Objective: To examine the impact of a 1-year pragmatic obesity trial on primary care providers' (PCPs) perspectives of treatment.

Methods: PCPs from four intervention clinics (PCP-I) and five control clinics (PCP-C) completed pre- and postintervention surveys on weight-loss counseling, comfort discussing obesity treatments, and perceived effectiveness of interventions; questions were rated on 0 to 10 Likert scales. Only PCP-I received patient updates and education about obesity management.

Results: Eighty PCPs completed preintervention surveys (pre: 71% female, 71% physicians); 82 PCPs completed postintervention surveys (post: 66% female, 70% physicians). PCPs were most comfortable discussing exercise before and after the trial (pre PCP-C: 8.22 [1.44], mean [standard deviation (SD)]; post PCP-C: 8.37 [1.24], P = 0.8; pre/post PCP-I: 7.88 [1.51] vs. 7.80 [1.71], P = 0.3). PCPs were initially least comfortable discussing phentermine/topiramate extended release (ER) but developed significantly more comfort after the trial, to a greater degree among PCP-I (pre/post PCP-C: 2.86 [2.66] vs. 3.73 [2.72], P < 0.001; pre/post PCP-I: 4.00 [2.57] vs. 6.17 [2.27], P < 0.001). After the trial, both PCPs rated exercise significantly less effective for weight loss, with a greater decrease in effectiveness ratings among PCP-I (pre/post PCP-C: 7.73 [1.94] vs. 6.93 [2.35], P = 0.017; pre/post PCP-I: 6.27 [2.69] vs. 5.15 [2.31], P = 0.001). Both PCPs rated phentermine (pre/post PCP-C: 5.03 [2.05] vs. 5.50 [2.12], P = 0.002; pre/post PCP-I: 5.70 [1.64] vs. 6.83 [1.18], P = 0.001) and phentermine/topiramate ER (pre/post PCP-C: 3.91 [2.33] vs. 5.47 [2.54], P < 0.001; pre/post PCP-I: 5.58 [2.21] vs. 7.02 [1.47], P < 0.001) significantly more effective after the trial, though ratings were higher among PCP-I.

Conclusions: PCPs initially overvalued exercise and undervalued weight-loss medications. PCPs exposed to education and experience gave higher comfort and effectiveness ratings to weight-loss medications.
Patients with obesity reported receiving weight-loss counseling even when they had obesity-related comorbidities (7,8). Specifically, weight-loss counseling by primary care providers (PCPs) is not increasing and may be declining, and most PCPs provide no weight-loss counseling at all (9). Studies have identified several barriers to providing weight-loss counseling, including lack of time, lack of comfort in discussing treatments, and lack of reimbursement (10,11). Despite these challenges, stakeholders continue to encourage PCPs to take an active role in obesity management (12,13).

Although very little structured obesity treatment is delivered within primary care, effective tools to facilitate weight loss exist. Meta-analyses have demonstrated that meal replacements (14) and group behavioral programs (15) produce clinically significant weight loss in real-world settings. Antiobesity medications are also effective (16). However, prescription rates are low because of concerns over safety, modest weight loss, and questions surrounding the appropriateness of pharmacological treatment for obesity (17). Low prescribing rates may lead to PCPs' discomfort in discussing medications because of a lack of knowledge about and experience with the relative effectiveness of medications compared with more frequently suggested modalities, such as dietary change and exercise.

Because obesity disproportionately affects racial and socioeconomic minorities (18-20), and nonwhite survey respondents more likely want weight-related discussions with their providers (21), we assessed the obesity treatment-related perceptions of PCPs at urban clinics serving culturally diverse patients within an integrated safety net health care institution. As part of a 1-year pragmatic clinical trial using a “toolbox” approach to weight-loss management (22), we provided education to PCPs and offered intervention patients the ability to choose from several nonsurgical obesity treatment modalities at low out-of-pocket costs. We sought to determine the impact of our pragmatic trial on those patients' PCPs regarding their: 1) views on obesity and weight-loss counseling, 2) comfort discussing nonsurgical obesity treatments, and 3) perceived effectiveness of those tools. The findings extended our understanding of current views and barriers toward obesity management within primary care.

