Dulce Mothers: an intervention to reduce diabetes and cardiovascular risk in Latinas after gestational diabetes

Athena Philis-Tsimikas, MD,¹ Addie L. Fortmann, PhD,¹ Sapna Dharkar-Surber, MPH,¹ Johanna A. Euyoque, MA,² Monica Ruiz, MA,¹ James Schultz, MD, MBA,³ Linda C. Gallo, PhD²

¹Scripps Whittier Diabetes Institute, Scripps Health, 10140 Campus Point Drive Suite 200, San Diego, CA 92121, USA

²Department of Psychology, San Diego State University, San Diego, CA, USA

³Neighborhood Healthcare, Escondido, CA, USA

Correspondence to: A Philis-Tsimikas
tsimikas.athena@scrippshealth.org

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Abstract

Latina women with prior gestational diabetes mellitus (GDM) are at elevated risk for type 2 diabetes mellitus and cardiovascular disease. Few primary prevention programs are designed for low socioeconomic status, Spanish-speaking populations. We examined the effectiveness of a Diabetes Prevention Program (DPP) translation in low-income Latinas with a history of GDM. Eighty-four Latinas, 18–45 years old with GDM in the past 3 years, underwent an 8-week peer-educator-led group intervention, with tailoring for Latino culture and recent motherhood. Lifestyle changes and diabetes and cardiovascular risk factors were assessed at study baseline, month 3 and month 6. Participants showed significant improvements in lipids, blood pressure, physical activity, dietary fat intake, and fatalistic and cultural diabetes beliefs ($p < 0.05$). Formative evaluation provides preliminary evidence of program acceptability. A peer-led, culturally appropriate DPP translation was effective in improving lifestyle changes and some indicators of cardiovascular and diabetes risk in Latinas with GDM.

Keywords

Diabetes, Gestational diabetes, Hispanic, Latino, Lifestyle intervention, Prevention

Women with a history of gestational diabetes mellitus (GDM) have a sevenfold higher likelihood of future type 2 diabetes mellitus (T2DM) [1] and a higher risk for developing cardiovascular disease (CVD) [2] relative to those with normoglycemic pregnancies. Latinas have the highest birthrate among all US racial/ethnic groups [3] and are at higher risk for GDM [4] and T2DM [5] when compared with non-Latino whites. One study showed that Latinas with a history of GDM had a 50–60 % risk of developing T2DM within 5 years of pregnancy [6].

Recent trials such as the Diabetes Prevention Program (DPP) demonstrate that intensive lifestyle interventions can delay or prevent T2DM onset [7, 8] and can modify CVD risk factors [9, 10] in high-risk individuals. In the DPP, lifestyle intervention was effective in reducing diabetes risk by 50 % over 3 years [7]. A handful of community-based DPP

Implications

Practice: A low cost, clinically effective and culturally appropriate Diabetes Prevention Program translation for Latinas with a recent history of gestational diabetes mellitus was feasible, acceptable, and reduced some aspects of diabetes and cardiovascular disease risk.

Policy: Programs such as *Dulce Mothers* may promote policy changes to extend Medicaid/Medicare health care coverage for women with a gestational diabetes mellitus diagnosis to 1-year postdelivery and to cover prevention/education interventions for high-risk populations.

Research: The postgestational diabetes mellitus population is an important target for prevention and research given exceptionally high risk for future type 2 diabetes mellitus and cardiovascular disease.

translations have shown promising results over relatively short time frames [11, 12]. However, limited efforts have been made to translate the DPP for women with a history of GDM [13, 14], especially those with low socioeconomic status (SES). This represents a critically missed opportunity [15] given that a GDM diagnosis identifies individuals at a very high risk for future T2DM [1, 16] and that lifestyle intervention is an effective diabetes prevention strategy for women with history of GDM [16]. Further, few community-based adaptations of the DPP have been tested in Latinos [17] who, on the whole, experience unique socioeconomic and cultural circumstances that may affect response to traditional intervention programs [18, 19].

