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Satisfaction with primary care provider involvement is associated with greater weight loss: Results from the practice-based POWER trial

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Abstract

Objective—To evaluate the association between the patient-provider relationship, satisfaction with primary care provider's (PCP) involvement and weight loss in a practice-based weight loss trial.

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Disclosure

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Methods—POWER was a practice-based randomized controlled behavioral weight loss trial. Participants completed questionnaires about patient-provider relationship and satisfaction with their PCPs' involvement in the trial. PCPs completed a demographics and practice survey. The main outcome was the mean weight change from baseline to 24 months. We created mixed-effect models, accounting for the random effects of patients clustering with the PCP and the repeated outcome assessments within patient over time, and adjusted for randomization assignment, age, gender, race and clinical site.

Results—347 (of 415) were included. Mean age was 54.8 years, mean BMI was 36.3 kg/m². Participants reported high quality patient-provider relationships (mean summary score=29.1 [range 14–32]). Patient-provider relationship quality was not associated weight loss in either the intervention or control groups. Among intervention participants, higher ratings of the helpfulness of the PCPs' involvement was associated with greater weight loss (p=0.005).

Conclusion—Patient-provider relationship quality was not associated with weight loss in a practice-based weight loss trial but rating PCPs as helpful in the intervention was associated with weight loss.

Practice Implications—Partnering with PCPs to deliver weight loss programs may promote greater participant satisfaction and weight loss.

Keywords

obesity; primary care provider; patient-provider relationship

Introduction

Behavioral weight loss interventions in primary care settings have been shown to help patients lose weight and improve adverse health conditions associated with excess body weight such as hypertension and type 2 diabetes (1–8). The U.S. Preventive Services Task Force recommends that primary care providers (PCPs) “screen for obesity and offer or refer patients with a body mass index (BMI) of 30 kg/m² to intensive, multicomponent behavioral interventions” (9, 10). However, in practice, only about one-third of obese adults receive an obesity diagnosis, less than half are advised to lose weight, and approximately one-fifth receive counseling for weight reduction (11, 12). Despite barriers to translating behavioral weight loss programs into practice (13, 13–16), many PCPs are interested in developing sustainable, practical strategies to promote and support patients' weight loss efforts (16).

High quality patient-provider relationship, including trust, respect and effective communication, is associated with greater patient satisfaction and behavior change (17, 18). However, compared to people with normal weight, people with obesity report greater doctor shopping, reduced rapport-building dialog with their PCPs and lower levels of trust in their PCPs (19–21). Importantly, understanding the role of patient-provider relationship in primary care-based weight management is especially timely because of changes in reimbursement for obesity management in primary care settings. The Centers for Medicare and Medicaid Services (CMS) now reimburses PCPs for obesity management in primary care settings (22). The Practice-based Opportunities for Weight Reduction (POWER) Trial at Hopkins (2) was one of three NIH-funded trials to assess behavioral interventions for

weight loss in primary care settings (23). The POWER trial documented that 2 behavioral interventions significantly reduced weight in obese patients with CVD risk factors (2). This trial was designed for PCPs and practices to have supportive role, including participant referral, review of weight loss progress reports at regularly scheduled clinic visits and outreach for participants who were not engaged (16). In this context, the POWER trial provided an ideal opportunity to assess the quality of patient-provider relationships, provider characteristics and their association with weight loss.

Our main objectives were to examine whether the quality of the patient-provider relationship or patients' satisfaction with their PCPs involvement in the intervention were associated with weight loss. Our secondary objective was to examine the associations between PCP characteristics (e.g. age, BMI) and weight loss. We hypothesized that higher quality patient-provider relationships and greater patient satisfaction with their PCPs involvement in the trial would be associated with greater weight loss.