Methods

Study design

We conducted cross-sectional surveys of PCPs at nine primary care clinics affiliated with Denver Health and Hospital Authority (DH) before the initiation and after the completion of a pragmatic clinical trial, A Toolbox Approach to Obesity Treatment in Primary Care Trial (Toolbox) (22). Briefly, Toolbox was a 1-year, open-label obesity treatment trial within primary care clinics at DH, with a registry-based comparator group. Patients in the intervention cohort were provided with computer-based education at the first visit and offered tools for weight-loss management at monthly clinic visits. Patients at the four intervention clinics could choose a tool from a variety of the following evidence-based weight-loss treatments at a low out-of-pocket cost ($5-$10 copay/month): partial meal-replacement regimen (i.e., protein shakes and small portion-controlled meals meant to replace two of three self-selected meals), recreation center vouchers, obesity pharmacotherapy (phentermine or phentermine/topiramate extended release [ER]), commercial weight-loss program vouchers, and a clinic-based group behavioral weight-loss program.

PCPs from intervention clinics (PCP-I) were provided four half-hour education sessions during the trial, which were conducted by the principal investigator of the trial during regularly scheduled staff meetings. During these sessions, information was presented on the relative effectiveness of each of the weight-loss treatment strategies used in the trial, details of obesity treatment guidelines, the low rates of utilization of these tools reported in the literature, and strategies for discussing weight management with patients during busy office visits. The modest effectiveness of exercise as a weight-loss tool and the greater effectiveness of medications were highlighted. Details of the Toolbox design were presented in the initial session, and details of the study's progress and challenges were highlighted in later sessions. There was an opportunity for discussion and questions. Attendance was taken only at the first session when preintervention surveys were circulated. Throughout the study, PCP-I were given status updates whenever their patients enrolled in the intervention, were lost to follow-up, chose or switched tools (including which tool was selected), or achieved ≥5% weight loss. PCPs from the five control clinics (PCP-C) were not provided any education, nor did they gain any firsthand experience with patients receiving obesity treatments through the trial.

The primary outcome of the parent trial was percentage of patients participating in the intervention who achieved ≥5% weight loss after 1 year compared with a registry-based comparator group who did not receive the intervention.

Participants and procedures

Survey development. A short survey was developed to assess PCPs' perspectives regarding the significance of obesity as a problem for their patients, barriers to providing weight-loss advice, comfort discussing various weight-loss tools, and the perceived effectiveness of those same weight-loss interventions. The survey incorporated several items from a questionnaire previously developed and validated by investigators from The Johns Hopkins University School of Medicine and Harvard T.H. Chan School of Public Health (KG, SB, JC) (11,23). Surveys were reviewed and approved by the Colorado Multiple Institutional Review Board (see Supporting Information Surveys S1 and S2 for pre- and postintervention questionnaires).

Setting, participants, and survey implementation. DH is an integrated safety net health care system serving a low-socioeconomic, ethnically diverse, and medically underserved population in Colorado. As of 2014, DH served a population consisting of roughly two-thirds racial and/or ethnic minorities, including 43% Hispanic, 14% African American, and 6% either Asian American, Native American, or multiracial. The participants for this study were PCPs who worked at the nine primary care clinics affiliated with DH, geographically distributed around the greater Denver, Colorado, metropolitan area. Clinics varied markedly by patient volume, the demographics of the populations served, the total number of providers at each site, and the relative number of nurse practitioners (NPs), physician assistants (PA-C), family medicine physicians, and/or internal medicine physicians. Clinics were randomized to either intervention (four clinics, PCP-I) or control (five clinics at baseline and included in the analyses, PCP-C). Preintervention surveys were distributed, completed, and collected at standing monthly team meetings held at each clinic site during December 2013 and July 2014. During the postintervention period between September 2016 and December 2016, providers were notified that the trial concluded, and surveys were distributed again at standing team meetings. In an effort
to survey all PCPs at clinic sites, PCPs who were not in attendance at meetings during which surveys were distributed ($n=9$ pre; $n=12$ post) were contacted individually and given surveys to return to study staff.

All surveys were completed anonymously with the intention that PCPs would respond honestly to questions about weight-loss interventions without fear of their answers being judged by study staff. To accomplish this, demographic data were collected separately from all PCPs who completed surveys. As a result of this strategy, we were unable to correlate individual PCPs’ responses on the surveys to demographic variables or to compare changes in individual PCPs’ responses between preintervention and postintervention surveys.