The current single-group pilot study evaluated the feasibility, acceptability, and effectiveness of a group format, peer-educator-administered DPP-adapted lifestyle intervention to reduce T2DM and CVD risk among low SES Latinas with a history of GDM. Peer education models have been shown to be a cost and clinically effective approach to health

promotion and behavior change and may be particularly effective among Latinos [20, 21]. We hypothesized that the program would be feasible (as evidenced by enrollment rate) and acceptable (as evidenced by the attrition rate and qualitative feedback regarding the program). In addition, we hypothesized that the *Dulce Mothers* participants would demonstrate significant improvements over time in clinical and self-reported indicators of diabetes and CVD risk. The primary outcome was Hemoglobin A1c (A1C), which has been adopted by the American Diabetes Association as a method of assessing progression to new onset T2DM and prediabetes [22]. Changes in secondary clinical (lipids and blood pressure) and self-reported outcomes (physical activity, diet, overall perceived health, fatalistic beliefs, and diabetes-specific cultural beliefs) were examined as additional indicators of the effectiveness of the *Dulce Mothers* program.

METHODS

Participants and recruitment

Latinas, 18–45 years old with GDM in the past 3 years, were recruited through provider referrals, medical chart reviews, and clinic flyers from a northern San Diego County federally qualified community health center, which serves a large, well-established (primarily) Latino population (Neighborhood Healthcare, Escondido, CA). Women with T2DM, who were pregnant, and/or who had a serious health condition that precluded participation in the intervention were excluded. Of the 263 women prescreened, 192 (73.0 %) met the criteria, 90 declined participation due to childcare, transportation, or other barriers, and 102 (53 %) provided informed consent and completed the screening laboratory visit. Nine of the women who completed the laboratory screening were deemed ineligible (e.g., due to evidence of current T2DM or another health condition) and two became pregnant for an initial sample of 91; however, seven women discontinued before the intervention began, for a final analytic sample of $N=84$.

Procedures

A single-group pre-post design was utilized. The protocol included a physical assessment with fasting blood draw and administration of self-report questionnaires at baseline, month 3 (postintervention) and month 6 (follow-up). Between baseline and month 3, participants attended 2-h weekly education classes (*Dulce Mothers* intervention) for 8 weeks. This schedule was chosen, instead of 16 1-h sessions as in the DPP, to reduce attendance barriers. Monthly maintenance and support sessions were offered to the participants following the completion of the primary intervention period. All participants provided written informed consent, and all procedures were approved by the Scripps Health Institutional Review Board.

Intervention

Consistent with other DPP adaptations, the curriculum is grounded in a social cognitive theory [23–25] and focuses on developing health-related knowledge, behavioral skills such as goal setting and self-monitoring, building resources (e.g., self-efficacy and support) for enacting health protective behaviors, and learning via role modeling (i.e., from peer educators and other group members). All core DPP topics are included in the *Dulce Mothers* curriculum (i.e., healthful eating, dietary fats, physical activity, social and environmental cues, problem-solving, healthy eating out, coping with negative thoughts and emotions, motivation, and maintenance and setbacks) but are presented in an abbreviated manner to accommodate the shorter treatment duration (i.e., 8 vs 16 sessions) and discussion of the topics specific to Latina mothers with a history of GDM, including breastfeeding, childhood obesity, modeling healthy behaviors to family members, and nonfood rewards for children. Participants are encouraged to pursue weekly healthy lifestyle goals that involve their children and other family members (e.g., “Family will make a list of the physical activities they can do together.”). Also, the *Dulce Mothers* curriculum is tailored for the Latino culture and individuals with low SES, for example, through discussion of culturally driven beliefs about diabetes and income-related barriers to healthy lifestyles. The curriculum emphasizes the importance of interpersonal relationships and cultural values of family caretaking for Latinas to promote motivation for change. *Dulce Mothers* was delivered in Spanish (all participants’ preferred language) to groups of 5–12 in a community clinic setting with available childcare. A 15–20-min physical activity component was included in each class. Participants were encouraged to track food intake and physical activity between sessions; however, weight was not assessed or graphed at the start of each class as it was in the DPP. To enhance program sustainability, elements of community-based participatory research (CBPR) were utilized. Specifically, early in the development of the curriculum, a series of test classes were conducted in the community health center, and participants and providers were subsequently interviewed for recommendations regarding changes to enhance the curriculum. Revisions were performed based on the input from participants and community clinic providers in areas such as types of exercise and food preparation to discuss, and processes to enhance attendance, such as offering childcare and providing support for bus transportation. The final revised curriculum was used to conduct the pilot program described in the current study.