Methods

Overview of the POWER trial at Johns Hopkins

Details of the study design and main results of the trial have been published previously (2, 23). Hopkins POWER was a 3-arm randomized controlled trial evaluating the effectiveness of two 24-month practice-based behavioral weight loss interventions. For this analysis we combined the 2 intervention arms, which included the "Remote" arm with a weight-loss health coaches who provided behavioral via telephone and an "In-person" arm, which provided in-person coaching, off site from the primary care practices. Participants in the control arm met with a weight loss health coach once during the study at the time of randomization and, if desired, after the final data collection visit, and received brochures along with a list of recommended weight loss websites. Participants were obese adults, at least 21 years of age, with one or more cardiovascular risk factors (hypertension, hypercholesterolemia, and/or diabetes). They also had to be a patient in one of 6 participating primary care practices. For this analysis, we included 347 out of 415 POWER participants who completed the end of study patient-provider relationship questionnaire.

Forty-six PCPs enrolled participants from 6 primary care practices (about 60 patients per site, range 14 to 122, depending on practice size) in the Baltimore, MD area. PCPs publicized and recommended the POWER study to patients, reviewed weight progress reports during routine patient encounters for the two active intervention arms, and sent re-engagement letters to encourage study participation if intervention patients had not entered their weight on the study website nor talked with their coach for over two months.

Measure of patient-provider relationship quality

At the 24-month end-of-study outcome assessment visit, participants in both the intervention and control arms completed an 11-question instrument to assess patient-provider relationship (Appendix A). Six questions were adapted from the validated The Consumer Assessment of Healthcare Providers and Systems (CAHPS) Adult 12 month survey, 2.0, using the 4-point Likert response scale (1=never to 4=always), which asks patients how

often their providers explained things clearly, listened carefully, showed respect, provided easy to understand instructions, knew their medical history and spent enough time (24, 25). A shorter 4-question version of these question showed high internal consistency with a Cronbach's alpha of 0.86 and the items were strong predictors of other overall ratings of providers (24). We also included the CAHPS global rating of the provider (scale 0 to 10 with 0 being the worst and 10 being the best). Finally, we added a question to address patient-centeredness or the perception of "being known as a person," which was previously identified as an important domain in the patient-provider relationship and related to patient health (26). We modified the framing of these questions by asking respondents to reflect about their care over the past 2 years, instead of 12 months, as the trial was 2 years long, and also asked whether they had changed providers in the past 2 years. We created a summary patient-provider relationship score by adding up the total responses from the 8 questions (and reversing the 2 opposite scales). This summary score had a minimum of 14 and a maximum of 32.

Measure of satisfaction with the PCP role in the study

Intervention group participants completed an additional questionnaire that we developed to assess the helpfulness of each of the intervention components (e.g., website, coach), including 2 questions about the helpfulness of their PCP's involvement ("How helpful was your PCP's involvement in the POWER study" and "How helpful was reviewing your self-monitoring weight graph with your PCP?"). Responses used a 5-point Likert scale (0=did not use or not at all helpful, 4=extremely helpful).

PCP Baseline Survey

At the beginning of the trial, we conducted a survey of participating PCPs to assess their demographic information. Two PCPs were unavailable to complete the survey. We assessed PCPs' demographic (age, race/ethnicity, training, specialty, years in practice, weight/height), knowledge about weight management and frequency of weight management practices (e.g. BMI calculation, weight loss counseling and referral) (Appendix B). Because we did not identify a standard instrument for these questions, we adapted them from a previously developed needs assessment tool to create an obesity curriculum. PCPs selected ranges (0–9, 10–24, 25–49, 50–74, 75–100%) that best represented the percentage of obese adult patients in which they perform each of several weight management practices. Depending on the response distribution, aiming to have balanced numbers of PCPs in the final combined categories, we dichotomized the categories into the percentage of PCPs who perform each activity among either 50% or 75% of their obese patients (e.g. the percentage of PCPs who discuss weight management in 75% of obese patients).

Main outcome: Mean weight change at the end of the trial

The primary outcome for this analysis was mean difference in weight in lbs. from baseline to the end of the study, 24 months after randomization. Weights were measured on a high-quality, calibrated digital scale with the participant wearing light, indoor clothes without shoes. Trained, certified staff, masked to treatment assignment, obtained measurements.

Other covariates

Other covariates included participants' demographic characteristics and medical history, which were collected by in-person or online surveys at baseline.

