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Improving Relational Functioning in Mother-Daughter Dyads With Obesity

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Family-level interventions have the potential to address intergenerational obesity among Mexican American women. Given that poor family functioning is associated with worse weight loss outcomes, this study tested a weight management program aimed at improving relational functioning in mothers and daughters with obesity. Mexican American mothers and their adult daughters were randomly assigned to participate in a 16-week group-based standard behavioral (SB) weight loss program without or with relationship skills training (SRT). Relational functioning was assessed via observational behavioral coding using the Global Structural Family Rating Scale. General relational functioning and specifically positive alliance patterns and conflict avoidance improved significantly more in the SRT group than in the SB group. Average weight changes included percent weight loss of -5.6% in the SRT group versus -3.9% in the SB group and body mass index reduction of -2.2 kg/m^2 in the SRT group versus -1.2 kg/m^2 in the SB group. More participants in the SRT group (75%) than in the SB group (40%) tended to achieve at least 3% weight loss. Greater changes in positive alliance patterns increased the likelihood of losing 3% of body weight. Improving relational functioning in mother-daughter dyads may promote favorable outcomes in a behavioral weight loss intervention.

Key words: family functioning, Mexican American, obesity, weight loss intervention

MEXICAN AMERICAN WOMEN are disproportionately affected by obesity.¹ More than 50% of Mexican American women, compared with 38% of non-Hispanic white women, are classified with obesity.² Obesity is highly concordant in Mexican American families, especially between mothers and daughters.³ Although the maternal obesity risk for females exists in childhood,^{4,5} there are lasting effects as obesity tends to track into adulthood where it elevates the risk for type 2 diabetes.⁶⁻⁹ Consequently, Mexican American adults are more likely to have a diabetes diagnosis, poor glycemic control, and diabetes-related mortality than non-Hispanic whites.^{2,10-13} Multiple factors are reported to contribute to the racial/ethnic disparities in obesity and associated conditions including socioeconomic, environmental, cultural, lifestyle, and biological.¹⁴

The guidelines for management of obesity recommend modest weight loss through a comprehensive

lifestyle intervention and a sustained weight loss of 3% to 5% body weight to reduce cardiovascular risk factors such as diabetes.¹⁵ Unfortunately, despite the health benefits, Mexican American women have been underrepresented in weight management interventions.¹⁶ Although some weight loss interventions have been developed specifically for Mexican American women using mostly surface structure cultural adaptations (eg, language, role models, ethnic foods), they have yielded smaller weight losses compared with trials conducted with a majority non-Hispanic white participants.^{17,18} One reason for this is that treatment adherence and retention are relatively low.

Family-level factors may influence weight loss outcomes by reducing treatment adherence. Mexican Americans have larger family-based networks and greater attitudinal familism than non-Hispanic whites,^{19,20} and these factors are negatively associated with treatment adherence and weight loss in traditional obesity treatment.²¹ Familism is a core cultural value based on strong feelings of loyalty, reciprocity, and solidarity among family members.¹⁹ Familism is generally considered a protective factor because it is associated with better psychological health.²² However, the traditional treatment approach to weight management, which focuses on individual-level changes (ie, self-efficacy), may not account for the family dynamics that influence eating and physical activity behaviors of the individual. Although family members are recognized as important sources of support for weight management, existing intervention approaches tax the individual with garnering support for oneself without the

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interpersonal skills to achieve it. In contrast, a family-level approach grounded in familism would leverage a cultural value to promote shared goals, collaborative problem solving, and communal coping when treating family members alongside each other.

