. However, the “cost” of diabetes prevention may become too high as adoption and retention of preventive behaviors threaten family dynamics, a price many of these women are unwilling to pay in exchange for future health gain.

Our results confirm the findings from others researchers showing an association between negative life events (such as the diagnosis of a medical condition) and an increased readiness to adopt healthy behaviors.<sup>29</sup> For health educators and healthcare providers this is an indication that positive blood glucose screening results, dramatic changes in Latinas’ health status and/or in the health of their family members should be viewed as a cue to refer them to prevention programs, since this may well be the best time for them to benefit from an intervention. Furthermore, because the health of family members is a high priority and motivator among Latinas, assessing key family relationships and engaging relatives should be explored at time of diagnosis.<sup>7</sup>

While knowing the benefits of preventive behaviors may influence willingness to adopt a behavior in some, it is not sufficient.<sup>30,31</sup> In one study, increased knowledge positively affected the behavior of Whites, but not that of Latinos.<sup>32</sup> In our study, specifically experiential knowledge of the devastating effects of diabetes on family and friends seemed a



strong motivator to engage in preventive behaviors. Experiencing the seriousness of the disease, albeit vicariously, by hearing or seeing its effects on an acquaintance with diabetes seems to have helped intensify the process leading to “action”. It is as if exposure to (hearing about, or seeing) diabetes complications (blindness, kidney disease, and amputations) created a previously absent cause-to-effect mental association between behavior and complications. Elsewhere, emphasis on complications of certain behaviors has been shown to discourage unhealthy behaviors.<sup>33</sup> This strategy may be worth implementing more in this population.

It is clear that physician referral and engagement were instrumental in promoting program enrollment, motivating adherence to recommended behaviors and improving program retention. The role of clinicians has been a powerful motivator to action within and outside the Latino culture, with some reporting a 50% enrollment with physician referral compared to 10% without.<sup>32,34</sup> For this reason, referrals, especially those targeting enrollment within 2 months would be ideal.<sup>35</sup> Ironically, the NDPP reports less referrals of monolingual Spanish-speaking Latinos compared with those who are English-speaking,<sup>36</sup> although a preference for “expert-driven” health guidance among monolingual Spanish patients has been reported.<sup>37</sup> However, according to our study participants, the quality of physician-patient connection determines the impact of physician referral. Trust and connection have been shown to affect success of lifestyle modification programs.<sup>38,39</sup> Therefore, for best results, a positive connection between healthcare providers and Latinas seems essential. This may require a better matching of patient to healthcare providers as well as cultural-sensitivity training for providers assigned to Latino communities. Moreover, physicians labeling the patient’s condition (eg, “prediabetes,” “high risk”) and offering a prescription may convey a sense of seriousness and urgency which is more likely to be interpreted as a “call to action,” and to help garner more family support.<sup>40-42</sup>

Healthcare providers and health educators cannot ignore the important dilemma—“decisional balance”—many Latinas face when weighing the impact of adopting preventive behaviors (avoidance of future harm) against the cost of sacrificing family stability/unity now. Some questions could help identify the extent of their dilemma at referral or on enrollment: “Is the patient’s support system (spouse, family, relatives, friends) on board?” If not, “is there an alternative support group available to her if she were to lose her family’s support?” “Are we (healthcare professionals, program directors or health educators) providing enough support and resources to mitigate the emotional and/or financial “burden” she may have to bear as she engages in preventive behaviors?” The answers to these questions may help determine the emotional “cost” she may incur if she enrolls in a prevention program and may suggest a different

approach or the allocation of additional resources to increase the likelihood of success.

Social support has been shown to improve adoption of healthy behavior, independently of cultural background, but this is even more so in collectivistic cultures such as the Latino culture.<sup>37,43,44</sup> In collectivism, group harmony and cooperation with group activities supersedes individual decisions. Along with collectivism is the Latino core value of *familismo*, which highly regards loyalty to family, including reciprocity with other family members, engaging in similar activities together, a strong dependence on family for material and emotional support, and often living in the same house.<sup>45</sup> Indeed, family support has been shown to be protective against diabetes among Latinos (not so among non-Hispanic Whites).<sup>46</sup> Another concept closely related with *familismo* is *marianismo*, which assumes the role of women to be that of caretakers willing to sacrifice for their families. Examples of practical application for the ideal wife and mother would be to eat the same food as her family and wait for her family before starting to eat.<sup>47</sup>

Yet, our data show that more than half of the participants received little to no encouragement from family members for healthy eating, and more than two-thirds reported family and friends never or rarely engaging in physical activity with them.

