HHS Public Access

Author manuscript

Obesity (Silver Spring). Author manuscript; available in PMC 2019 March 26.

Published in final edited form as:

Obesity (Silver Spring). 2018 October ; 26(10): 1532–1538. doi:10.1002/oby.22223.

Effects of Education and Experience on Primary Care Providers' Perspectives of Obesity Treatments during a Pragmatic Trial

Sean Iwamoto[1,2], **David Saxon**[1,3], **Adam Tsai**[4], **Erin Leister**[5,6], **Rebecca Speer**[7], **Hilde Heyn**[7], **Elizabeth Kealey**[8], **Elizabeth Juarez-Colunga**[5,6], **Kimberly Gudzune**[9,10], **Sara Bleich**[11], **Jeanne Clark**[9,10], and **Daniel Bessesen**[1,7]

[1]Division of Endocrinology, Metabolism and Diabetes, University of Colorado School of Medicine, Anschutz Medical Campus, Aurora, CO, USA

[2]Department of Endocrinology, Veterans Affairs Eastern Colorado Health Care System, Denver, CO, USA

[3]Denver/Seattle Center of Innovation for Veteran-Centered and Values Driven Care, Department of Endocrinology, Veterans Affairs Eastern Colorado Health Care System, Denver, CO, USA

[4]Department of Internal Medicine and Metabolic-Surgical Weight Management, Kaiser Permanente Colorado, Denver, CO, USA

[5]Department of Biostatistics and Informatics, Colorado School of Public Health, Aurora, CO, USA

[6]Adult and Child Consortium for Outcomes Research and Delivery Science (ACCORDS), University of Colorado School of Medicine, Aurora, CO, USA

[7]Department of Medicine, Section of Endocrinology, Denver Health Medical Center, Denver, CO, USA

[8]Anschutz Health and Wellness Center, University of Colorado at Denver, Anschutz Medical Campus, Aurora, CO, USA

[9]Department of Medicine, Division of General Internal Medicine, The Johns Hopkins University School of Medicine, Baltimore, MD, USA

[10]Welch Center for Prevention, Epidemiology, and Clinical Research, The Johns Hopkins University, Baltimore, MD, USA

[11]Department of Health Policy and Management, Harvard T.H. Chan School of Public Health, Boston, MA, USA

Abstract

CONTACT INFO: Sean Iwamoto, M.D. University of Colorado, School of Medicine, Division of Endocrinology, Metabolism and Diabetes, 12801 E 17th Ave, Mail Stop: 8106, Aurora, CO 80045, sean.iwamoto@ucdenver.edu.

CLINICAL TRIAL REGISTRATION: A Toolbox Approach to Obesity Treatment in Primary Care (Toolbox), NCT01922934, https://clinicaltrials.gov/ct2/show/NCT01922934

DISCLOSURE: SI, DS, AT, EL, RS, HH, EK, EJ, KG, SB, and JC declared no conflict of interest. DB serves on a Data Safety Monitoring Committee for Enteromedics, Inc.

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

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

Results—Eighty PCPs completed pre-intervention surveys [pre] (71% female, 71% physicians); 82 PCPs completed post-intervention surveys [post] (66% female, 70% physicians). PCPs were most comfortable discussing exercise (median 8, interquartile range 7–9), even after the trial (P=0.71). PCPs were least comfortable discussing phentermine/topiramate ER (4, 2–6), but developed more comfort (pre 3, 1.5–6; post 5, 3–7; P<0.001). Only PCP-I became more comfortable discussing phentermine (pre 7, 4–8; post 8, 7–9; P=0.026). After the trial, PCPs rated phentermine/topiramate ER more effective (pre 5, 3–6; post 7, 5–8; P<0.001); only PCP-I rated exercise less effective (pre 7, 4–8.5; post 5, 3–7; P=0.035) and phentermine more effective (pre 5, 5–7; post 7, 6–8; P<0.001).

Conclusions—PCPs initially overvalued exercise and undervalued medications. PCPs exposed to education and experience gave higher comfort and effectiveness ratings to weight loss medications.