Dulce Mothers also builds on the successful *Project Dulce* model (7) by emphasizing bicultural/bilingual peer (i.e., “promotora”) delivered group education. Peer educators receive in-depth standardized training in the curriculum and group facilitation methods

and are supported by a multidisciplinary team. The peer educators are trained by a lead health educator with at least 5 years of experience in delivering peer-led interventions. The formal training program involves 40 h of didactics, including disease content, group management dynamics, motivational interviewing skills, Health Insurance Portability and Accountability Act (HIPAA), and other health workplace regulations. Competencies must be met before peer educators can move into the teaching environment. Newly trained peer educators coteach a class series with an experienced peer and then teach their own series under the observation of a mentor. After all the training phases are completed, peers are eligible to independently lead the intervention. A masters level program supervisor employed by the health system to oversee community programs and research has direct responsibility for ensuring that peer educators adhere to the curriculum and to health system policies. Peer educators are compensated for their time.

Measures

Clinical indicators—Blood was drawn by certified licensed phlebotomists following a 12-h fast. Hemoglobin A1C, total cholesterol, high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), and triglycerides were assayed at the clinic laboratory, which meets all the guidelines set forth by the College of American Pathologists [26, 27]. Blood pressure was evaluated according to the JNC 7 recommendations [28] using an automated oscillometric device. Three measures were taken, and the average of the last two was used to indicate systolic and diastolic blood pressure (SBP and DBP). Height and weight were measured using a standardized protocol while participants were wearing light indoor clothing without shoes or belts, using a standard stadiometer and medical grade digital scale. Body mass index (BMI) was represented as weight in kilograms/height in square meters.

Self-report measures—Dietary fat (% of total calories) was assessed with a screening instrument [29] that generates macronutrient scores that correlate closely with those from the validated full-length Block Food Frequency Questionnaire [30]. A Spanish translation was developed using forward and backward translation for a prior study of Mexican Americans [31]. Physical activity was assessed with the Rapid Assessment of Physical Activity (RAPA), which is available in both English and Spanish, and has demonstrated psychometric properties equivalent to other brief assessments of physical activity in prior research [32]. RAPA items evaluated the participants' engagement in light, moderate, and vigorous physical activity (7 items) and in flexibility and strength-building exercises (2 items) and were scored to create two dichotomous variables reflecting whether participants did or did not engage in the recommended 30+min/day of moderate

physical activities, 5+days/week (i.e., aerobic activity subscale), and in any flexibility and/or strength training (i.e., flexibility/strength subscale). Perceived health was assessed with a single question, whereby participants rated their health on a four-point scale ("poor" to "excellent"). Fatalism (i.e., the belief that events are determined by fate) was assessed via the Powe Fatalism Inventory [33], a measure that has demonstrated adequate validity and good internal consistency (Cronbach's $\alpha \geq 0.80$) in both English and Spanish [34]. For the current study, items were modified to address beliefs about diabetes onset (rather than cancer). A 10-item (true/false) measure, previously validated in English and Spanish in this population, assessed the participants' diabetes-specific cultural beliefs (e.g., urine is a cure for diabetes) [35]. Items were summed to reflect the number of (erroneous) beliefs endorsed out of 10.