From a family systems perspective, family-level approaches to obesity treatment can improve the adoption and maintenance of weight management behaviors. Functioning of family members is interdependent because individuals are connected to others through relationship ties in a family (system) and changes made by one individual have consequences for others (disrupts the system's homeostasis).²³ Family dynamics are interaction patterns with reciprocal effects on family members through processes called feedback loops. To achieve individual-level behavior change, family interventions must focus on addressing these dynamics to establish a new homeostasis (adaptation) that supports lasting change. The collectivist nature of Mexican American culture may challenge the family's adaptation to change when a member deviates from existing roles or norms related to eating and physical activity.²⁴ Indeed, the lack of attention to the need for change at the family level (systemic change) may explain why Mexican Americans fare worse at maintenance of weight loss than non-Hispanic whites.²⁵

Targeting family functioning in obesity treatment is needed. Family functioning refers to interactions and relationships among family members that reflect connectedness such as emotional closeness. Indicators of family functioning include communication, conflict, cohesion, and adaptability. Family functioning is predictive of weight and weight-related behaviors in both children and adults.^{26,27} Unlike obesity treatment for adults, family-based interventions are the gold standard for childhood obesity, although they largely involve teaching caregivers skills on parenting.²⁸

Given the high prevalence of obesity and the younger age of onset of type 2 diabetes in women with familial history of diabetes,²⁹ we focused our research efforts through the *Communication on Mothers Inspiring Healthy Actions* (Con MIHA) study on understanding family functioning in Mexican American mothers and their adult daughters with obesity.³⁰ The results revealed less traditional hierarchical dynamics and more mutual influence, both positive and negative, in eating and physical activity behaviors. Furthermore, wider acculturation gap between mothers and daughters led to greater differences in communication competencies, which in turn was associated with lower family functioning.³⁰ This is consistent with the intergenerational

acculturation discrepancy model that asserts that the difference in acculturation (acculturation gap) between parent and child is associated with lower family functioning and higher psychological distress especially in young adult daughters.^{31–33} Acculturation represents the extent of adoption of the mainstream culture such as language, attitudes, and behaviors. The interaction of the normal family process (eg, seeking autonomy) with the acculturation process (eg, valuing individualism) may exacerbate conflict³⁴ between lower acculturated mothers and higher acculturated daughters. However, interventions that promote bicultural competence by increasing transcultural perspective and bicultural skills to change interactional patterns have been effective at reducing intergenerational cultural conflict and improving psychological well-being in Latinx families.³⁵

Enhancing family functioning in obesity treatment may improve weight loss outcomes for Mexican American families. To date, only 1 weight loss pilot trial with adult Mexican American dyads has been published. In the Unidas Program, women with type 2 diabetes and their adult daughters, who received behavioral weight loss treatment through community health centers, experienced small but significant weight loss compared with those who received usual care providing preliminary support for family-level interventions.³⁶ We used our findings from the Con MIHA study to adapt the behavioral weight loss intervention from the landmark Diabetes Prevention Program (DPP) and Look AHEAD trials^{37,38} to include brief and structured counseling on family functioning. We implemented a weight management intervention using a family systems approach with the goal of improving family interaction patterns to increase eating and physical activity behaviors conducive to weight management.

METHODS

Participant recruitment and eligibility

Participants were recruited via social media (eg, Facebook), local media outlets (newspaper, radio, or Web-based advertisements), flyers/brochures distributed and posted at university and community sites, and presentations at community events. Mother-daughter dyads were screened for initial eligibility via telephone based on being female, 18 to 65 years of age, Mexican or Mexican American, and San Diego County residence as well as having a body mass index (BMI) of 25 to 50 kg/m². Individuals were excluded if they were unable to read and write in English or Spanish, were pregnant or planned to become pregnant in the next year, had a physical limitation that made exercise such as

walking difficult, were participating in a weight loss program, underwent weight loss surgery, and reported a serious medical or psychological condition. Eligible dyads were invited to attend an orientation to learn more about the study where interested participants provided written informed consent and were scheduled for a baseline assessment visit. The study was approved by the institutional review board at the University of California San Diego.

Intervention

Mother-daughter dyads were randomly assigned to 1 of 2 conditions: standard behavioral (SB) or standard behavioral with relationship skill training (SRT). Both conditions consisted of a 16-week group-based standard behavioral weight loss program adapted from the DPP and Look AHEAD interventions, which demonstrated that modest weight loss was associated with diabetes prevention and improved management across racial/ethnic groups.³⁷⁻⁴⁰ All sessions were led by a bilingual and bicultural interventionist. Intervention materials were available in English and Spanish.