Keywords

Obesity; Obesity Treatment; Primary Care; Exercise; Pharmacologic Therapy

INTRODUCTION

Obesity affects one-third of U.S. adults and increases the risk for common chronic medical conditions.(1–3) Forecasts predict the prevalence of obesity will increase by 33% and that of severe obesity by 130% between 2010 and 2030.(4) Additionally, obesity has increased medical costs, particularly in the Medicare and Medicaid populations.(5, 6) Despite recognition of obesity as a national epidemic, less than half of 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 a 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. Anti-obesity medications are also effective.(16) However, prescription rates are low due to 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 due to a lack of

knowledge about and experience with the relative effectiveness of medications compared to more frequently suggested modalities like dietary change and exercise.

Since obesity disproportionately effects racial and socioeconomic minorities(18–20) and non-white 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 one-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 non-surgical 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 non-surgical 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 one-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 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 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 principle 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 was 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 pre-intervention 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 one year as compared to 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 a number of 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 post-intervention 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/ethnic minorities including 43% Hispanic, 14% African American and 6% either Asian American, Native American, or multi-racial.

The participants for this study were PCPs who worked at the nine primary care clinics affiliated with DH, geographically distributed around the greater Denver 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 (NP)/physician assistants (PA-C)/family medicine physicians/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). Pre-intervention surveys were distributed, completed and collected at standing monthly team meetings held at each clinic site between December 2013 and July 2014. During the post-intervention period between September 2016 and December 2016, providers were notified that the trial concluded and surveys were again distributed at standing team meetings. In an effort to survey all PCPs at clinic sites, PCPs who were not in attendance at meetings where surveys were distributed (n=9 pre-intervention, n=12 post-intervention) 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 pre-intervention and post-intervention surveys.

Outcome Measure

On a 0–10 Likert scale (0 being “Least comfortable” and 10 being “Most comfortable”), PCPs rated their comfort discussing 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 0–10 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 0–10 Likert scales.

Statistical Analyses

The median and interquartile range (IQR) were calculated for each item rating on both the pre-intervention and post-intervention surveys. Since ratings were ordinal and non-normally distributed, medians were used instead of means for group comparison. The Wilcoxon rank sum test was used to compare within-group changes among the PCP-I and PCP-C groups. The p-values reported were not adjusted for multiple comparisons. Analyses were conducted using SAS version 9.4.

RESULTS

Demographics

The demographics for individuals completing surveys are depicted in Table 1 (80 of 85 pre-intervention participants, 82 of 82 post-intervention participants). The non-physician providers (n=23 pre-intervention, n=25 post-intervention) who completed surveys included NPs (n=5 pre-intervention, n=7 post-intervention), PA-Cs (n=15 pre-intervention, n=15 post-intervention), doctors of pharmacy (PharmD, n=1 pre-intervention, n=1 post-intervention), and registered nurses (RN, n=2 pre-intervention, n=1 post-intervention). Of all PCPs practicing at the clinic sites during the study, 85% (85 of 100) completed pre-intervention and 68% (82 of 121) completed post-intervention surveys. Eighty-nine percent (76 of 85) in the pre-intervention group and 85% (70 of 82) in the post-intervention 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 post-intervention periods is related to the addition of new providers in support of the new clinic (non-intervention) 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 post-intervention survey. Since surveys were anonymous and demographic data were collected separately from survey responses, we were unable to compare pre- to post-intervention survey results by individual providers to determine if differences in provider type (e.g., MD/DO vs. NP/PA-C/PharmD/RN, etc.) or attendance at 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. All providers identified obesity as a significant problem for their patients at both time points. Similarly, providers from both clinic groups rated their comfort discussing weight with their patients

an 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.

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 S1). 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. Unlike PCP-C, PCP-I were significantly more comfortable discussing phentermine (pre-PCP-I: median 7, IQR 4–8; post-PCP-I: 8, 7–9; P=0.026) and phentermine/topiramate ER (pre-PCP-I: 4, 2–6; post-PCP-I: 6, 5–8; P<0.001) after compared to before the intervention.