Statistical analysis

Descriptive analyses were conducted in IBM SPSS Statistics 20.0 [36]. Multilevel modeling (MLM) analyses with full maximum likelihood estimation conducted in hierarchical linear modeling 6.02 [37] were used to examine changes in clinical and self-report (behavioral and psychosocial) indicators over time in the overall sample ($N=84$). MLM accommodates the nested structure of the data (i.e., repeated measures within individuals), and allows for missing data and differences in time between assessment visits. Using the full maximum likelihood procedure, model parameters are estimated using all available data from both complete and partial cases. This recommended approach for handling missing data has been shown to produce unbiased parameter estimates and standard errors in varied missing data situations [38]. To evaluate the effects of intervention dosage, the attendance main effect and the attendance-by-time interaction effect were modeled in additional MLM analyses. New incidence of T2DM (based on A1C [22]) was described for $N=70$ participants who completed the baseline and month 6 assessments. Fourteen women who completed the baseline only ($n=8$) or baseline and month 3 only ($n=6$) were excluded from this analysis. For all analyses, statistical significance was defined as $p<0.05$; $p<0.10$ findings are also reported for descriptive purposes given the incipient status of this research. Process and formative evaluations were conducted to examine the program feasibility and acceptability.

RESULTS

Sample demographic characteristics are presented in Table 1. Women were 22–43 years of age (mean=31.93; standard deviation (SD)=5.35) and nearly all were born in Mexico (88.1 %). Only 8.4 % of women reported household incomes $>\$24,000$ /year, and the majority had no health insurance

Table 1 | Sample characteristics (N=84)

	N (%)
<2 years since GDM delivery	59 (77.6)
Nativity	
Mexico	74 (88.1)
US	2 (2.4)
Other	8 (9.5)
Marital status	
Married/cohabitating	78 (92.9)
Separated	2 (2.4)
Never married	4 (4.8)
Educational attainment	
<High school	60 (71.4)
≥Some high school	24 (28.6)
Household income	
<\$12,000/year	24 (28.6)
\$12,000–\$24,000/year	53 (63.0)
>\$24,000/year	7 (8.4)
Employed outside of the home	13 (15.5)
No health insurance	68 (81.0)

(81.0 %). Women who were excluded from the current analyses ($n=7$ who discontinued participation before the intervention began) did not differ from those who were included ($N=84$) on any clinical or demographic variables (all $p>0.10$).

Clinical indicators

Multilevel models that were adjusted for age, education, income, and time since GDM delivery revealed significant improvements across the 6-month follow-up period in total cholesterol ($B=-2.02$), LDL-C ($B=-1.50$), triglycerides ($B=-0.02$), and DBP ($B=-0.32$; all $p<0.05$) (see Table 2). A small, but statistically significant increase over time, was observed for A1C ($B=0.01$, $p<0.05$). A time-by-attendance interaction effect was observed for weight ($p=0.07$), suggesting that participants who attended more sessions showed a trend toward greater weight loss.

Self-report measures

Statistically significant improvements were observed for aerobic exercise ($B=0.02$), flexibility/strength training ($B=0.04$), dietary fat ($B=-0.52$), fatalistic beliefs about the controllability of diabetes ($B=-0.04$), and endorsement of culturally driven diabetes beliefs ($B=-0.11$; all $p<0.05$) (see Table 2). A dosage effect was observed for physical flexibility/strength training ($p=0.07$).

T2DM incidence

At baseline, $n=28$ women were categorized as being at “low risk” for diabetes ($A1C<5.7\%$) and $n=42$ as being at “high risk” for diabetes ($A1C\ 5.7\text{--}6.4\%$). Three participants (one low risk at baseline; two high risk at baseline), or 4.3 %, evidenced new

T2DM ($A1C\geq 6.5\%$) across the 6-month follow-up period.