### Outcome measure

On a 0 to 10 Likert scale (0 being least comfortable and 10 being most comfortable), PCPs rated their comfort discussing the following individual weight-loss tools with their patients: lifestyle modification programs, portion-controlled foods, exercise, phentermine, and phentermine/topiramate ER. This list of obesity interventions in the survey was similar to those offered in the Toolbox trial. PCPs also rated the effectiveness of these tools for weight loss on a 0 to 10 Likert scale (0 being least effective and 10 being most effective). Additionally, PCPs’ views on the importance of obesity as a problem and their comfort in general weight-loss counseling were measured on similar 0 to 10 Likert scales.

### Statistical analyses

The mean and standard deviation (SD) were calculated for each item rating on both the preintervention and postintervention surveys. We conducted an analysis of differences between pre- and postintervention survey questions using linear mixed models, with the Kenward-Roger approximation to account for the small number of clusters. The linear mixed models included a random intercept for clinic and an interaction between survey period (pre vs. post) and clinic type (control vs. intervention) to allow for different differences in the pre and post intervention within the PCP-I and PCP-C groups. The interclass correlation (ICC) was calculated, and a test for whether the model adjusting for clustering fit significantly better than the simpler model without adjustment was conducted based on a chi-squared test. The P values reported were not adjusted for multiple comparisons. Analyses were conducted in R using Imer and ANOVA functions in the Imer4 and ImerTest packages (R Core Team, R Foundation for Statistical Computing, Vienna, Austria).

### Results

#### Demographics

Demographics for individuals completing surveys are depicted in Table 1 (80 of 85 preintervention participants; 82 of 82 postintervention participants). The nonphysician providers ($n=23$ pre; $n=25$ post) who completed surveys included NPs ($n=5$ pre; $n=7$ post), PA-Cs ($n=15$ pre; $n=15$ post), doctors of pharmacy ($n=1$ pre; $n=1$ post), and registered nurses ($n=2$ pre; $n=1$ post). Of all PCPs practicing at the clinic sites during the study, 85% (85 of 100) completed preintervention and 68% (82 of 121) completed postintervention surveys. Eighty-nine percent (76 of 85) in the preintervention group and 85% (70 of 82) in the postintervention group attended the initial team meetings, at which the first surveys were distributed and education was delivered. The difference in the total number of PCPs between the pre- and postintervention periods is related to the addition of new providers in support of the new clinic (nonintervention) opening during the later portion of the trial and an increase in the number of part-time providers who may not have been available for the postintervention survey. Because surveys were anonymous and demographic data were collected separately from survey responses, we were unable to compare pre- and postintervention survey results by individual providers to determine whether differences in provider type (e.g., doctor of medicine or doctor of osteopathic medicine vs. NP, PA-C, doctor of pharmacy, registered nurse, etc.) or attendance of educational sessions led to differential views on obesity treatment.

#### Provider views on obesity and weight-loss counseling

Distributions of the ratings for all survey items are displayed in Table 2 and Supporting Information Figure S1. All providers identified obesity as a significant problem for their patients at both time points. Similarly, on average, providers from both clinic groups rated their comfort discussing weight with their patients between 7.5 and 8 out of 10 before and after the Toolbox study period. Providers were less optimistic that their advice had an impact or were comfortable in counseling patients on their own; these responses also did not change over time. There was no significant variability in survey responses between clinics.

#### Perceived comfort in discussing various weight-loss tools

Distributions of comfort ratings for specific weight-loss tools are depicted in Table 3 and Supporting Information Figure S2. PCPs from all clinics were most comfortable discussing exercise with no change in comfort ratings after the trial. Similarly, comfort ratings did not change significantly for all providers regarding lifestyle modification programs or portion-controlled foods, though these were both rated lower than exercise. All providers were significantly more comfortable discussing phentermine (pre/post PCP-C, mean [SD]: 5.35 [2.83] vs. 6.07 [2.74], $P = 0.013$; pre/post PCP-I: 6.30 [2.64] vs. 7.51 [1.76], $P = 0.013$) and phentermine/topiramate ER (pre/post PCP-C: 2.86 [2.66] vs. 3.73 [2.72], $P < 0.001$; pre/post PCP-I: 4.00 [2.57] vs. 6.17 [2.27], $P < 0.001$) after compared with before the invention, but the level and change in comfort were greater for intervention clinic providers. There was significant variability (ICC = 12.6; $P = 0.002$) in survey responses related to perceived comfort discussing phentermine/topiramate ER between clinics.