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 S2). PCPs in both types of clinics gave higher effectiveness ratings to lifestyle intervention, portion control, and exercise than they did for medications in the pre-intervention survey. Unlike PCP-C, post-intervention PCP-I felt exercise was significantly less effective than they did pre-intervention (pre-PCP-I: 7, 4–8.5; post-PCP-I: 5, 3–7; p=0.035) and reported phentermine to be more effective after the intervention (pre-PCP-I: 5, 5–7; post-PCP-I: 7, 6–8; p<0.001). Interestingly, both PCP-C and PCP-I gave higher effectiveness ratings to phentermine/topiramate ER after the trial (pre-PCP-C: 4, 2–5; post-PCP-C: 6, 4–7; p=0.005; pre-PCP-I: 6, 5–8; post-PCP-I: 7, 6–8; p=0.002).

DISCUSSION

While 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 one-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 to 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 since phentermine and phentermine/topiramate ER were rated as the least effective weight loss tools prior to the intervention. The post-intervention survey revealed that PCPs gave weight loss medications higher effectiveness ratings after the intervention. 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 to the other lifestyle interventions included in our survey. According to a recent review of U.S. Food and Drug Administration (FDA)-approved anti-obesity medications, the average placebo-subtracted weight loss among trials was 4.8 kg with phentermine given over 12–28 months and 9.1 kg with phentermine/topiramate ER 15mg/92mg given over one year.(25)

Since 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 2.6–4.4 kg with reduced-calorie diets and 7.0–7.3 kg with partial meal replacements after one year compared to various control groups whose treatments included an isoenergetic control diet, an isoenergetic traditional low-fat diet, an isoenergetic 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 (WW) program produced 2.4 kg comparator-subtracted weight loss on average at one year.(26) A systematic review of 45 studies (including 39 randomized controlled trials) of WW and/or various commercial and proprietary weight loss programs found 0.1–4.9% greater weight loss among programs at one year compared to control/education and/or counseling; kg weight losses were not reported.(27) Large behavioral weight loss trials have resulted in an average of 5.5 kg weight loss after four years and only about 2 kg weight loss after ten years compared to usual care (e.g., Diabetes Prevention Program and 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 but 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 anti-obesity medications given historical concerns over safety, limited patient requests), but little is known about current provider views about anti-obesity medications and how these views may relate to prescribing patterns. This is a 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 as compared to 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 1–3 kg of weight was lost in most studies conducted over roughly one 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 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 their counseling efforts have 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 have 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 a number of 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 and the effectiveness rating was significantly higher for exercise among PCP-C compared to PCP-I, see Supporting Information, Table 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 (see 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 post-intervention survey.

The surveys were anonymous, and therefore we were unable to determine whether the same providers completed both surveys and we noted that gender was different between the pre/post groups. Given that we were unable to link pre- and post-intervention 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 non-physician PCPs in control clinics compared to intervention clinics (Table 1). A recent web-based survey to assess beliefs, practices and knowledge regarding obesity management among PCPs (family physicians and internists), OB-GYN providers and NPs revealed that rates of

pharmacotherapy prescribing were lower and aversion to bariatric surgery was significantly higher among NPs and OB-GYN providers compared to 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, though, as mentioned previously, PCP-I were given four provider education sessions during the trial and received status updates when their patients enrolled in the study, which tool they chose, when they switched or added tools or achieved ≥5% weight loss. We only included 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, likely was 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 towards 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.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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 at Denver Health. 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.

FUNDING: Research reported in this work was primarily funded through a Patient-Centered Outcomes Research Institute (PCORI) Award (IH-12-11-4571). Support was also provided by P30 DK048520 and T32 DK007446 (DS and SI). DS was also supported in part by NIH/NCATS Colorado CTSA Grant Number UL1 TR001082 and the VA Advanced Fellowship Program in Health Services Research and Development.