Process and formative evaluations

The enrollment rate was 53 %. Fifteen women (16.5 %) dropped out of the program after enrollment, 7 (7.5 %) of these before they attended any classes. Reasons for attrition included inability to reach/disconnected number, lack of transportation, or return to Mexico. Only two women expressed a desire to drop out due to lack of interest. On average, participants attended 5.93 classes ($SD=1.76$). Attendance at individual sessions ranged from 64 to 87 %; 89.5 % of participants completed at least four classes, and 17.1 % attended all eight classes. In four postintervention focus groups, participants reported that the program content was new and useful to them, culturally relevant, and applicable to diabetes prevention for themselves and their families. Participants appreciated the convenient community location and social support received from other participants and the promotoras. When asked for ways to enhance the intervention, women requested additional content on weight reduction and dietary change; many also reported that they found the dietary and weight reduction information to be among the most helpful topics discussed.

DISCUSSION

Previously, a low-cost, group format, peer-educator-led model was successful in improving diabetes clinical outcomes among low SES Latinos with poorly controlled diabetes [39]. Dulce Mothers adopted a similar approach to examine if a culturally appropriate DPP translation could reduce diabetes and CVD risk in Latinas with a history of GDM. Dulce Mothers participants evidenced statistically significant improvements in lifestyle behaviors, BP, and lipids. Women also evidenced changes in fatalistic and culturally driven beliefs concerning diabetes that could be important for maintaining longer term changes in behavior.

The magnitude of effects for changes in CVD risk factors were small, with approximately 7 and 14 mg/dL decreases in LDL-C and triglycerides, respectively, and <2 mmHg decrease in DBP. However, in aggregate, the observed changes may be clinically meaningful at the population level in the long-term prevention of CVD, for which women with GDM are at higher risk [2]. In support of this assertion, a number of primary, secondary, and tertiary prevention studies of medication or lifestyle interventions to improve lipid and blood pressure profiles and dietary habits have demonstrated success in reducing incident CVD [40–44]. Primary prevention trials have shown that heart disease risk is modestly reduced even with only small changes in lipids [40] and that the risk of future coronary events is decreased with improvements in lipid profiles even when lipid levels are normal at trial

Table 2 | Results of multilevel modeling analyses evaluating change over time in clinical and self-report (behavioral and psychosocial) outcomes

	Baseline (N=84) Mean (SD) (min–max)	Month 3 (N=74) Mean (SD) (min–max)	Month 6 (N=70) Mean (SD) (min–max)	P values ^a
Clinical outcomes				
A1C (%)	5.73 (0.31) (4.6–6.4)	5.67 (0.36) (4.2–6.5)	5.82 (0.36) (4.6–6.8)	0.02
Total cholesterol (mg/dl)	180.14 (39.68) (94–286)	172.54 (35.01) (97–249)	169.94 (34.09) (92–257)	<0.001
HDL-C (mg/dl)	48.39 (11.96) (25–80)	46.73 (11.44) (28–92)	47.49 (10.63) (29–78)	0.28
LDL-C (mg/dl) ^b	107.77 (30.78) (51–201)	101.74 (26.41) (47–158)	100.43 (26.94) (37–152)	0.001
Triglycerides (mg/dl) ^c	124.04 (71.76) (41–497)	120.04 (70.99) (23–381)	110.26 (53.66) (36–240)	0.005
SBP (mm Hg) ^d	107.48 (11.09) (87.00–148.67)	106.20 (11.23) (90.50–154.00)	109.15 (10.34) (90.67–153.50)	0.26
DBP (mm Hg) ^d	70.34 (8.24) (56.00–105.67)	68.04 (9.07) (51.00–108.00)	68.84 (8.72) (50.33–97.00)	0.03
BMI (weight in kilograms/ height in square meters)	29.09 (5.10) (19.02–48.69)	29.08 (5.33) (17.87–50.13)	29.28 (5.57) (17.77–51.77)	0.21
Weight (pounds)	152.52 (31.57) (95.80–242.30)	152.88 (32.11) (90.00–244.50)	153.67 (32.45) (89.47–247.20)	0.26
Self-report outcomes				
	Mean (SD)	Mean (SD)	Mean (SD)	P values ^a
Aerobic activity (N (%)) ^e	44 (52 %)	53 (71 %)	48 (69 %)	0.045
Flexibility/strength (N (%)) ^f	15 (18 %)	35 (47 %)	28 (40 %)	<0.001
Dietary fat (% total calories)	33.91 (5.92)	30.54 (5.27)	30.57 (4.58)	<0.001
Overall perceived health	3.06 (1.01)	3.18 (0.85)	3.17 (0.88)	0.15
Fatalistic beliefs	4.86 (3.76)	3.86 (3.19)	3.89 (2.96)	0.02
Diabetes-specific cultural beliefs ^g	5.38 (2.32)	3.82 (2.12)	3.94 (2.33)	0.01

