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A weight-loss intervention program designed for Mexican-American women: Cultural adaptations and results

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Abstract

Background—This study assessed the feasibility of a culturally-appropriate weight-loss intervention targeting obese Spanish-speaking Mexican women.

Methods—This 12-month weight-loss program was based on behavioral interventions previously used successfully with English-speaking participants. Cultural adaptations included: female interventionists, minimal written materials, emphasis on group activities, focus on Mexican traditions and beliefs, and skill-building approach to food measurement. All sessions were conducted in Spanish. The study had few exclusionary criteria, which allowed participation of women with a wide range of literacy levels.

Results—Recruitment exceeded expectations, with 47 participants enrolling in the program. Not counting participants who became pregnant during the study, attendance at 6 and 12 months was 62% and 50% respectively. Mean weight loss at 6 and 12 months was 5.3 kg and 7.2 kg, respectively, with a mean reduction in BMI of 4.0 kg/m² and 5.5 kg/m² from baseline to 6 and 12 months, respectively.

Discussion—This pilot study shows that it is feasible to develop and implement culturally-appropriate behavioral lifestyle interventions for obesity treatment in Mexican-American women.

Keywords

Obesity; Hispanics; Women; Weight-loss Intervention; Cultural Adaptation

1. Introduction

The prevalence for overweight and obesity (body mass index [BMI] ≥ 25 kg/m²) among Hispanic women in the United States is 77%, compared to 61% for non-Hispanic white women (1). While comprehensive lifestyle modification programs are able to induce and maintain an average weight loss of 7–10% of initial weight loss for a significant proportion of non-Hispanic white, English-speaking participants (2,3), they appear to be less effective for participants of ethnic minorities (4,5). The few available weight-loss intervention studies that have compared results for Hispanic and non-Hispanic participants have shown that Hispanic participants tend to lose less weight than non-Hispanic whites and are more likely

to regain weight at follow-up (5–10). The results of these interventions may reflect treatment variables related to implementation approaches, cultural concerns, or socioeconomic factors (4,11), and little information is available on how to adapt protocols and intervention methods to maximize the success of weight-loss interventions for Hispanic populations (12).

Importance of Culture

Few behaviors are more culturally-bound than diet (13). What we eat, when we eat, how we eat, with whom we eat, how frequently we eat, and the meaning ascribed to specific meals and food choices—all these choices are largely determined by sociocultural factors (14). Given the close relationship between culture and dietary habits, weight-loss interventions must frame dietary recommendations as well as behavioral strategies for achieving dietary change within the specific cultural context of the target population (15).

This paper focuses on the specific cultural adaptations used when developing *De Por Vida* (“For Life”), a culturally-tailored weight-loss intervention targeting Mexican-American women. The basic structure of the program was based on behavioral weight-loss programs that had been shown to be effective with English-speaking populations, but many aspects of the program were modified for participants with a Mexican cultural background.

Intervention Development

The intervention program was based on behavior change strategies previously used successfully with English-speaking participants in the PREMIER (16) and Weight Loss Maintenance trials (17,18). These strategies were based on principles derived from social cognitive theory (19) and techniques of behavioral self-management (20), which emphasize the importance of the individual’s ability to regulate behavior by setting goals, developing specific behavior-change plans, monitoring progress, and developing problem-solving skills necessary to achieve the goals. The dietary and physical activity recommendations in the *De Por Vida* program were consistent with the 2005 Dietary Guidelines for Americans (21).

Cultural Adaptations

Cultural adaptation was conducted using guidelines that emphasize preserving a successful program’s core components while making adjustments for a specific population (22). This process was informed by the results of a focus group study we conducted with Mexican-American women as formative work for this intervention (12), by recommendations in published literature (23–25), and by advice from four experts in Mexican nutrition and diet (SVL, MRC, MC, NML) who were part of the research team. Throughout the program, the delivery of the intervention was guided by the needs and feedback (i.e., specific questions asked, requests that a topic be reviewed) of the participants. The cultural adaptation elements listed below were interwoven into the content and delivery of all intervention sessions.

i. Women only—Participants in our focus group study voiced a strong preference for weight-loss interventions “for women only,” where women “could talk freely to other women—even about their husbands (26).” In response to this expressed preference, our study was open only to women. This constitutes an important departure from some previous weight-loss interventions targeting Mexican Americans, where the entire family is involved based on the hypothesis that this would improve participants’ ability to successfully lose weight (9,8).