Statistical analysis

To assess the association between the patient-provider relationship, patient satisfaction with their PCPs' involvement in the trial, provider characteristics and the outcome of mean weight change, we used likelihood-based, repeated-measure, mixed-effects models. We tested the summary patient-provider relationship score first and then developed models for each individual relationship quality term. These models accounted for the random effects of patients clustering within the PCP (since PCPs varied in the number of their patients who participated in the trial) and the repeated outcome assessments within patient over time, and adjusted for intervention vs. control randomization assignment, participant age, gender, race and clinical site. We presented results by combined intervention vs. control group because we believed that the association between PCP relationship quality and weight loss might differ by study arm (i.e. the intervention group received intense weight loss coaching, had weight reports reviewed by PCPs and lost more weight).

We also created models for adjusted mean weight change associated with each of the ratings of helpfulness of the PCP, and calculated an overall p-value using a likelihood ratio test.

We conducted 3 additional sensitivity analyses to assess the association between the primary outcome of weight loss at 24 months and the summary patient-provider relationship score. In the first sensitivity analysis we used multiple imputation to impute the summary score for the entire trial sample of N=415 and then re-evaluated the model results. In the second sensitivity analysis we used multiple imputation to impute the missing items for the satisfaction questionnaire for the entire sample in the combined intervention arms (N=277) and re-evaluated the model results. In the third sensitivity analysis, we excluded the 38 patients who reported changing PCPs in the past 2 years of the trial and evaluated the model results.

All analyses were conducted using the Statistical Analysis System (SAS) version 9.2 (SAS Institute, Carey, NC) or R 2.10.0.

Ethical review

The Institutional Review Board of The Johns Hopkins University School of Medicine approved this study.

Results

Participant characteristics

Table 1 shows the characteristics of the 347 out of the 415 participants in the POWER trial, who completed the end-of-study patient-provider questionnaires and were included in the sample. Participants attended an in-person end-of-study outcome assessment visit in order to

complete this questionnaire, reducing the response rate. 239 (68.9%) were in one of the 2 intervention arms of the study.

In the study sample, 62.5% were female, 39.5% were African American and 61.1% were college graduates. The most common co-morbid medical condition was hypertension (75.2%) followed by hyperlipidemia (70.2%) and diabetes (23.1%). BMI at study entry was 36.3 (SD 5.1). The majority of participants had commercial health insurance (87%). (Table 1).

At the end of the study, the intervention group participants had a mean weight loss of 11.8 lbs. (SD 19.2) and control group participants had mean weight loss of 2.8 lbs. (SD 14.9). During the 24-month study, intervention group participants had a mean of 24.7 (SD 7.5) coaching contacts and a mean of 2.2 (SD 1.6) clinic visits when the PCP reviewed the weight progress reports. 11% reported changing PCPs during the study. Compared to the 68 participants who did not respond to the end-of-study patient-provider questionnaire, respondents tended to be older, had higher education and achieved greater weight loss at 24 months (data not shown).

Provider and practice characteristics

Table 2 shows the characteristics of the 44 PCPs from 6 primary care practices with participants in trial. Mean age was 46.3, 56.8% were female, 15.9% were African American, 59.1% were Caucasian and 25% were from other racial groups. Four PCPs were nurse practitioners and 42 were physicians. Each PCP had a mean of 8 patients in the trial. The majority of PCPs reported at least intermediate knowledge of weight management and 47% reported calculating BMI or assessing motivation to lose weight in most (>75%) obese patients. 83% reported never or rarely prescribing weight loss medications.

Over the two-year trial, two PCPs switched to another practice in the trial and five PCPs left all the participating practices. Two new PCPs joined the trial. 11% of study participants reported changing PCPs during the trial, and among these 47% changed within their same practice. Compared to the 309 participants who did not change PCPs during the trial, the 38 participants who reported changing PCPs were more likely to be White (vs. African American) but there were no other differences by age, income, baseline weight or weight loss during the trial (data not shown). Those who changed PCPs reported lower patient-provider relationship quality scores (27.2 vs. 29.3 summary score, $p < 0.001$).