This is where other sources of support seem to have been useful in closing the gap. Besides family members, fellow participants, community health workers, and physicians played an important role in the initiation and maintenance of newly acquired behaviors. According to our study, one of the most powerful determinants of readiness to adopt and maintain behavior was a strong social support network within the program, especially for those lacking support at home. Still, participants felt that enrollment of husbands and children in the same program could improve program success by reducing the resistance to changes at home, and increasing the critical support needed to sustain behavior modification. Thus, a parallel program for family members is worth considering if more success is desired.

Because community health workers share similar cultural background and circumstances, live in the same community as program participants, and have earned the trust of community members, they are more likely to be considered a reliable source of information. Participants tend to confide in them and share their emotional and health concerns without feeling intimidated, rushed, or rejected. This provides the *promotoras* a level of influence among Latinas that few other health professionals can attain.<sup>48</sup> At the same time, it is relatively easy for them to identify and connect well with these individuals. In fact, because of their special insights, the *promotoras* in our study were instrumental in assessing and relaying participants’ thought processes and challenges. This type of connection with their community is even more important because the women in our study are less likely to

receive health information from a health care provider (many lack health insurance), and also less likely to receive information from the media (written or otherwise, including from a mobile device) due to their educational level and income. Instead they tend to listen more to family and trusted friends.<sup>49</sup> Program participants and *promotoras*' statements confirmed findings that report a strong reliance among this population on family and trusted "friends" for health information and decisions.

Several studies on behavioral modification factors among Latinas have revealed barriers at individual, family and community levels.<sup>14,50-52</sup> However most studies do not report participants' current built environment, access to healthy food, transportation and neighborhood safety.<sup>8</sup> Among our participants, we found a high level of food insecurity, an independent factor associated with prediabetes.<sup>24,53</sup> As a "food desert," the intervention area has one of the highest proportions of fast-food restaurants to produce and grocery stores in California.<sup>54,55</sup> Higher cost of healthy foods in "food deserts" and more access to fast foods in Latino neighborhoods have been reported elsewhere.<sup>56,57</sup> Thus, the challenge of finding healthy food would be expected. Although a case could be made for the sale of certain foods in these neighborhoods based on cultural food preferences (applying the law of supply and demand), our study shows that when Latinas chose to eat healthy, their food choices were limited.

Regarding the built environment, the small cities where participants live have limited public transportation and—being that summer days can get extremely hot in this part of the country—it can be unsafe for individuals to engage in outdoor physical activity during most daylight hours. Lack of access to neighborhood safe spaces to walk is a risk factor for diabetes and an inverse correlation between neighborhood walkability and development of diabetes exists.<sup>58</sup> Safety is also a concern in this region where violence is a daily occurrence, reducing the opportunities for women to safely engage in outdoor physical activity.

It's easy to understand how a sense of helplessness among individuals attempting to implement healthy behaviors can eventually give way to discouragement.<sup>59</sup> Unless the above-mentioned hindrances to behavior modification are reduced or eliminated, offering lifestyle prevention programs to these Latinas may be setting them up for failure. Of note, top barriers for our study participants differed from the most common barriers cited by Latino participants in the original DPP (who had higher income and educational levels),<sup>14</sup> an indication that suggests different living conditions /circumstances between the groups.

