



# Benefits of Participating With a Partner in the National Diabetes Prevention Program

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The evidence-based National Diabetes Prevention Program (NDPP) can reduce type 2 diabetes risks, although strategies to improve outcomes are needed. Attendance and weight loss are suboptimal, especially among racial/ethnic minorities, and men are underrepresented (1). Promoting participation with household members may be important given risk concordance (2,3) and benefits of partner/family support in diabetes management interventions (2). Less is known about the role of close others in diabetes prevention. Here, we examined whether engaging in the NDPP with a household member improves outcomes.

The NDPP was implemented in a safety net health care system following standard guidelines (4). During 2013–2017, 2,946 adults with diabetes risks (e.g., overweight/obesity, prediabetes) enrolled in classes, available in person at no cost, following outreach from NDPP coaches. Eligible patients were identified from medical records and provider and self-referrals. Individuals in the same class with a shared address were considered dyads. NDPP delivery was otherwise identical whether participants enrolled alone or with a household

member. Outcomes included attending  $\geq 1$  session, percentage of sessions attended, duration, program completion ( $\geq 3$  sessions attended in months 1–6 and duration  $\geq 9$  months), percent weight loss, and achieving  $\geq 5\%$  weight loss. *t* tests and  $\chi^2$  analyses determined demographic differences by dyad status. Multivariable logistic and linear regression models determined outcome differences. Covariates included race/ethnicity, age, sex, and attending an introductory “pre-session” made available in 2016 as previously reported (5). Weight models further adjusted for attendance, a key driver of weight loss (1), to better ascertain dyad effects. Post hoc analyses examined interactions between dyad status and sex and race/ethnicity, respectively, for weight loss. Ineligible household members who attended sessions were excluded from analyses. The Colorado Multiple Institutional Review Board approved this program evaluation project.

Most enrollees were women (79.0%). Sixty-two percent were Hispanic, 19.3% were black, and 16.9% were white. Mean age was 50.0 years (SD 13.2). Relatively more men and Hispanic individuals enrolled in dyads than alone (30.0% vs.

20.5%,  $P = 0.035$ , and 72.2% vs. 61.7%,  $P = 0.047$ , respectively). In covariate-adjusted models, dyad members had threefold greater odds of attending  $\geq 1$  session (OR 3.11;  $P < 0.001$ ; 95% CI 1.90–5.08) than individuals enrolling alone (Table 1). Attendees in dyads remained longer than those participating alone, with twofold greater odds of program completion (OR 1.92;  $P = 0.022$ ; 95% CI 1.10–3.36).

There were no significant main effects of dyad status on weight loss, although achieving  $\geq 5\%$  weight loss was moderated by sex ( $P = 0.016$ ): men participating in dyads had fourfold odds of achieving  $\geq 5\%$  weight loss than unpartnered men (OR 4.39;  $P = 0.031$ ; 95% CI 1.14–16.80), while achieving  $\geq 5\%$  weight loss did not differ by dyad status for women ( $P = 0.200$ ). In weight analyses, all partnered men ( $n = 19$ ) participated with female peers, while partnered women ( $n = 47$ ) joined alongside either men or women. Race/ethnicity did not moderate effects of dyad status on weight loss (all  $P > 0.40$ ).

Diverse individuals with diabetes risks who joined the NDPP alongside household members showed greater engagement. Relatively more men and Latinos enrolled alongside household members, suggesting

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**Table 1—Attendance and weight loss by dyad status in the NDPP**

	Participants (N = 2,946)		P value
	Enrolled in dyad (n = 90)	Enrolled alone (n = 2,856)	
Any attendance	66 (73.3)	1,272 (44.5)	<b>&lt;0.001</b>
Percentage of sessions attended*	43.0 ± 3.8	36.3 ± 0.9	0.074
Days of attendance*	145.0 ± 15.1	110.0 ± 3.6	<b>0.025</b>
Program completion**†	22 (33.3)	250 (19.7)	<b>0.022</b>
Percent weight loss*	−1.4 ± 0.5	−1.8 ± 0.1	0.495
Achieved ≥5% weight loss*‡	13 (19.7)	191 (15.3)	0.462‡
Men	6 (31.6)	43 (16.0)	<b>0.031</b>
Women	7 (14.9)	148 (15.5)	0.200

Data are presented as mean ± SE based on modified population marginal means for continuous variables and frequency (percent) for categorical variables. Boldface type indicates statistical significance in adjusted models ( $P < 0.05$ ). Models include sex, age, race/ethnicity, and attendance to presessions prior to enrollment. Weight loss models are further adjusted for attendance. \*Data are presented for participants attending ≥1 session. †Program completion is defined as attending ≥3 sessions in months 1–6 and duration ≥9 months. ‡Achieving ≥5% weight loss was significantly modified by sex ( $P = 0.016$ ).

that promoting delivery to couples and family members may help reach these priority groups. Men may have preferred attending alongside household members to attending on their own, as may have Latinos with more traditional, family-oriented values. Dyad members may have encouraged each other to continue in the program, while those participating alone may have struggled more to engage. After accounting for attendance and other covariates, men had improved weight loss when participating in a dyad, whereas women and Latinos did not. Overall, men may have benefited from coparticipating female partners who could potentially facilitate household lifestyle changes. Yet even for dyads, attendance and weight outcomes were relatively low, compared with national averages of 172 days attended and 4.2% weight loss (1). This may reflect overall challenges of serving a safety net patient population and highlights that additional improvements remain needed.

Limitations include nonrandomization, focus on successfully recruited individuals, and relatively few dyads. Dyads

were determined by shared address, such that those living apart but participating together were not captured, and the nature of relationships was uncertain (e.g., romantic partners, parent-child). Relationship status for enrollees joining alone was also unknown.

To support attendance, NDPP coaches may explicitly encourage participants to invite close others. In classes with limited space, including ineligible support partners may be unsustainable given likely billing restrictions for these individuals. Further, coaches may need to inquire whether enrollees anticipate comfort participating with a close other. Relationship discord may necessitate exclusion. As lifestyle change likely happens alongside household members, more efforts to work within the context of these relationships may be important and support population-wide impact. Moreover, women may need additional strategies to achieve greater weight loss.

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