ii. Female interventionists—Focus group participants also expressed a strong preference for female Mexican interventionists who not only spoke Spanish but who “understood what it means to emigrate.” In response to this, both interventionists were Mexican women, one

of them a clinical psychologist (NL) and the other an endocrinologist (MR), both experienced clinicians.

iii. Minimal written materials—To ensure effective communication with a population with a wide range of literacy and numeracy skills, our program minimized reliance on written materials. When used, these materials were provided in Spanish and English, with simple sentence structures and commonly used words, at a fourth to sixth grade reading level. Materials maximized the use of simple, adult-appropriate, non-technical illustrations, icons, and color codes that allowed participants to grasp key ideas with a minimum of explanatory captions. For example, different products or food packages demonstrated in sessions (e.g., a Mexican pastry, a glass of juice) were marked with color tape to indicate the food's caloric content (e.g., “*if you eat this much, you consume 200 calories*”; “*if you drink up to this line, you have consumed 100 calories*”).

iv. Small and large-group activities—Intervention sessions emphasized group interaction. In every intervention session, small- or large-group activities were conducted. For example, pairs of participants developed possible behavioral strategies to manage difficult situations and presented them to the group as role-playing exercises. Similarly, small “teaching teams” would “teach back” a specific topic covered in the session or lead a group exercise segment. Examples of large group activities included individual participants teaching a favorite recipe modification, leading a group exercise, comparing the nutritional information labels of different brands of the same product, or having the group collectively work on calculating the caloric content of a recipe.

v. Focus on Mexican traditions—Dietary recommendations included returning to healthful dietary habits congruent with traditional Mexican culture. For example, participants were encouraged to return to traditional Mexican breakfasts, which typically include vegetables and protein (e.g., “*huevos con chaya*”) rather than relying exclusively on American-style breakfast foods (e.g., pre-sweetened cereals, pancakes, or breakfast bars) that Mexican Americans quickly adopt after moving to the United States (27–29). Participants were encouraged to return to the Mexican tradition of starting the main meal with “*sopa aguada*” (a low-energy-density soup) and eating traditional snacks of fruits and vegetables rather than processed or ready-made fast foods. The program emphasized staple foods traditionally used in the Mexican diet, showing participants the diversity of choices within the same product type. For example, participants learned about the wide variety of caloric content in different brands of commercially-available tortillas, which ranged from 40-kilocalories to 120-kilocalories per regular-sized corn tortilla. Participants also learned that they did not have to “give up our foods” in order to control their weight and have a healthful diet, as long as they selected the more healthful choices within the types of Mexican foods they preferred. The intervention guide included dietary and behavioral content specifically relevant to the major holidays and celebrations that have particular significance in Mexican culture and which are associated with specific foods (e.g., *buñuelos* for Christmas, cod empanadas for Lent, tamales for christenings).

vi. Food measurement—In traditional Mexican culture, food preparation rarely involves the use of standard measurements. For example, cookbooks published in Mexico often eschew standard measurements, such as cups, tablespoons, or grams, and instead use non-specific terms such as “enough,” “not too much,” or “to taste.” The Spanish language does not have specific terms for ‘tablespoon’ or ‘teaspoon’—instead, the differing sizes of spoons are denoted by attaching diminutive or superlative suffixes to the basic word ‘spoon’. “Cuchara” (spoon) becomes “cucharita” (little spoon) if it’s relatively small, and the word

“cucharita” could equally refer to a baby spoon, a collectable miniature spoon, a demi-tasse teaspoon, or an actual measuring teaspoon.