#### Perceived effectiveness of various weight-loss tools

Distributions of the effectiveness ratings for specific weight-loss tools are displayed in Table 4 and Supporting Information Figure S3. PCPs in both types of clinics gave higher effectiveness ratings to lifestyle intervention, portion control, and exercise than they did for medications in the preintervention survey. To a greater degree, PCP-I compared with PCP-C felt exercise was significantly less effective than they did pre-intervention (pre/post PCP-C, mean [SD]: 7.73 [1.94] vs. 6.93 [2.35], $P = 0.017$; pre/post PCP-I: 6.27 [2.69] vs. 5.15 [2.31], $P = 0.001$). PCP-I also had a greater significant increase in effectiveness ratings for phentermine after the trial compared with PCP-C (pre/post PCP-C: 5.03 [2.05] vs. 5.50 [2.12], $P = 0.002$; pre/post PCP-I: 5.70 [1.64] vs. 6.83 [1.18], $P = 0.001$). Additionally, both PCP-C and PCP-I gave significantly higher effectiveness ratings to phentermine/topiramate ER...
after the trial (pre/post PCP-C: 3.91 [2.33] vs. 5.47 [2.54], \(P < 0.001\); pre/post PCP-C: 5.58 [2.21] vs. 7.02 [1.47], \(P < 0.001\)). There was significant variability (ICC = 12.0; \(P = 0.01\)) in survey responses related to perceived effectiveness of phentermine between clinics.

**Discussion**

Though little is known about the content of patient-provider discussions about obesity and weight loss, prior studies have found that when weight-loss counseling does occur, discussions often fail to include guideline-recommended assessments and treatment plans (24). After our 1-year, open-label pragmatic trial in urban safety net primary care clinics, we found that PCPs, regardless of working at intervention or control clinics, overvalued exercise and undervalued obesity medications compared with what the literature shows about their respective effectiveness in weight loss. However, intervention PCPs who received provider education and patient updates were significantly more comfortable discussing and gave higher effectiveness ratings to obesity medications after the trial. Our study is one of the first to assess changes in provider attitudes in response to education and real-world obesity intervention within primary care.

Providers appeared to undervalue the effectiveness of weight-loss medications because phentermine and phentermine/topiramate ER were rated as the least effective weight-loss tools prior to the intervention. There was significant variability in survey responses across clinics regarding comfort in discussing phentermine/topiramate ER and the effectiveness ratings for phentermine alone. Perhaps PCP-I perspectives changed through the four education sessions on weight-loss tools and when they saw that their patients were losing weight with one or more of the Toolbox tools. Trials have shown that medications provide equivalent or greater weight loss compared with the other lifestyle interventions included in our survey. According to a recent review of United States Food and Drug Administration (FDA)-approved antiobesity medications, the average placebo-subtracted weight loss among trials was 4.8 kg with phentermine given over 12 to 28 months and 9.1 kg with phentermine/topiramate ER 15 mg/92 mg given over 1 year (25).

Because many individuals treated with weight-loss interventions initially lose weight and then regain it, the duration of treatment and follow-up are important in assessing the relative effectiveness of different treatments. In contrast to weight-loss medications, a meta-analysis showed mean weight losses of 2.6 kg to 4.4 kg with reduced-calorie

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**TABLE 1** Characteristics of the surveyed primary care providers

| Demographic            | Preintervention survey, \(n = 80^a\), \(n(\%)\) | Postintervention survey, \(n = 82\), \(n(\%)\) |
|------------------------|-----------------------------------------------|-----------------------------------------------|
| Gender                 | PCP-C\(^b\), 37 (46)                          | PCP-C, 41 (57)                                |
|                        | PCP-I\(^c\), 43 (54)                          | PCP-I, 41 (43)                                |
| Gender                 | Female                                        | Female                                        |
|                        | 25 (68)                                       | 29 (71)                                       |
|                        | 32 (74)                                       | 25 (61)                                       |
| Degree                 | Physician\(^d\)                               | Physician\(^d\)                              |
|                        | 24 (63)                                       | 24 (59)                                       |
|                        | 33 (77)                                       | 33 (80)                                       |
|                        | 13 (35)                                       | 17 (41)                                       |
|                        | 10 (23)                                       | 8 (20)                                        |

^a Demographics missing for five providers on preintervention survey.

^b PCP-C = control clinic PCPs.

^c PCP-I = intervention clinic PCPs.

^d Included doctor of medicine and doctor of osteopathic medicine.