Association between patient-provider relationship and weight change

Overall, participants rated the quality of their relationships with PCPs very highly with mean summary scores of 29.1 and 29.2 in the Intervention and Control groups, respectively, out of a total possible score of 32 (Table 1). Table 3 shows the mean weight change for participants who reported high patient-provider quality, i.e. rating “always” for each quality item, compared those who rated less than “always,” within the Intervention and Control groups. Overall, participants in the intervention group lost more weight than in the control group, regardless of ratings on the patient-provider items. We did not detect any statistically significant differences in weight change by high vs. lower patient-provider relationship ratings, within each treatment group. The treatment group interaction term for the quality

item “explained things in a way that was easy to understand” was statistically significant ($p < 0.05$). Participants in the control arm who rated the PCP as “always” explaining “things in a way that was easy to understand” had greater weight loss (7.2 lbs.) than those who rated the PCP as “always” explaining things clearly and had received the intervention (Table 3).

In the intervention having a PCP who was a physician (vs. nurse practitioner) and in the control group, having a PCP who had previously been involved with research, were both associated with greater weight loss (−10.8 lbs, 95% CI: −20.4 to −1.1; −7.4 lbs, 95% CI: −14.7 to −0.18, respectively) (Table 3).

In sensitivity analyses using multiple imputation of the summary scores for the entire study sample ($n=415$) and in an analysis excluding the 38 participants who changed PCPs during the 2 year trial, the non-statistically significant relationship remained between mean weight change and patient-provider relationship summary score within the Intervention and Control groups.

Association between satisfaction with PCP’s involvement and weight change

Among the 277 participants in the 2 combined intervention arms, 239 (86%) completed an end of study satisfaction survey. We identified a statistically significant trend ($p=0.005$) between a greater weight loss and higher ratings (not helpful to extremely helpful) of the overall “helpfulness of the PCP involvement in the POWER study” in adjusted analyses. Higher ratings of “PCP helpfulness in reviewing the weight graph” were also associated with greater weight loss (p-value for the trend was $p=0.012$) (Figure 1). In the sensitivity analysis using multiple imputation of the missing items that addressed provider satisfaction the statistically significant relationship trend remained, but was weakened ($p=0.017$) (data not shown).

Discussion and Conclusion

In this study of 347 patients who participated in the POWER practice-based weight loss trial, high quality patient-provider relationship was not associated with greater weight loss. However, overall, study participants had very positive perceptions of the quality of their relationships with PCPs. The lack of variation in quality ratings likely limited our ability to discern an association with weight change outcomes. We noted that control group participants who rated the PCP highly for communication, as “always” explaining “things in a way that was easy to understand,” had greater weight loss than intervention group participants with high ratings on this item. This finding may indicate a PCP-related weight loss effect unique to those who did not receive any intervention. Finally, among intervention group participants, we identified a consistent and significant relationship between high ratings of the helpfulness of PCPs’ involvement in the trial and greater weight loss.

High quality patient-provider relationships, consisting of empathy, effective communication, collaborative decision making, trust and feeling cared for, have been associated with appointment and medication adherence (27, 28) and patient satisfaction (29). Obese patients are at particularly high risk of suffering from poor quality patient-provider relationships, with evidence of decreased respect (30) and weight bias from providers (30, 31). Prior

weight management programs. Fifth, we did not account for the accumulation of type 1 error through multiple comparisons across patient-provider relationship quality items. Notably, we only identified one statistically significant relationship in the communication item and weight loss in the control group, which is a finding that could be by chance. However, the large difference in weight (weight loss of 7.2 lbs in the Control group for those with higher vs. lower ratings) may have clinical significance. Sixth, the response rate for the end of study surveys was 83.6% and we detected differences between survey respondents and non-respondents, indicating the possibility of selection bias. To explore this concern, we conducted sensitivity analyses using multiple imputation methods to impute the missing items and confirmed a statistically significant, but slightly weakened, association between satisfaction with the provider role and weight loss.

This study also had several strengths, including high rates of participant follow-up for the outcome of weight (2) and survey completion at the end of the study, the diversity of the population, and the commitment of the practices and PCPs to the study.

Conclusion

In conclusion, our study of 347 patients enrolled in the POWER weight loss trial showed an association between high levels of participant satisfaction with the PCP role and greater weight loss. We did not detect an association between the quality of the patient-provider relationship and weight loss. In designing future practice-based models for weight loss programs, successful engagement of PCPs has potential to improve patients' satisfaction and weight loss success.