Given the key role of food measurement both for estimating calorie content and managing portion control, the lack of familiarity with standard measurements required that this topic be revisited many times over the course of the intervention. Various intervention sessions included activities and information related to standard measurements. To familiarize participants with standard measurements, a variety of hands-on activities were used throughout the intervention, such as measuring food with cups of different shapes, and holding contests to estimate the amount of food contained in plates or bowls of different sizes and shapes. A frequent intervention activity was to collectively review a randomly-selected day from a participant’s food journal. The journal entry was shown on an overhead projector, and the group would provide feedback regarding the accuracy of the measurements used in the journal entry, and of the calories recorded for each of the food entries.

vii. Adaptation of food journaling for limited literacy—Participants were encouraged to keep food diaries, which have been shown to be a powerful intervention tool in weight-loss programs (18,30). However, to facilitate self-monitoring of nutritional intake for participants with limited literacy and numeracy skills, we made several adaptations. Contemporary weight-loss programs generally provide food journals in which each page is printed with columns where participants record the amount and type of food they ate, along with the calories in that specific food serving.

The use of food journals requires basic proficiency in estimating the amount of food consumed, as well as the knowledge of the approximate number of calories contained in a particular food serving. In order to know the caloric content, individuals are expected to consult calorie guides (e.g. CalorieKing™), which list the nutritional content in a variety of food items. Unfortunately, such commercially-available calorie guides were not available in Spanish at the time of our study. In our study we provided participants with the English-language CalorieKing™ guide, and we compiled a list in Spanish of about 50 commonly consumed foods (along with their caloric content), which we provided to participants.

Rather than simply asking participants to record the specific amount of food consumed, participants were taught to tally the number of servings of fruits, vegetables, dairy products, carbohydrates, proteins, and fats (each identified by different pictorial icons and colors). This strategy supported the efforts of all participants to maintain a rich and balanced diet, it also gave them the option of keeping a traditional journal (specifying the type of food, portion consumed, and associated calorie content with a total calorie count for each day), or keeping a journal of daily tallies for servings of each major food groups, without calculating the calorie content consumed each day.

viii. Topics central to immigration experience—Throughout the intervention, topics central to the immigration experience were woven into the session content. For example, when talking about fast foods, the group discussion would touch upon the pressure to “fit in” in terms of adopting “American foods” or “American food schedules,” while wanting to maintain Mexican food traditions and schedules. Similarly, when discussing realistic weight goals, the group discussion would include what might be considered an ideal body type in traditional Mexican culture, and how those standards might differ in American culture. The loss or disruption of family or social networks as a result of leaving Mexico was a frequent centerpiece of discussion when talking about food preparation; many participants were not able to rely as they did in Mexico on sharing food preparation with other family members, which was a problem that tended to increase reliance on processed foods.

ix. Traditional beliefs regarding health and food—Our intervention was sensitive to the many and varied traditional Mexican cultural beliefs regarding health and food consumption. Some of these traditional beliefs run counter to information provided in nutrition education programs targeting the general population and must be addressed with sensitivity. For example, most participants in our study held the belief that adding vinegar or lime juice to food (e.g., adding a few drops of lime juice to condensed milk or drinking hot water with vinegar before eating fried foods) somehow “dissolved” the fat content of the food and made the food less caloric. Another widespread belief is that overheating tortillas to the point of crispness, or toasting bread, significantly reduces their caloric content. Other beliefs involved traditional Mexican medicine alimments, such as *empacho*, thought to be caused by “heavy” foods, by an improper combination of foods in the “hot and cold” spectrum (31), or by consuming “too much” of a particular food (including certain fruits or dairy products, or their combination), or eating a particular food at an inappropriate time of day (e.g., eating oranges in the evening) (31). Our intervention supported the integration of traditional Mexican cultural practices that were beneficial or not harmful (such as consuming a small amount of vinegar in warm water before breakfast) into the recommended dietary strategies, and to provide culturally-congruent alternatives to popular practices that ran counter to the program’s dietary recommendations.

x. Physical activity—Our program emphasized the value of leisure physical activity not only as a means to improve energy balance and promote good health but also as a way to manage stress and improve mood. During alternate sessions, a segment of the intervention was devoted to physical activity. Because our focus group findings suggested that most participants did not have access to gyms and that they may not feel safe walking in their neighborhoods, our program sought to provide examples of physical activities that they could do in the privacy of their homes. In addition to providing an opportunity to engage in types of physical activity with which participants were already familiar (e.g., dancing to a salsa dancing exercise video), the program sought to present types of physical activity with which participants were not familiar --such as exercise videos of tai-chi, Pilates, or Tae Bo, all of them available at the local public library—and encourage participants to find a physical activity that was meaningful to them.