^e Included NP, PA-C, doctor of pharmacy, and registered nurse.

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**TABLE 2** Provider views on obesity and weight-loss counseling

| Question\(^a\)                                      | ICC\(^b\) | \(P\)  | Pre-intervention, \(n = 37\), Mean (SD)\(^d\) | Post-intervention, \(n = 41\), Mean (SD)\(^d\) | \(P\)  | Pre-intervention, \(n = 48\), Mean (SD)\(^d\) | Post-intervention, \(n = 41\), Mean (SD)\(^d\) | \(P\)  |
|---------------------------------------------------|-----------|--------|-----------------------------------------------|-----------------------------------------------|--------|-----------------------------------------------|-----------------------------------------------|--------|
| How significant a problem do you think obesity is for your patients? | 3.01 0.4 | 8.54 (1.12) | 8.61 (1.22) | 0.9 | 8.54 (1.53) | 8.51 (1.12) | 0.9 |
| How comfortable are you overall in discussing weight with your patients? | 0.42 0.9 | 7.97 (1.38) | 7.73 (1.53) | 0.6 | 7.53 (1.84) | 8.00 (1.61) | 0.7 |
| Do you think your advice to a patient to take action to lose weight has an impact? | 2.45 0.5 | 5.78 (1.86) | 5.20 (1.90) | 0.7 | 5.54 (1.47) | 5.85 (1.89) | 0.3 |
| How comfortable are you in counseling patients on your own for weight loss? | 7.02 0.1 | 6.89 (1.84) | 6.98 (1.81) | 0.9 | 6.73 (1.87) | 6.78 (1.93) | 1.0 |

\(^a\) Questions rated from 0 (least significant, comfortable or impact) to 10 (most significant, comfortable or impact).

\(^b\) ICC = intraclass correlation.

\(^c\) \(P\) values testing whether fit of the model that adjusts for clustering is significantly better than the fit of model without clustering adjustment (based on chi square test).

\(^d\) SD = standard deviation.

\(^e\) \(P\) values calculated using linear mixed model with random intercept for clinic and corrected using Kenward-Rogers formula.
Table 3 Perceived comfort in discussing various weight-loss tools

| Question                                    | Control clinic PCPs (PCP-C), n = 78 | Intervention clinic PCPs (PCP-I), n = 89 |
|---------------------------------------------|-------------------------------------|-------------------------------------------|
|                                             | ICC  | P var  | Mean (SD) | ICC  | P var  | Mean (SD) | Mean (SD) | P     |
| Lifestyle modification programs/commercial weight-loss programs | 8.53 | 0.069  | 6.57 (2.03) | 7.10 (2.07) | 0.3  | 6.90 (1.85) | 7.10 (1.62) | 0.5  |
| Portion-controlled foods/meal replacements  | 1.73 | 0.6    | 5.32 (2.17) | 5.54 (2.24) | 0.3  | 5.58 (2.26) | 6.10 (1.79) | 0.3  |
| Exercise                                    | 0    | 1      | 8.22 (1.44) | 8.37 (1.24) | 0.8  | 7.88 (1.51) | 7.80 (1.71) | 0.3  |
| Phentermine                                 | 7.45 | 0.08   | 5.35 (2.83) | 6.07 (2.74) | 0.013 | 6.30 (2.64) | 7.51 (1.76) | 0.013 |
| Phentermine/topiramate ER                   | 12.6 | 0.002  | 2.86 (2.66) | 3.73 (2.72) | <0.001 | 4.00 (2.57) | 6.17 (2.27) | <0.001 |

Table 4 Perceived effectiveness of various weight-loss tools

| Question                                    | Control clinic PCPs (PCP-C), n = 78 | Intervention clinic PCPs (PCP-I), n = 89 |
|---------------------------------------------|-------------------------------------|-------------------------------------------|
|                                             | ICC  | P var  | Mean (SD) | ICC  | P var  | Mean (SD) | Mean (SD) | P     |
| Lifestyle modification programs/commercial weight-loss programs | 0    | 1      | 7.35 (2.10) | 6.73 (1.99) | 0.7  | 6.70 (1.99) | 6.98 (1.78) | 0.8  |
| Portion-controlled foods/meal replacements  | 1.83 | 0.6    | 6.03 (1.76) | 5.93 (2.49) | 0.4  | 6.46 (2.08) | 7.05 (1.82) | 0.1  |
| Exercise                                    | 0    | 1      | 7.73 (1.94) | 6.93 (2.35) | 0.017 | 6.27 (2.69) | 5.15 (2.31) | 0.001 |
| Phentermine                                 | 12   | 0.01   | 5.03 (2.05) | 5.50 (2.12) | 0.002 | 5.70 (1.64) | 6.83 (1.18) | 0.001 |
| Phentermine/topiramate ER                   | 9.39 | 0.07   | 3.91 (2.33) | 5.47 (2.54) | <0.001 | 5.58 (2.21) | 7.02 (1.47) | <0.001 |