Our results show the high value of partnering with PCPs and their practices to develop innovative models to deliver weight loss programs, which may promote greater participant satisfaction, weight loss, and possibly retention, given the high level in this trial (2).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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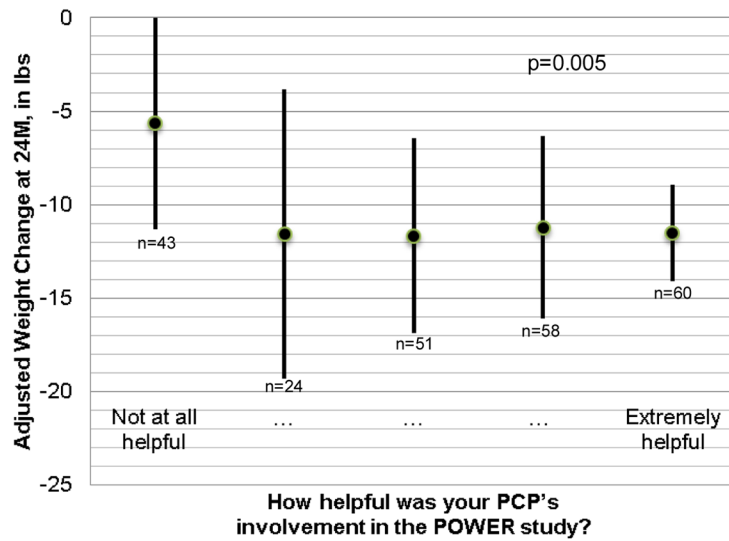
Highlights

- We surveyed participants in trial about their patient-provider relationship.
- Weight loss was not associated with patient-provider relationship **quality**.
- Satisfaction with the providers' involvement **in trial was** associated with greater weight loss.
- Partnering with PCPs may promote greater participant satisfaction and weight loss.

Practice Implications

Our results have important implications for developing weight management programs integrated primary care settings and for the CMS policy to reimburse PCPs for weight loss counseling (22). Our results highlight that patients in this trial highly value their providers, through their report of very high quality relationships, and that they value their PCPs involvement in their weight loss efforts. We showed that patients who most highly rated the involvement of the PCP as helpful in the weight loss intervention were also likely to have lost the most weight, indicating a possible direct role of the PCP, such as through referring the patient to the program, supervising the titration of medications or providing encouragement over the 2-year trial. These results may indicate patients' desire to have PCPs involved in their weight loss efforts, both directly and indirectly, through their supervision in multidisciplinary programs with health coaches, nutritionists or even in commercial weight loss programs. PCPs are ideally positioned to manage obesity as a long-term chronic illness, which requires sustained behavioral changes, and a combination of periodic intensive programs superimposed on longer term strategies aimed at small, incremental changes and weight maintenance. Several primary care team-based models might provide a framework for weight management programs that are based within or linked to primary care practices. The creation of a patient centered medical home (36) for obesity could include a multidisciplinary practice environment with health coaches, behavioral psychologists and nutritionists who work alongside PCPs. The POWER trial provided a unique example of health coaches who remotely delivered the intervention to patients who felt connected to PCPs and practices associated with the intervention (2). However, identifying methods to replicate this effective weight loss model in primary care requires creative reimbursement strategies, such as offering wellness benefits through employers, or within accountable care organizations that focus on chronic disease prevention (37).