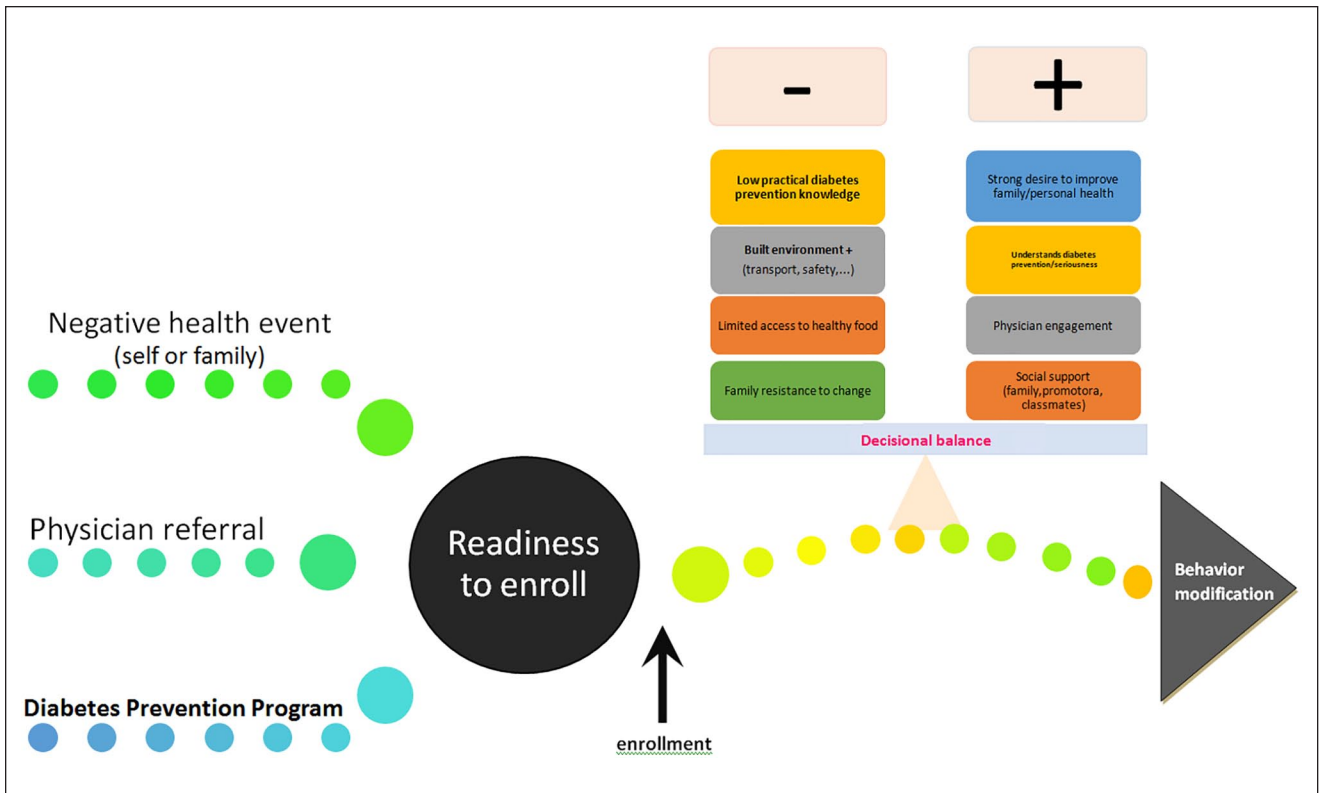
Several studies have compared the health of Mexican immigrants with that of other groups of immigrants in the United States: one study analyzing data from more than 34,000 immigrants from various countries and continents reported that Mexican immigrants tended to have a higher

risk of diabetes and obesity compared with immigrants from Central America, the Caribbean Islands, and Asian countries.<sup>60</sup> Furthermore, a higher risk of diabetes has been associated with lower socioeconomic status.<sup>61</sup> Indeed a study among Latino immigrants in Northern California found that low-income Latino immigrants were more likely to experience diabetes. This phenomenon was attributed to lifestyle-related consequences of poverty.<sup>62</sup> Other studies mentioned residing in an obesogenic environment as a factor that increased even further the risk of diabetes among low-income individuals.<sup>63</sup>

When considering immigrants living outside the United States, income and sociopolitical factors influence health outcomes: in countries with low social and political tolerance toward immigrants, these were more likely to experience worst health outcomes compared to natives and to immigrants living in less "exclusionist" countries.<sup>64</sup> In countries such as Sweden, where health care is universal, but immigrants earn less than Swedes, low-income and lower "occupational class" consistently increased the risk of disease within every immigrant group, independently of birth country.<sup>65</sup> Since our participants live in a county where 54% of the population is Latino,<sup>66</sup> social and political tolerance may or may not be factors influencing their health outcomes, but low-income status and employment type may play a role.