2. Methods

Design Overview

This pilot project was conducted with Spanish-speaking women of Mexican origin living in Portland, Oregon. We used a pretest-posttest design to assess the feasibility of a culturally-adapted intervention aimed at the adoption of recommended health behaviors to reduce body weight.

Our recruitment goal was to reach a broad range of participants. To this end, we minimized enrollment barriers for inclusion: The program was open to women of a wide range of ages and literacy levels, there were few exclusionary criteria and, unlike many clinical trials involving multiple pre-enrollment screening visits [e.g., Women’s Health Trial (32); Weight Loss Maintenance Randomized Controlled Trial (17); Diabetes Prevention Program (33)] we minimized the number of pre-enrollment meetings and requirements. As a result, our program included many participants who would probably have been excluded from more selective randomized clinical trials whose stringent eligibility criteria, including multiple on-site screening visits and completion of lengthy questionnaires, often constitute a barrier to study participation for individuals of lower socioeconomic status (34–37).

Eligibility criteria included: female, Spanish-speaking, self-identified as Mexican or Mexican-American (regardless of place of birth), age 18 or older, and a BMI of 30 kg/m² or

above. Exclusions included: current pregnancy, having given birth within the previous 12 months, plans to become pregnant or to leave the area in the next 12 months. There were no medical exclusions, and no information was collected on medical history or current health status; however, all potential participants were asked to complete the Physical Activity Readiness Questionnaire (PAR-Q) (38), a self-screening tool that identifies adults for whom physical activity may be inappropriate. Participants endorsing any PAR-Q items were required to obtain medical clearance before enrolling. All interactions with study participants were conducted in Spanish, and all written materials were provided in Spanish and English. The study offered no financial incentives or compensation for participation. This study was approved by the Kaiser Permanente Northwest Institutional Review Board, and all participants provided written informed consent.

Recruitment and Informational Visit

Bilingual flyers describing the *De Por Vida* program were posted at businesses and agencies serving the Hispanic community, inviting interested women to call the study recruitment office. Flyers were written at a 4th–6th grade reading level. All project staff were bilingual Mexican-American women. Recruiters talked to the owners and employees of the businesses and agencies where flyers were posted, and provided information about the study, including its purpose and rationale; the funding agency; the potential benefits to the Mexican community; and the fact that no identification (i.e., driver's license) or health insurance would be required in order to participate in the program.

Additional recruitment activities included interviews of the principal investigator on local Spanish-language radio and television programs. In each instance, the interviews focused on the health risks posed by obesity and the benefits of adopting healthful dietary and physical activity habits. Because listeners and viewers were able to call in with questions or comments, this format allowed for a public dialogue and provided an opportunity to “break the ice,” allowing interested women to interact with the program's principal investigator (a native Spanish-speaking Mexican-American woman).

Interested women who called the recruitment office spoke with a staff member who briefly described the study, conducted a preliminary eligibility screening, and answered questions. Those who appeared to be eligible were invited to a group informational visit.

During the informational visit, the principal investigator (NML) introduced herself and the project staff and described the study in detail. Women were encouraged to ask questions, and were invited to return one week later to enroll in the study.

Baseline Data Collection

To make women feel more comfortable, and to make the data collection process culturally congruent, the enrollment visit was conducted in a group setting. All study forms were provided in Spanish written at a 4th–6th-grade literacy level. The consent form was read out loud and reviewed individually with each participant before signing. Consented participants were individually measured for height and weight to confirm eligibility, and participants then completed two paper-and-pencil questionnaires: a food frequency questionnaire and a demographic information form. Each page of the food frequency questionnaire was shown on an overhead projector, each question was read out loud, and the possible response options were read out loud and shown on the overhead projector. A similar procedure was followed for the demographic information form. If limited literacy prevented a participant from filling out the demographic information form, she could dictate the information to a member of the project staff who would fill out the forms.

Measures

Height and weight—Participant height was measured without shoes using a wall-mounted stadiometer. Participant weight was measured using a calibrated digital scale while wearing indoor clothing without shoes. Height data was collected at baseline. Weight data was collected at baseline and subsequently at every intervention session, including 6 and 12 months.