A) Panel A. Overall helpfulness of the PCPs' involvement



B) Panel B. Helpfulness of having the PCP review weight graph

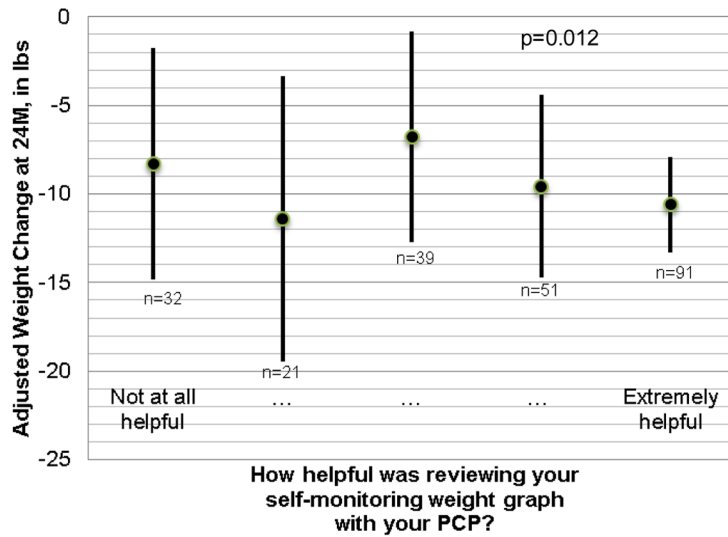


Figure 1. Adjusted¹ association between satisfaction with PCP involvement and weight change (lbs) among the 239 patients in intervention group of the Hopkins POWER trial

Footnote:

1. Analyses adjusted for the random effects of the PCP (since PCPs varied in the number of their patients who participated in the trial) and study visits, and participant age, gender, race and clinical site.
2. Overall p-values were calculated using Likelihood ratio testing from mixed effects effect models.

Table 1

Characteristics¹ of 347 study participants who completed the patient-provider relationship questionnaire in the Hopkins POWER study, by Intervention and Control groups

	Total N=347	Intervention ² N=239	Control N=108	p-value
Age, years	54.8 (10.0)	55.1 (10.1)	54.3 (9.8)	0.52
Gender				
Female	62.5%	62.3%	63.0%	0.91
Race				0.42
African-American	39.5%	39.8%	38.9%	
White	57.6%	58.2%	56.5%	
Other races	2.9%	2.1%	4.6%	
Education				0.47
High school graduate or less	8.9%	8.8%	9.3%	
Some college	30.0%	28.0%	34.3%	
College graduate	61.1%	63.2%	56.5%	
Health insurance ³				0.06
Commercial only	87.0%	87.0%	87.0%	
Medicare or Medicaid	12.1%	13.0%	10.2%	
Employment				0.37
Employed	74.4%	74.5%	74.1%	
Retired	16.4%	17.6%	13.9%	
Other	9.2%	8.0%	12.0%	
Household income				0.98
Less than \$50,000	21.9%	21.8%	22.2%	
\$50–99,000	37.5%	37.2%	38.0%	
100,000 or more	40.6%	41.0%	39.8%	
Medical conditions				
Diabetes	22.8%	22.6%	23.2%	0.91
Hypertension	75.2%	74.9%	75.9%	0.84
Hyperlipidemia	70.6%	69.9%	72.2%	0.66
Baseline measures				
Weight, lbs	227.5 (39.7)	227.0 (40.0)	228.4 (39.1)	0.76
BMI, kg/m	36.3 (5.1)	36.2 (5.1)	36.5 (5.2)	0.63
End of study measures				
Weight loss at 24 months (lbs) ⁴	9.0 (18.4)	11.8 (19.2)	2.8 (14.9)	<0.001
% weight loss at 24 months ⁴	3.9 (7.6)	5.1 (7.9)	1.1 (6.2)	<0.001
# Weight reports reviewed with PCP	2.98 (1.90)	2.2 (1.6)	n/a	n/a
# Coaching contacts	24.4 (7.3)	24.7 (7.5)	n/a	n/a
Patient-PCP relationship summary score ⁵	29.1 (3.6)	29.2 (3.7)	29.1 (3.4)	0.92

¹ Mean (Standard Deviation) or %

² 2 intervention groups (remote and in-person) were combined

³ 3 participants were uninsured. P value was across comparison between Commercial, Medicaid, Medicare and no insurance categories.

⁴ N=346 (instead of 347) because 1 participant was censored at 24 months because of having bariatric surgery.