The standard behavioral weight loss program focused on nutrition and physical activity and behavioral modification strategies (Table 1). Parti-

cipants were given a calorie goal designed to produce weight loss of 0.5 to 1 kg/wk. Nutrition education focused on well-balanced meals and healthy eating patterns with an emphasis on reduced energy intake relative to expenditure. Participants were instructed to gradually increase physical activity to 150 min/wk and greater of at least moderate intensity activity. Four instructional physical activity “Move those muscles” sessions, designed for dyads, were conducted to provide basic training (eg, stretching) as well as opportunities for collaboration (eg, partner yoga). Participants were given a 10 000 daily step goal and brisk walking was encouraged as a regular form of exercise. Participants were taught standard cognitive and behavioral weight loss techniques including goal setting, planning ahead, problem solving, eliciting social support, stimulus control, cognitive restructuring, and relapse prevention.^{37,38} Self-monitoring was strongly emphasized and participants recorded their food intake, type and duration of exercise, and body weight in their daily diaries (booklets or app). At each weekly session, participants were privately weighed, submitted their self-monitoring records, and received written feedback on their diet and activity records.

TABLE 1. Intervention Curriculum

Sessions	SB	SRT
1	Keeping track: calorie and exercise goals	What is communication?
2	Counting calories and reading nutrition labels	Patterns of communication
3	Move those muscles: stretching	Bicultural communication
4	Planning for exercise and using activity trackers	Disclosing
5	Eating fewer calories: portion control and meal plan	Speaking
6	Solving problems that get in the way of exercise and healthy eating	Listening
7	Move those muscles: flexibility	Assertive communication
8	Working with people around you to increase exercise and healthy eating	Expressing emotions
9	Healthy eating: eating well-balanced meals	Greeting and complimenting
10	Changing home and work environments to increase exercise and healthy eating	Asking open-ended questions
11	Move those muscles: balance	Resolving conflict
12	Dealing with negative thoughts	Negotiating conflict
13	Managing stress and your weight	Communicating empathy
14	Mindful eating	Encouraging
15	Move those muscles: strength	Solving problems collaboratively
16	Setting goals for weight loss maintenance	Staying positive with communication

Abbreviations: SB, standard behavioral weight loss program; SRT, standard behavioral weight loss program with relationship skills training.

The intervention curriculum for the standard behavioral weight loss program with relationship skills training (Table 1) incorporated content and activities aimed at increasing positive and supportive interactions as dyads worked toward their eating, physical activity, and weight loss goals. Sessions drew on family therapy and communication models to teach skills that touched on characteristics associated with relational functioning (eg, positive communication, collaboration, biculturalism, and conflict resolution) that were identified from the Con MIHA study. Real-life scenarios were also extracted from formative qualitative interviews to teach these skills in the context of communicative exchanges on eating, physical activity, and weight between mothers and daughters. The structured and goal-focused sessions consisted of brief psychoeducation, practice-based activities, and group feedback.

Measurements

Baseline participant characteristics

Participants provided demographic information on age, education, employment, marital status, and nativity. The Acculturation Rating Scale for Mexican Americans (ARSM-A-II) was used to measure acculturation.⁴¹ Participants also provided information on individual and family health history.

Relational functioning

An adapted Global Structural Family Systems Ratings was used to conduct observational coding of baseline and postintervention dyadic communication and interaction.^{42,43} Specifically, mother-daughter dyads engaged in a 10-minute video-recorded discussion on a topic they frequently disagreed. The topic was selected on the basis of responses to a 25-item questionnaire on topics of disagreement that was developed from the formative Con MIHA study. The recorded interactions were viewed and scored utilizing the Global Structural Family Systems Ratings by 2 independent raters. All ratings were conducted on a 5-point scale where a “1” indicated no evidence of a particular construct and “5” indicated pervasive evidence of a particular construct. Interrater reliability was satisfactory across all constructs, with intraclass correlation coefficient of 0.90. The following 5 constructs were evaluated: (1) positive affect—indicative of overall emotional tone (eg, stating compliments, smiling), (2) positive alliance patterns—reflect cohesion, reciprocity, and respect (eg, voicing agreement, eye contact), (3) conflict resolution—demonstrated by a process of joint contribution to the negotiation of differences (eg, expression of ideas, calm composure),

(4) negative affect—characterized by anger/hostility or sadness/anxiety (eg, expressing criticism, crying), and (5) conflict avoidance—refers to the lack of engagement in discussing the designated topic of disagreement (eg, distract or change subject). A general composite score was calculated by subtracting sum scores of negative affect and conflict avoidance from sum scores of positive affect, positive alliance patterns, and conflict resolution.