Dietary intake—Dietary intake was assessed using the bilingual (Spanish-English) version of the Block Food 2005 Frequency Questionnaire Spanish Version™ (NutritionQuest, Berkely, CA), which has been validated with Mexican-American populations (39). This questionnaire asks about average consumption over the past year, and provides estimates of total calories, total calories from fat, carbohydrates, and protein, and number of servings of various foods (e.g., fruits, vegetables, etc.). Dietary intake information was collected at baseline and 6 months.

Content and Conduct

The intervention consisted of six months of weekly group sessions (Phase 1) followed by six months of monthly group meetings (Phase 2). All sessions lasted 90 minutes. Sessions started with individual weigh-ins, and continued with a group check-in, during which participants could ask questions and share the successes or difficulties they encountered since the previous session. This check-in provided interventionists an opportunity to decide if the pace of the intervention was adequate. After the check-in, the sessions followed the content outlined in the intervention guide, allowing flexibility to address the concerns participants expressed during the check-in. The intervention was delivered by two Spanish-speaking Mexican women, both of whom were experienced clinicians (a clinical psychologist and an endocrinologist).

Analyses

Statistical analyses were conducted using SAS 9.2 (SAS Institute Inc., Cary, N.C.). Changes in weight, BMI, and diet were analyzed using t-tests. Pearson chi-square tests and likelihood ratios were used to analyze differences on categorical variables.

3. Results

Study recruitment exceeded expectations. With an original recruitment goal of 30 participants, 62 women contacted the study requesting information about the study, and had a brief eligibility screening. Most (55%) learned about the study from friends or family members or from recruitment flyers (53%). Among them, 12 women did not meet eligibility criteria (5 lived outside the Portland area, 4 were <12 months postpartum, 3 had BMI < 30), and the remainder 50 women were invited to, and attended the informational sessions. Forty-seven women consented and were enrolled for the intervention. Three separate intervention cohorts of 15 to 17 participants were assembled and met on different days and times.

Participant Demographic Characteristics

Participants were all self-identified Mexican-American women; most (89%) were Mexican-born. Table 1 shows participants' demographic characteristics. Participants had a mean age of 38 years old (Median = 39; S.D. = 11.7; range 18 – 77). In terms of self-reported educational level, 14 had an education level of sixth grade or less, 16 had completed between seventh and eleventh grade, nine had completed high school, and eight had some post-high school education or completed college. Spanish was the primary language for all participants.

Phase 1 (months 1–6)

Retention: Participant retention is shown in Figure 1. Of the 47 women enrolled in the program, seven dropped out of the program because of changes in their work schedule, four moved to Mexico, and three provided no reason for leaving the study. In addition, two participants became pregnant during Phase 1 and their weight data were censored (pregnancy was an exclusionary criterion for participation).

Attendance: During Phase 1, the average attendance for the 26 sessions for the 45 non-pregnant participants was 62%. Sixteen participants (36%) attended over 80% of the sessions, 11 participants (24%) attended 60 – 80% of sessions, 10 women (22%) attended 20 – 60% of sessions, and eight participants (18%) attended fewer than 20% of sessions.

Weight Change: The average baseline weight was 94.0 kg (median = 93.5 kg; SD = 17.8 kg, range 70.9–146.7 kg). Mean BMI at baseline was 38.7 (median = 37.5; SD = 6.5, range 31 – 58.3).

Average weight change from baseline to the last session attended during Phase 1 for all 47 participants was –5.3 kg (median = –4.0 kg; SD = 5.3 kg, range –18.6 to +2.5 kg; $t = 6.9$, $p < .0001$), representing an average weight loss of 5.7% from baseline (median = 4.4%; $t = 7.2$, $p < .0001$). Average BMI at 6 months was 34.7 (median = 33.4), representing a significant mean reduction in BMI of 4 kg/m² ($t = 2.6$; $p = 0.01$). See Figure 2.