Thus, our findings have policy-making ramifications. While free DPPs are needed, several conditions must be met to ensure their relevance and success among low-income Latinas: increased access to trusted health care providers—Latinos having the highest uninsured rates,<sup>67</sup> incentives to health care providers prescribing prevention programs to Latinas and supporting their behavior, and year-round vetted programs for participants and family members. Increasing access to healthy food and to safe walkable areas, and providing efficient transportation in low income Latino neighborhoods should also be seriously considered. Investment in these policies has the most potential of dramatically changing outcomes and would go a long way, especially in view of the large potential health care savings for each year of delay in a person's diabetes onset.<sup>68</sup> Figure 2 depicts behavior modification considerations among Latinas enrolled in a DPP.

Several limitations of our study need to be acknowledged. Our study group was composed of Latinas from Southern California, mostly of Mexican descent and the program was led by *promotoras*. Therefore, results cannot be generalized to other Latino subcultures and programs taught in other settings. Also—besides asking about language spoken at home—we did not fully assess acculturation neither did we enquire about household size, medical mistrust, or perceived discrimination. We had hoped to obtain "food recall measurements" to corroborate the qualitative data, but it was not possible due to the need to limit



**Figure 2.** Behavior modification considerations among Latinas enrolled in a *promotora*-led diabetes prevention program.

questions. However, we did ask one question to collect general information on food type and portion size, and participants freely shared changes they made in their eating pattern. Since interviews were conducted at the end of the program, there may also have been selection and memory biases.

One of the strengths of our study is that we were able to gather information from a variety of perspectives (several *promotoras* and FGDs) and were able to analyze results in context (timing, family-life, food availability, other life circumstances surrounding participants), something that is often lacking when program results are reported. Also, having some participants referred by a trusted Latino health-care provider allowed us to assess the potential impact of collaboration between clinicians, *promotoras* and program development specialists. Last, our study sheds light on factors currently affecting low-income Latinas’ response to DPPs, a reality which may have been assumed of the past, especially after the implementation of the Affordable Care Act and the availability of the NDPP.

### Conclusions and Implications for Practice

The emergence of DPPs throughout the country has provided options—including online alternatives—for low-income

communities to learn about, and apply diabetes preventive behaviors. However, our study suggests that these programs will only accomplish their goal among populations that need it most within the scope of a multipronged approach, especially one that includes continuous program availability, informed healthcare providers, and the implementation of additional policy and research priorities.

First, year-long culturally tailored “family-style” programs should be offered to Latinos recently diagnosed with diabetes, fully engaging spouses and children in the process. It is important that these programs contextualize environmental factors, emphasize the connection between behavior modification and diabetes complications, and teach coping skills to help preserve family cohesiveness while the participants adopt the new healthier behaviors. Second, health care providers should be proactive and aim to refer at-risk Latino families once a diagnosis is established in one of the family members. They should also remain engaged and alert to possible family tensions resulting from attempts at behavior modification and strive to promote supportive policies. Thirdly, policies should reward healthcare providers prescribing prevention programs to Latinas, ensure insurance coverage for at-risk Latinas, and improve social determinants of health in these communities (safe parks, access to healthy foods, transportation, neighborhood safety, childcare, etc). Such concerted

efforts may tilt Latinas' "decisional balance" more favorably toward preventive behaviors, and thus increase the success rates of DPPs.

Last, it is not enough to report the results of DPPs. Research among Latinos should assess and report participants' family dynamics, physician-patient rapport, and other social determinants of health, especially the built environment. This would create a consistent reference for replication and true program comparison between prevention programs. Replicating this study on a larger scale and in a variety of settings may also shed more light on factors associated with successful diabetes prevention among Latinas' and help reduce the diabetes health disparities and mortality rates in the United States.

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### Supplemental Material

Supplemental material for this article is available online.

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