Anthropometric measurements

At the baseline and postintervention assessment visits, height was measured using a stadiometer and weight was measured with a digital scale while participants wore light clothing and no shoes. Body mass index was calculated by weight (kilograms)/height (meters)².

Intervention adherence

Every week, participant session attendance and submission of self-monitoring diaries were recorded. Treatment adherence was determined by the number of sessions attended and diaries submitted out of a possible 16.

Data analysis

A total of 23 mother-daughter dyads enrolled in the intervention program ($n = 46$). Descriptive statistics were used to summarize baseline participant characteristics. Group differences in relational functioning, BMI, and weight changes were assessed using 2 sample t tests. Group differences in achieving 3% and 5% weight loss were determined using χ^2 test. Analyses that accounted for the dyad structure were conducted using Generalized Estimating Equation to further investigate the intervention effects and the likelihood of achieving 3% or 5% weight loss with changes in relational functioning.

RESULTS

Participant characteristics

Baseline participant characteristics are summarized in Table 2. Mothers (BMI $35 \text{ kg/m}^2 \pm 6$) and daughters (BMI $37 \text{ kg/m}^2 \pm 6$) were on average 52 ± 6 and 27 ± 6 years of age, respectively. The majority of mothers and daughters completed a high school education with less than a quarter having a college degree. More than a half of mothers were employed and about a quarter of daughters were college students. Most mothers were married and daughters were single. About 65% of dyads resided in the same household.

The majority of mothers were immigrants to the United States (US; 91%) and Spanish-language dominant (74%) whereas daughters were US born

TABLE 2. Baseline Participant Characteristics

	Mothers	Daughters
Age, y ^a	52.3 ± 6.1	27.1 ± 6.2
Education, %		
Less than high school graduate	30.4	8.7
High school graduate	52.2	69.6
College graduate	17.4	21.7
Employment, %		
Employed	52.2	39.1
Student	4.3	26.1
Homemaker	21.7	17.4
Retired	4.3	0.0
Unemployed	17.4	17.4
Marital status, %		
Married/cohabitating	69.6	30.4
Divorced/widowed/separated	26.1	13.0
Single	4.3	56.5
Generational status, %		
First generation	91.3	43.5
Second generation	8.7	47.8
Third generation	0.0	8.7
Language speak and read, %		
Spanish or more Spanish	73.9	13.0
Spanish and English equally	0.0	0.0
English or more English	26.1	87.0
ARSMA-II ^a	-1.5 ± 0.9	-0.4 ± 0.8
BMI, kg/m ^{2a}	35.2 ± 6.8	37.2 ± 6.1
Weight, kg ^a	90.9 ± 20.2	99.7 ± 18.4

Abbreviations: ARSMA-II, Acculturation Rating Scale for Mexican Americans; BMI, body mass index.

^aMean ± standard deviation.

(56%) and English-language dominant (87%). The ARSMA-II scores were generally higher for daughters than for mothers.

Prevalent health conditions included type 2 diabetes (17% mothers and 9% daughters), high blood pressure (30% mothers and 9% daughters), and high cholesterol (30% mothers and 9% daughters). Approximately 70% of participants reported a family history of diabetes, high blood pressure, or high cholesterol.

Relational functioning

Intervention effects on relational functioning are presented in Table 3. Dyads in the SRT group improved significantly more than in the SB group in general relational functioning ($P < .01$). The SRT group also experienced greater increased positive alliance patterns ($P < .01$) and decreased conflict avoidance ($P = .01$). There were no group dif-

ferences in positive or negative affect and conflict resolution.

