



Rethinking the National Diabetes Prevention Program for Low-Income Whites

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The National Diabetes Prevention Program (NDPP) is a widely disseminated lifestyle intervention to prevent diabetes through weight loss. Racial/ethnic disparities in NDPP effectiveness have been shown, with non-Hispanic whites (NHWs) losing more weight than Hispanics and non-Hispanic blacks (NHBs) (1). Income disparities in NDPP effectiveness are understudied, yet they are relevant for future Medicaid coverage of the program. We previously reported a lower-than-average weight loss for NHWs participating in the NDPP within a health care system for underserved populations (2). Here, we examined whether income status modifies the association between race/ethnicity and NDPP outcomes.

The NDPP was implemented in a safety-net health care system following Centers for Disease Control and Prevention (CDC) guidelines (3). Effectiveness was evaluated among 994 Hispanic, NHB, and NHW participants. The Colorado Multiple Institutional Review Board approved this program evaluation project. Race/ethnicity, income, age, sex, and BMI were collected from medical records. Income was classified as either above or below 133% of the federal poverty level following state Medicaid requirements. Outcomes included percentage of sessions attended and weight loss.

General linear models were constructed to determine differences in attendance and weight loss by race/ethnicity, income, and the interaction between race/ethnicity and income after adjusting for significant covariates. Weight-loss models were further adjusted for attendance and repeated for active participants (≥ 4 sessions attended in months 1–6 but without program completion) and completing participants (≥ 9 and ≥ 3 sessions attended in months 1–6 and 7–12, respectively). SPSS version 22 was used for analyses.

Over one-half of participants (59.0%) were Hispanic, 20.1% were NHB, and 20.9% were NHW. A majority of participants in each racial/ethnic group were low income (61.7% overall). Participants attended 35.3% of sessions (SD 31.6) on average. The interaction of race/ethnicity by income was nonsignificant for attendance ($P = 0.566$). Main effects of race/ethnicity ($P = 0.121$) or income ($P = 0.671$) on attendance were also nonsignificant after the interaction was removed from the model. However, the effect of race/ethnicity on weight loss was significantly modified by income ($P = 0.020$), with similar results for active and completing participants ($P = 0.047$ and $P = 0.044$, respectively) (Table 1). Among NHWs

finishing the program, those with low income achieved only one-quarter of the weight loss obtained by their higher-income counterparts (1.73% vs. 6.32%, $P = 0.019$). There were no weight-loss differences by income among Hispanics and NHBs. Additionally, the proportion of completing participants who achieved $\geq 5\%$ weight loss was 66.0% among NHWs vs. 54.9% among Hispanics and NHBs ($P = 0.234$).

In conclusion, low-income NHWs experience disparities in NDPP effectiveness despite regular attendance, raising concerns about pay-for-performance coverage models that largely reimburse by weight loss (4). In contrast, there were no income disparities for Hispanics and NHBs (3). In addition to cultural tailoring, low-income adaptations of the NDPP should be developed and tested, which may include skills-based training in food preparation on a budget and increasing access to resources like food banks and recreation centers. Results are not generalizable, and future research is needed to replicate findings, including in samples with greater income variability, and to understand perceived barriers to weight loss among low-income NHWs. In summary, the findings highlight the need to better serve priority populations in diabetes

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Table 1—Adjusted percent weight loss by race/ethnicity and income in the NDPP, N = 994

	All participants			Active but not completing participants†			Completing participants‡		
	n	Weight loss	P value	n	Weight loss	P value	n	Weight loss	P value
NHW									
Low income	106	1.21 (0.38)	0.007	40	1.46 (0.55)	0.029	24	1.73 (1.36)	0.019
Not low income	102	2.66 (0.38)	–	46	3.09 (0.51)	–	23	6.32 (1.39)	–
Hispanic and NHB									
Low income	507	1.52 (0.18)	0.945	193	1.70 (0.25)	0.841	94	4.54 (0.68)	0.997
Not low income	279	1.54 (0.24)	–	99	1.61 (0.35)	–	50	4.54 (0.94)	–

Data are presented as percent weight loss mean (SE) based on modified population marginal means, unless otherwise indicated. Models include attendance, income, race/ethnicity (NHW vs. Hispanic and NHB), and race/ethnicity*income. Neither age ($P = 0.973$), sex ($P = 0.675$), nor baseline BMI ($P = 0.810$) were significant predictors and were removed from final models. Boldface type indicates statistical significance in adjusted percent weight loss within racial/ethnic groups by income level ($P < 0.05$). †Active participants attended ≥ 4 sessions in months 1–6 but did not complete the program. ‡Completing participants attended ≥ 9 and ≥ 3 sessions in months 1–6 and 7–12, respectively, per CDC guidelines (3).

prevention efforts, including low-income NHWs.

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