Diet Change: Table 2 shows dietary changes from baseline to 6 months. Reported total energy intake (kilocalories) showed a significant reduction from baseline ($M = 2316$ kcal; SD 1179) to 6 months ($M = 1417$ kcal; SD 531; $F = 4.85$; $p < 0.0001$). A significant reduction was also observed in the percentage of calories from fat from baseline ($M = 36.5\%$) to 6 months (31.1%; $t = 4.25$, $p < 0.0001$). Significant increases were shown in percent of calories from protein from baseline ($M = 16\%$) to 6 months ($M = 19.4\%$, $t = 4.61$, $p < 0.0001$), and percent of calories from carbohydrates, from baseline ($M = 49\%$) to 6 months ($M = 52\%$; $t = 2.1$, $p < 0.05$). Moreover, at the end of Phase 1, refined sugar intake was 29% lower than at baseline ($p < 0.05$). Significant increases were shown in the number of daily servings of vegetables from baseline ($M = 1.9$) to 6 months ($M = 3.66$, $t = 2.9$, $p < 0.01$). No significant differences were reported in daily servings of fruits from baseline ($M = 1.2$) to 6 months ($M = 1.7$, $t = 1.8$, $p = .07$).

Phase 2 (months 7–12)

Retention: As seen in Figure 1, five participants became pregnant during Phase 2. Their weight data were censored as pregnancy was an exclusionary criterion.

Attendance: During Phase 2, the average attendance for the 6 monthly sessions among the 26 non-pregnant participants was 58%.

Weight Change: Data was censored for all participants who became pregnant during the study. Between Phase I and Phase 2, non-pregnant participants who completed Phase 2 ($n = 26$), registered an average weight change of –.38 kg (median = –.02 kg; S.D. = 3.06, range 4.7 to – 10.6 kg).

Total weight change between baseline and 12 months among non-pregnant participants who completed Phase 2, was –7.2 kg (median = –5.4 kg; S.D. = 6.8), with a range of +2.7 to –23.6 kg. ($t = 5.9$, $p < .0001$), representing a mean percent weight change of –7.6%, (median = –6.4%; S.D. = 6.4; range = +3.6 to –23.6% $t = 5.9$, $p < .0001$). Mean BMI at 12 months was 33.2 (median = 33.6). Mean BMI change between baseline and 12 months was –5.5

(median = -4 S.D.= 2.9), with a range of +1.3 to -9.2 ($t = 6.02$, $p < .0001$). Figure 2 illustrates the mean BMI at baseline, 6, and 12 months for participants completing the intervention. Mean BMI change between baseline and 12 months was -5.5 (median = -4 S.D.= 2.9), with a range of +1.3 to -9.2 ($t = 6.02$, $p < .0001$).

Including all individuals who started the intervention and did not become pregnant ($n = 40$) and assuming no weight loss for those non-pregnant participants who were lost to follow-up, 74% of all participants lost at least 5% of their baseline weight. Of those, 20% lost 7–10% of their baseline weight, and over 17% lost more than 10% of their baseline body weight.

For the seven participants who became pregnant during the intervention, at their last recorded pre-pregnancy weight, the mean weight change was -6.5 kg (median = -7.6 kg, S.D. = 5.99; $p = 0.08$), with a range of +3.4 to -19.9 kg; representing a mean percent weight change of -7.5% (median = -9.6%; S.D. = 7.9; $p = 0.08$).

IV. Discussion

This pilot study shows that it is feasible to develop and implement culturally-appropriate behavioral lifestyle interventions for obesity treatment in Mexican-American women. Although Hispanics have been previously underrepresented in health-related research (40), our recruitment success suggests that a culturally coherent recruitment strategy can be successful: 94% of the 50 women who attended our information session registered for the program. Of note, nearly 24 months after the end of our recruitment phase and over 10 months after the end of the intervention, our office continued to field telephone calls of women who would want to participate in our study.

The most salient limitation of this pilot study is the retention rate. Fifteen percent (7/47) of our participant data was censored due to pregnancy, and 30% (14/47) of participants stopped attending the program for other reasons. While this is far from our goal, our retention rates are similar to those reported recently in other lifestyle intervention studies (many of much shorter duration) targeting Hispanic adults. For example, Rocha-Goldberg (41) reports a 65% retention rate (17/26) for a 6-session intervention, and Faucher et al. (42), report a 63% (12/19) for a 4-session intervention. It is worthwhile to note that while the attrition rate in this study is significantly higher than large national trials, including some which have included ethnic minority participants [e.g., Diabetes Prevention Program (43)], the present study had a truly open-door-policy, and did not screen out individuals who are generally considered poor candidates for retention. Most large clinical trials have strict filtering criteria for enrollment, as well as attendance requirements and incentives. In contrast, our study minimized pre-enrollment data collection and did not include financial incentives for participation, compensation for transportation, or childcare. This “open-door” policy provided an opportunity to assess the feasibility and acceptability of this culturally-appropriate intervention in a “real world” setting, and as a result, attendance and retention were lower than in highly selective clinical trials. It is important to note that the “gold standard” in retention and attendance for weight-loss interventions has been set by programs typically targeting non-minority populations whose attendance patterns are likely to reflect key socio-cultural elements. Thus, in addition to supporting the need to culturally adapt the content of behavioral interventions, our experience suggests the importance of developing and implementing culturally-sensitive intervention formats and alternative standards of success for behavioral interventions targeting minority populations.