Anthropometric measurements

Intervention effects on weight changes are shown in Tables 4 and 5. There was a statistically significant group difference in BMI reduction (2.2 kg/m² SRT vs -1.2 kg/m² SB; $P = .02$) but not in weight loss (-5.6 kg ± 4.1 SRT vs -3.7 kg ± 3.6 SB; $P = .12$). Average percent weight loss in the SRT group was 5.6%, and in the SB group, it was 3.9% ($P = .13$). More participants in the SRT group (75%) than in the SB group (40%) tended to achieve at least 3% weight loss ($P = .05$). Weight loss of at least 5% of initial body weight was met by 50% of the SRT group and 35% of the SB group ($P = .52$). Generalized Estimating Equation models indicate that dyads experienced significant changes in BMI (Intercept = -1.2, $P < .01$) and weight

TABLE 3. Changes in Relational Functioning From Baseline to Postintervention

	SB ^a	SRT ^a	P
Composite score	−2.7 ± 3.7	0.8 ± 3.5	.006
Positive affect	−0.5 ± 0.9	0.0 ± 1.2	.180
Positive alliance patterns	−0.7 ± 0.8	0.1 ± 0.3	.001
Conflict resolution	−0.1 ± 1.2	0.5 ± 0.7	.099
Negative affect	0.7 ± 0.8	0.0 ± 1.5	.089
Conflict avoidance	0.7 ± 1.3	−0.2 ± 0.8	.017

Abbreviations: SB, standard behavioral weight loss program; SRT, standard behavioral weight loss program with relationship skills training.

^aMean ± standard deviation.

(Intercept = −3.7, $P < .01$) in both treatment groups, but greater reduction in BMI was observed in the SRT group than in the SB group ($P = .03$). In these analyses, the group difference approached significance for achieving at least 3% body weight ($P = .09$) but not for achieving at least 5% body weight ($P = .43$).

Relational functioning and weight loss

The change in relational functioning was marginally associated with weight loss. Specifically, improvement in positive alliance patterns increased the likelihood of losing at least 3% of initial body weight ($P = .06$). Other relational functioning constructs were not predictive of reaching 3% or 5% weight loss.

Intervention adherence

Participants submitted more than half of self-monitoring diaries (62% SRT and 59% SB, $P = .73$) and attended the majority of the 16 sessions (70% SRT and 77% SB, $P = .37$). The program was completed by 87% of dyads and there was no difference between groups. The higher number of diaries submitted or sessions attended was associated with losing at least 3% of body weight ($P < .05$).

DISCUSSION

A weight management intervention for Mexican American mothers and adult daughters, focused on relationship skills training, was successful at improving relational functioning. The intervention also produced modest weight loss in the majority of families. Moreover, improved relational functioning was associated with modest weight loss.

Compared with the standard behavioral group, dyads in the relationship skills training group improved in general relational functioning as well as positive alliance patterns and conflict avoidance. Hence, mothers and daughters who received relationship skills training demonstrated greater use of collaborative problem solving and lesser use of emotional disengagement while resolving a disagreement. The intervention targeted communication competencies such as disclosure, empathy, and support as they were previously linked to emotional closeness in Mexican American mothers and daughters with obesity.³⁰ Although research on the role of relational functioning in weight-related behaviors among Mexican American mothers and daughters in adulthood is scarce, studies have shown that adult attachment (ie, high in communication quality and feelings of trust and low in degree of alienation) between Latinx mothers

TABLE 4. Changes in Weight From Baseline to Postintervention

	SB	SRT	P
BMI, kg/m ^{2a}	−1.2 ± 1.3	−2.2 ± 1.2	.027
Weight change, kg ^a	−3.7 ± 3.6	−5.6 ± 4.1	.120
Weight change, % ^a	−3.9 ± 3.6	−5.6 ± 3.3	.130
≥3% weight loss, %	40	75	.055
≥5% weight loss, %	35	50	.522

Abbreviations: BMI, body mass index; SB, standard behavioral weight loss program; SRT, standard behavioral weight loss program with relationship skills training.