HbA1c glycosylated hemoglobin, *BMI* body mass index, *DBP* diastolic blood pressure, *HDL-C* high-density lipoprotein cholesterol, *LDL-C* low-density lipoprotein cholesterol, *SBP* systolic blood pressure

^a P values are from multilevel modeling analyses examining changes across time

^b LDL at baseline, sample size reduced by N=1 (triglyceride result was too high for an accurate LDL-C estimation)

^c Data was naturally log transformed due to skew for analyses; however, untransformed data are presented above

^d BP at baseline, sample size reduced by N=1 participant who did not complete entire clinical assessment

^e Percentage who meet recommended criteria of 30+min/day of moderate physical activities, 5+days/week

^f Percentage of participants who report engaging in any flexibility- and/or strength-training

^g Mean number of (erroneous) beliefs endorsed out of 10

inception [42]. In patients with established heart disease receiving statins, each 1 % reduction in LDL-C was associated with a 1.7 % reduction in future coronary event risk [45]. A reduction in incident cardiovascular events among participants free from CVD at baseline was recently demonstrated with modifications in dietary habits that promoted reduction in saturated fats and higher consumption of monounsaturated fats [43]. A review of observational and randomized trials' data estimated that a 2-mm Hg reduction in DBP at the population level would result in a 17 % lower prevalence of hypertension, a 6 % lowered risk of CHD, and a 15 % reduction in risk of cerebrovascular events [46]. It is also notable that in the original DPP, improvements in blood pressure and lipids in the lifestyle modification arm were maintained over the 3-year intervention period, even

when weight loss was not maintained [47]. A recent report on the 10-year follow-up of the DPP showed that while groups maintained improvements in blood pressure and lipids, use of blood pressure and lipid-lowering medications was lower in the original lifestyle intervention group relative to other groups [10]. Ongoing research will determine if these changes translate into a long-term reduction in CVD.

Although the current trial is suggestive of CVD risk reduction, the direct translation to reduced T2DM risk is less clear. Contrary to predictions, the primary outcome of A1C evidenced a small but statistically significant *increase* (0.09 %) over 6 months. The total conversion rate to T2DM was 4.3 %. A prior observational study identified a cumulative incident diabetes rate of 50 % across 5 years in post-GDM Latinas [6]. Given the high-risk

low SES, post-GDM Latina sample, single-group design, and lack of comparable data, it is difficult to determine whether Dulce Mothers helped maintain glycemic regulation. It is also notable that weight—a primary target in the DPP—did not decrease significantly in response to the intervention, although overweight was not an inclusion criterion in the current study.

In support of the Dulce Mothers program's feasibility and acceptability, eligibility and enrollment rates were similar to those observed in other community-based DPP translations performed in underserved communities [17, 48, 49]. For example, in the "Racial and Ethnic Approaches to Community Health Detroit Partnership," involving Black and Latino participants, 50 % of participants screened were found to be eligible and 50 % of those eligible enrolled [48]. However, the dropout rate in the current study was higher than expected, especially the number of women who did not attend any classes. In part, we believe this may reflect a desire to obtain critical health screening information (i.e., via the no-cost baseline clinical assessment) in a high-risk group with poor health care access, whether or not they were actually interested in Dulce Mothers. Attendance compared well to similar trials [17, 48] and was substantially higher than a recent pilot study of a postpartum DPP translation in low-income women, in which fewer than half of the enrolled women attended at least three out of eight sessions [49]. Nonetheless, attendance was by no means optimal, and because intervention dosage was found to be a ($p < 0.10$) moderator of successful weight loss, further exploration of ways to address barriers to class attendance is needed. It is also probable that weekly classes are simply not feasible for some members of underserved communities, due to barriers related to work schedules, transportation, caregiving responsibilities, etc. Research exploring alternative methods for delivering diabetes prevention or other behavior change programs in these communities (e.g., internet, phone, and text; for recent reviews see [50–52]), or examining if providing participants with choices regarding intervention modality is effective [53], will be important. Methods that employ secure e-visit technology may also be a viable approach to delivering educational content and group discussions in the future.