⁵ Summary score calculated as sum of 8 questions. Possible range was 14–32 but calculated range was 28–32. In Table 2 the summary score was assessed as a continuous variable (n=336 for this analysis because we required all 8 questions to be completed)

Abbreviations: BMI=body mass index; PCP=primary care provider

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Table 2

Characteristics and weight management clinical practices of the 44 PCPs with patients in the Hopkins POWER trial

	PCPs N=44
PCP characteristics, Mean (SD) or %	
Mean Age (SD)	46.3 (9.4)
Gender	
Female	56.8%
Race	
African American	15.9%
Caucasian	59.1%
Other races	25.0%
Mean BMI (SD)	24.4 (3.1)
General internal medicine (vs. Family Practice) training	75.0%
Physician (vs Nurse Practitioner)	90.9%
Mean years in practice (SD)	16.9 (9.5)
Past participation in research studies	60.0%
Mean number of patients in Hopkins POWER trial (SD)	7.9 (6.6)
Weight management clinical practices ^{1,2}, %	
Has intermediate/advanced knowledge of weight management	91.7%
Calculate BMI in 75% or more of patients	47.2%
Discuss weight management in 75% or more of your obese patients	41.7%
Assess motivation to lose weight in 75% or more of obese patients	25.0%
Discuss dietary recommendations for weight loss in 50% or more of obese patients	80.6%
Discuss specific physical activity recommendations related to losing or maintaining weight in 50% or more of obese patients	66.7%
Provide behavioral counseling and help setting goals in >50% or more obese patients	40.0%
Refer 50% or more obese patients to a commercial weight loss program	28.6%
Prescribe weight loss medication never or rarely	83.3%

¹ 8 PCPs did not respond the questions about weight management practices (n=36)

² Categories were dichotomized into the percentage of PCPs who perform each activity among either 50% or 75% of their obese patients (e.g. the percentage of PCPs who discuss weight management in 75% of obese patients) to have balanced numbers of PCPs in the final combined categories.

Abbreviations: BMI=body mass index; PCP=primary care provider; SD=standard deviation

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Weight change (lbs) at 24 months in Intervention and Control groups, by quality of the patient-provider relationship and PCP characteristics

Table 3

Patient-PCP relationship (always vs. other) ¹	Intervention			Control		
	Weight change (lbs)	95% CI	p-value	Weight change (lbs)	95% CI	p-value
Summary Score ²	-0.1	-0.8,0.5	0.71	-0.4	-1.4,0.7	0.50
Explained things so easy to understand ³	3.7	-2.1,9.4	0.21	-7.2	-16.3,1.8	0.11
Knows my medical history	-3.0	-8.1,2.1	0.24	2.1	-5.3,9.5	0.58
Knows me as a person	-0.9	-5.5,3.7	0.71	1.4	-5.4,8.2	0.69
Shows me respect	0.7	-6.1,7.5	0.84	-2.9	-11.3,5.5	0.50
Spends enough time with me	-1.0	-6.1,4.1	0.69	2.5	-4.7,9.7	0.50
Involves me in decision making	-1.1	-6.3,4.1	0.68	1.7	-6.8,10.3	0.69
Cares about me as a person	-2.3	-7.7,3.1	0.40	-0.4	-7.7,7.0	0.92
I would recommend my PCP	-3.1	-9.8,3.6	0.37	-3.5	-12.2,5.3	0.43
PCP characteristics (present vs. not)						
PCP age 50 (vs. < age 50)	-1.6	-6.2,3.0	0.49	0.5	-6.3,7.4	0.88
Physician (vs. Nurse Practitioner) as PCP ⁴	-10.8	-20.4,-1.1	0.03	-8.6	-23.3,6.1	0.25
BMI (per unit increase)	-0.2	-1.0,1.5	0.68	0.3	-1.1,0.7	0.65
PCP had prior experience with research	-2.4	-7.6,2.8	0.37	-7.4	-14.7,-0.18	0.04

¹ Patient-PCP relationship scale was dichotomized as always vs. all other responses (never, sometimes and usually)

² The summary score was calculated as the sum of all 8 questions (and reversing the 2 opposite scales). The summary score had a minimum of 14 and a maximum of 32

³ The interaction term for weight loss (in lbs) between the Intervention and Control groups had a p value < 0.05

⁴ Reference group gender non-concordance between the PCP and patient – i.e. male PCP with female patient or female PCP with male patient.

⁵ Four nurse practitioners were included, compared to 40 physicians, in the study

Abbreviations: BMI=body mass index; PCP=primary care provider; SD=standard deviation