Our study compares favorably with other culturally-tailored weight-loss studies for Mexican-American populations. For example, with a follow-up rate of 51% ($n = 86$) in a culturally-appropriate weight loss trial comparing an individual-based with a family-based intervention for Mexican-American participants, Cousins et al. (9) reported a mean weight

loss of 2.1 kg (individual-based intervention) and 3.8 kg (family intervention) and a mean BMI reduction of 0.8 kg/m² (individual) and 1.6 kg/m² (family-based intervention) at 12 months. Similarly, with a retention rate of 45% (n = 20) for an 11-week culturally-sensitive weight-control intervention, Domel et al. (44) reported a mean weight loss of 3.95 kg and a 0.8 reduction in BMI. In a culturally-tailored 20-week duration weight-loss intervention delivered by *promotoras de salud*, Faucher and Mobley (42) reported a 63% (n = 7) retention rate and a mean weight loss of 2.9 kg. By contrast, our study showed an average loss of 5.3 kg at 6 months, and 7.2 kg at 12 months, and a mean reduction of 3.2 kg/m² in BMI from baseline to 12 months post intervention. This pilot study has a number of limitations: it is short-term, and the effects are measured within subjects rather than comparing effects to a control group. It is important to note that participants' lack of familiarity with standard food measurement may have negatively affected the accuracy of their estimation of dietary intake, particularly during the baseline data collection before they had the opportunity to learn about food measurement and estimation of portions. In addition, the group format for dietary data collection may have impacted participants' responses on the FFQ. Given our goals of assessing the feasibility of this intervention and of developing specific cultural adaptations in recruitment, data-collection, and intervention content, the design allows reasonable conclusions that establish a rationale for a larger clinical trial. However, this design does not allow us to draw conclusions regarding the relative impact of specific elements of cultural adaptation in the study, or the relative efficacy of culturally adapted interventions, as compared to those targeting general (i.e., non-minority) populations.

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Figure 1.
Consort Diagram

Figure 2.
Mean BMI at baseline (38.7 kg/m²), 6 months (34.7 kg/m²), and 12 months (33.2 kg/m²)

Table 1

Baseline demographic characteristics of participants (n = 47)

Baseline Characteristics	Value	N	Percentage
Age	< 21 years	2	4
	21–29	7	15
	30–39	18	38
	40–49	15	32
	50+	5	11
Education	6 th grade	14	29
	7–11 th grade	18	39
	Completed HS	8	18
	Some college	7	14
Primary language	Spanish	47	100
Country of birth	Mexico	42	89
	United States	5	11
Baseline BMI	30–39	32	68
	40–49	11	23
	50+	9	9

Mean age: 38 years

Mean weight: 94.0 kg

Mean BMI: 38.7 kg/m²

Table 2

Dietary Change

	Baseline (SD) (n= 47)	6 months (SD) (n= 31)	t	p
Total calories	2315.5 (1169.9)	1417.3 (531.5)	3.7	<0.001
% calories from fat	36.53 (4.7)	31.06 (4.9)	4.3	<0.0001
% calories from protein	15.9 (2.0)	19.48 (3.4)	4.61	<0.001
% calories from carbohydrate	48.9 (5.4)	52.03 (5.4)	2.1	<0.05
Total sugar (gr)	111.6 (66.5)	79.15 (31.9)	2.3	<0.01
Daily servings of vegetables	1.9 (1.6)	3.66 (2.6)	2.9	<0.01
Daily servings of fruit	1.2 (0.9)	1.66 (0.9)	1.8	0.07