In poststudy focus groups, women voiced enthusiasm for the Dulce Mothers program and expressed a willingness to continue in monthly support groups, thus indicating that the women who are able to attend enjoy and benefit from the classes. Women also stated a desire for additional content related to dietary change and weight reduction. This feedback, combined with the finding that women who attended more sessions tended to lose more weight, has motivated a revision of the Dulce Mothers curriculum to extend the program duration (to 12 sessions) and enhance the emphases on weight loss and ways to maintain lifestyle changes. In particular, the revised curriculum incorporates additional DPP-

derived content concerning specific recommendations for modifying dietary intake (consuming more whole grains, fruits and vegetables, and fewer unhealthy fats) and maintaining energy balance (e.g., enhanced information regarding portion size and control). Such content, which was originally abbreviated in, or omitted from the original 8-session version of Dulce Mothers, may ultimately strengthen the program's impact on weight loss and diabetes risk reduction.

Limitations—Limitations of this pilot study include the single-group design and short follow-up period, which impede our ability to evaluate the program's effectiveness in maintaining glycemic regulation over time. In addition, the 16.5 % dropout rate may bias conclusions. Because inclusion criteria did not include overweight/obesity status or glucose intolerance, changes in weight and A1C may have been limited relative to other programs (such as the DPP) that targeted higher risk individuals. As noted, we also recognize the need for a more rigorous emphasis on weight loss and associated behavioral and maintenance strategies. Medication use was not monitored, and thus, we could not control for this potential source of bias in analyses. Finally, self-reported assessments of diet and activity may overestimate changes in these outcomes.

Conclusions and implications—Dulce Mothers, a low-cost culturally appropriate DPP-adapted lifestyle intervention for Latinas with a recent history of GDM, showed preliminary evidence of effectiveness in reducing some aspects of CVD and T2DM risk. The study made initial progress toward developing a prevention intervention focused on low-income Spanish-speaking participants at high risk for diabetes. Several cardiometabolic risk factors improved, although HbA1c and weight did not. It is notable that numerous studies demonstrate primary prevention of CVD in high-risk individuals when lipids and BP are lowered, even in the absence of substantive changes in weight and glucose levels [41, 42]. The program may therefore ultimately have beneficial implications for prevention of CVD, which has been identified as an important emphasis for women with GDM history [54]. However, a randomized clinical trial is needed to evaluate the revised Dulce Mothers curriculum, particularly in relation to weight loss and glycemic regulation. The post-GDM population represents an important target for clinical prevention and intervention efforts given an exceptionally high risk for future T2DM. Programs such as Dulce Mothers and others that are tailored to high-risk populations are needed to provide the impetus for policy change that would extend Medicaid/Medicare health care coverage for women with a GDM diagnosis from the current 6-week to 1-year postdelivery to ensure that appropriate services can be obtained. Additionally, in California, Medicaid does not cover prevention education programs. Research

demonstrating positive results of self-management education to reduce risk of diabetes and CVD may support policy changes to cover such programs. As more uninsured populations transition to Medicaid with enrollment into the health care exchanges, research that supports the value of self-management education may help drive uniform coverage for all at risk populations.

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Trial Registration: The trial has been registered with Clinicaltrials.gov—Community Approach to Reduce the Risks of Diabetes After Gestational Diabetes Mellitus, NCT01613937, 06/05/2012

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