Diets and 7.0 kg to 7.3 kg with partial meal replacements after 1 year compared with various control groups whose treatments included an isooenergetic control diet, an isooenergetic traditional low-fat diet, an isooenergetic diabetic diet, the American Diabetes Association Diet, a 1,500 kcal/day control diet, and a traditional lifestyle group (14). A 12-week Weight Watchers program produced 2.4-kg comparator-subtracted weight loss on average at 1 year (26). A systematic review of 45 studies (including 39 randomized controlled trials) of Weight Watchers and/or various commercial and proprietary weight-loss programs found 0.1% to 4.9% greater weight loss among programs at 1 year compared with control, education, and/or counseling; kilograms of weight losses were not reported (27). Large behavioral weight-loss trials have resulted in an average of 5.5-kg weight loss after 4 years and only about 2-kg weight loss after 10 years compared with usual care (e.g., Diabetes Prevention Program, Diabetes Prevention Program Outcomes Study) (28,29).

Our providers serve a socioeconomically disadvantaged population; therefore, high costs of weight-loss medications could explain why PCPs were less comfortable discussing these options. However, this should not have affected their perceptions of medication effectiveness.
One can speculate as to why PCPs undervalue medications for weight loss (i.e., physician stigma against treating obesity, lack of training in obesity management and medications, fear of prescribing antiobesity medications given historical concerns over safety, limited patient requests), but little is known about current provider views on antiobesity medications and how these views may relate to prescribing patterns. This is particularly relevant given the recent approval by the FDA of several new weight-loss medications and the apparent low level of uptake of these medications compared with new glucose-lowering medications (30).

In contrast to the level of efficacy PCPs attributed to the practice, physical activity without dietary restriction has been shown to have only a modest effect on body weight, typically providing a weight loss of less than 3% of initial body weight (31). Although exercise has numerous health benefits, a review of randomized controlled trials comparing weight loss in groups assigned to physical activity alone versus groups assigned to no intervention found that only 1 kg to 3 kg of weight was lost in most studies conducted over roughly 1 year (range 4-16 months) (32).

In contrast to the level of efficacy PCPs attributed to the practice, physical activity without dietary restriction has been shown to have only a modest effect on body weight, typically providing a weight loss of less than 3% of initial body weight (31). Although exercise has numerous health benefits, a review of randomized controlled trials comparing weight loss in groups assigned to physical activity alone versus groups assigned to no intervention found that only 1 kg to 3 kg of weight was lost in most studies conducted over roughly 1 year (range 4-16 months) (32). National physical activity guidelines do not include an evidence statement supporting the notion that physical activity results in significant weight loss, but they instead stress that the “health benefits of physical activity are generally independent of body weight” (33). PCPs seem to overvalue exercise as a weight-loss intervention. Our results are unlikely to be unique to our group of PCPs, as a previous study found that PCPs were more likely to counsel on physical activity than on diet or weight control (34). Another study found that increased physical activity and dietary advice were most commonly discussed during talks about weight loss (35). Small qualitative studies have found that clinicians often base advice on their own experiences with weight (36). Perhaps PCPs are more comfortable discussing exercise because they have more personal experience with this activity than dietary restriction or weight-loss medications.

Consistent with previous studies, providers gave a low rating to the impact of their counseling efforts on patients’ actions to lose weight (37). It has been suggested that inadequate weight-management counseling during primary care visits may, in part, be due to providers’ perceived futility based on how they view their patients’ ability to lose weight as well as environmental factors beyond their control (38). Such a pessimistic attitude from providers may not be warranted, however, as a recent meta-analysis found that most studies demonstrated a positive effect of provider weight-loss advice on patient attempts to change behaviors related to their weight (39). Studies have also shown that patients report that they want their physicians to address weight during visits, to give specific individualized weight-loss management plans, and to provide encouragement to foster self-motivation for weight loss (40).