^aMean ± standard deviation.

TABLE 5. Changes in Weight From Baseline to Postintervention—Generalized Estimating Equation Fit

	Intercept		Group Difference	
	Estimate	P	Estimate (SRT) ^a	P
BMI, kg/m ²	-1.19	<.001	-0.96	.030
Weight change, kg	-3.69	<.001	-1.94	.170
Weight change, %	-3.91	<.001	-1.70	.160
≥3% weight loss	-0.41	.480	1.50	.091
≥5% weight loss	-0.62	.250	0.62	.430

Abbreviations: BMI, body mass index; SRT, standard behavioral weight loss program with relationship skills training.

^aThe SB group is set as reference group.

and daughters serves to mutually protect against other unhealthful behaviors.⁴⁴⁻⁴⁶ These findings further support the value of strengthening relational functioning when promoting health behaviors to intergenerational Latinx families.

Intervening on communication competencies in an obesity treatment program is especially valuable, given that maternal weight-related messages to daughters could influence relationship quality and weight loss efforts.⁴⁷ In fact, a greater reduction in BMI was observed in dyads receiving relationship skills training. In addition, more participants in the relationship skills training group than in the standard behavioral group tended to lose at least 3% of initial body weight. Across both groups, however, participants with higher positive alliance patterns were more likely to lose 3% or more of their initial body weight. These findings may reflect communal coping in promoting collaboration in weight management (ie, shared responsibilities for coping with behavioral challenges). Hence, a more collaborative and cohesive relationship has the potential to translate into greater weight loss among mothers and daughters.

Weight loss interventions for parents and adult children may be notably salient because of the opportunity to address conflictual relational dynamics that interfere with weight management. Interestingly, relational functioning increased in dyads who received relationship skills training but decreased in dyads in the standard behavioral group suggesting that communication competencies may have buffered negative interactions. Family-level weight management interventions for Mexican American women, in particular, have the potential to reduce problematic behaviors that undermine their eating and activity efforts by focusing on shared goals and collaborative problem solving.³⁶

Other weight loss studies indicate a need to help families deal with interpersonal stress that arises when adapting to changes in weight-related behaviors. In the SCALE trial, while participants who

reported that receiving help with eating goals from an adult child lost more weight,⁴⁸ those who reported greater family conflict experienced weight gain during the intervention.⁴⁹ Among bariatric surgery patients, higher impaired family functioning was associated with having children with overweight as well as receiving less support for changing eating habits and family exercise participation.⁵⁰ Impaired family functioning was also linked to losing significantly less weight.⁵¹

This study has limitations. The study was designed as a pilot test of a weight management intervention focused on relational functioning and therefore was not adequately statistically powered to detect weight loss group differences. To enroll in the study, both mother and daughter were required to agree to participate together, which means that families were relatively well functioning to begin with and most resided in the same home where Spanish was spoken. Hence, it is unknown whether this treatment approach would be appropriate for families who have high interpersonal conflict, less in-person contact, or greater intergenerational acculturation difference. Furthermore, the intervention was relatively short-term with no follow-up measure of the longer-term effects on weight loss maintenance. Nonetheless, the promising results from this small trial support the need to conduct a larger and longer study to test intervention efficacy.

On the other hand, this study has several strengths. A randomized controlled trial design was used, which increases confidence in these preliminary findings. An observational measurement of relational functioning was used, which provides a more objective assessment of family dynamics compared with self-report. The intervention was adapted for Mexican American families from evidence-based behavioral weight loss treatments.^{37,38} Moreover, the intervention was successful at engaging and retaining participants as well as achieving clinically meaningful weight loss.

About one-third of the participants in the standard behavioral group and half of the participants in the relationship skills training group lost at least 5% of initial body weight, which is associated with health benefits.³⁹

In sum, participating in relationship skills training resulted in improved relational functioning in Mexican American mothers and adult daughters with obesity. Promoting shared lifestyle goals along with positive communication and conflict resolution may benefit weight loss outcomes by helping families adapt to changes in eating and physical activity through cooperation and collaboration.

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