This study has several limitations. We surveyed a small sample of PCPs from a single health care system, which primarily serves a socioeconomically disadvantaged population. Differences in baseline ratings between control and intervention clinics (e.g., the comfort and effectiveness ratings were significantly lower for phentermine/topiramate ER, the effectiveness rating was significantly higher for exercise among PCP-C compared with PCP-I; Supporting Information Tables S1 and S2) may represent uncontrolled variation between the control and intervention clinics, such as the characteristics, experiences, prior education, and training of the providers at the different clinics. Interestingly, comfort and effectiveness ratings for other types of weight-loss tools were not significantly different at baseline. There were also no significant differences in any of the questions related to provider views on obesity and weight-loss counseling at baseline (Supporting Information Table S3). Altogether, the above differences likely do not change the main conclusions of this study that exercise was overvalued, medications were undervalued, and intervention clinic providers’ views changed more from the pre- to postintervention survey.

The surveys were anonymous, and we were therefore unable to determine whether the same providers completed both surveys. We also noted that gender was different between the pre- and postintervention groups. Given that we were unable to link pre- and postintervention responses, we treated the two samples of providers as independent, which could underestimate the variance and thus inflate type I error. To protect anonymity, we could not match provider demographics with responses or directly assess changes to individual PCPs’ perceptions and habits regarding weight-loss counseling and treatment. Determining whether our PCPs’ degree or provider type led to differential outcomes in comfort or effectiveness ratings would have been interesting to investigate, as there was a greater proportion of nonphysician PCPs in control clinics compared with intervention clinics (Table 1). A recent Web-based survey to assess beliefs, practices, and knowledge regarding obesity management among PCPs (family physicians and internists), obstetrics and gynecology providers, and NPs revealed that rates of pharmacotherapy prescribing were lower and aversion to bariatric surgery was significantly higher among NPs and obstetrics and gynecology providers compared with the PCP physicians (41).

We were also unable to determine the degree of contact with the Toolbox intervention for each PCP at an intervention clinic. However, as mentioned previously, PCP-I were given four provider education sessions during the trial and received status updates on when their patients enrolled in the study, which tool they chose, when they switched or added tools, or achieved ≥5% weight loss. We included only phentermine and phentermine/topiramate ER in our survey because those were the only two medications offered in the Toolbox intervention. Although not measured, the amount of prior training PCPs had with the obesity interventions offered in the trial, particularly phentermine and phentermine/topiramate ER, was likely related to survey ratings. Providers may have had more familiarity with other FDA-approved weight-loss medications, such as orlistat, lorcaserin, naltrexone/bupropion, or liraglutide. Phentermine and phentermine/topiramate ER in particular may raise unique concerns among PCPs as phentermine was part of the “fen-phen” combination taken off the market in 1997, is FDA-approved for only 3-months duration, is a stimulant, and is a controlled substance. PCPs may be reluctant to prescribe topiramate because of the cognitive dysfunction that is seen at the higher doses used to treat migraines and seizures. However, as discussed before, weight-loss prescription practices are very low, and the most common medication prescribed was phentermine, both at DH and nationally (42,43). Additionally, unmeasured beliefs toward weight loss may confound the relationship between PCP comfort discussing weight loss and perceived efficacy of the weight-loss tools, thus biasing our results toward or away from the null. Lastly, given that Colorado has the lowest self-reported adult obesity rates and highest physical activity rates in the country (44,45), our findings may not be generalizable to other settings.

In conclusion, our results suggest that providers may be spending their limited counseling time discussing exercise at the expense of discussing more effective weight-loss interventions. The Toolbox trial
demonstrated that providing education to clinicians and providing clinical experience with a variety of evidence-based medical weight-loss tools within the primary care setting of a pragmatic clinical trial improved PCPs’ comfort in discussing and their perceived effectiveness of weight-loss medications.

Acknowledgments

We gratefully acknowledge the PCPs who participated in this study and the staff of the Medical Staff Office of Denver Health and Hospital Authority for assistance in providing information on the characteristics of the PCPs. We also thank Dr. J. Michael Oakes (University of Minnesota) for his expertise with the statistical analyses. The views presented in this manuscript are solely the responsibility of the author(s) and do not necessarily represent the views of the Patient-Centered Outcomes Research Institute (PCORI) or its Board of Governors or Methodology Committee.

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