References

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011–2012. JAMA. 2014; 311:806–814. [PubMed: 24570244]
2. Abraham TM, Pencina KM, Pencina MJ, Fox CS. Trends in diabetes incidence: the Framingham Heart Study. Diabetes Care. 2015; 38:482–487. [PubMed: 25552418]
3. Tanamas SK, Wong E, Backholer K, et al. Duration of obesity and incident hypertension in adults from the Framingham Heart Study. J Hypertens. 2015; 33:542–545. discussion 545. [PubMed: 25479024]
4. Finkelstein EA, Khavjou OA, Thompson H, et al. Obesity and severe obesity forecasts through 2030. Am J Prev Med. 2012; 42:563–570. [PubMed: 22608371]
5. Finkelstein EA, Trogdon JG, Cohen JW, Dietz W. Annual medical spending attributable to obesity: payer-and service-specific estimates. Health Aff (Millwood). 2009; 28:w822–831. [PubMed: 19635784]
6. Wang YC, Pamplin J, Long MW, Ward ZJ, Gortmaker SL, Andreyeva T. Severe Obesity In Adults Cost State Medicaid Programs Nearly $8 Billion In 2013. Health Aff (Millwood). 2015; 34:1923–1931. [PubMed: 26526251]
7. Sciamanna CN, Tate DF, Lang W, Wing RR. Who reports receiving advice to lose weight? Results from a multistate survey. Arch Intern Med. 2000; 160:2334–2339. [PubMed: 10927731]
8. Stafford RS, Farhat JH, Misra B, Schoenfeld DA. National patterns of physician activities related to obesity management. Arch Fam Med. 2000; 9:631–638. [PubMed: 10910311]
9. Kraschnewski JL, Sciamanna CN, Stuckey HL, et al. A silent response to the obesity epidemic: decline in US physician weight counseling. Med Care. 2013; 51:186–192. [PubMed: 23047128]
10. Khandalavala BN, Rojanala A, Geske JA, Koran-Scholl JB, Guck TP. Obesity bias in primary care providers. Fam Med. 2014; 46:532–535. [PubMed: 25058546]
11. Bleich SN, Bennett WL, Gudzune KA, Cooper LA. National survey of US primary care physicians' perspectives about causes of obesity and solutions to improve care. BMJ Open. 2012; 2
12. Centers for Medicare & Medicaid Services. Decision Memo for Intensive Behavioral Therapy for Obesity (CAG-00423N). 2017. [WWW document]. URL https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=253
13. Jensen MD, Ryan DH, Apovian CM, et al. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. Circulation. 2014; 129:S102–138. [PubMed: 24222017]
14. Heymsfield SB, van Mierlo CaJ, van der Knaap HCM, Heo M, Frier HI. Weight management using a meal replacement strategy: meta and pooling analysis from six studies. Int J Obes Relat Metab Disord. 2003; 27:537–549. [PubMed: 12704397]
15. Ali MK, Echouffo-Tcheugui J, Williamson DF. How effective were lifestyle interventions in real-world settings that were modeled on the Diabetes Prevention Program? Health Aff (Millwood). 2012; 31:67–75. [PubMed: 22232096]
16. Yanovski SZ, Yanovski JA. Long-term drug treatment for obesity: a systematic and clinical review. JAMA. 2014; 311:74–86. [PubMed: 24231879]
17. Bessesen DH, Van Gaal LF. Progress and challenges in anti-obesity pharmacotherapy. Lancet Diabetes Endocrinol. 2018; 6:237–248. [PubMed: 28919062]
18. Wang Y, Beydoun MA. The obesity epidemic in the United States–gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. Epidemiol Rev. 2007; 29:6–28. [PubMed: 17510091]
19. Robert SA, Reither EN. A multilevel analysis of race, community disadvantage, and body mass index among adults in the US. Soc Sci Med. 2004; 59:2421–2434. [PubMed: 15474198]
20. Zhang Q, Wang Y. Trends in the association between obesity and socioeconomic status in U.S. adults: 1971 to 2000. Obes Res. 2004; 12:1622–1632. [PubMed: 15536226]

21. Lewis KH, Gudzune KA, Fischer H, Yamamoto A, Young DR. Racial and ethnic minority patients report different weight-related care experiences than non-Hispanic Whites. Prev Med Rep. 2016; 4:296–302. [PubMed: 27486558]
22. ClinicalTrials.gov. A Toolbox Approach to Obesity Treatment in Primary Care - Full Text View - ClinicalTrials.gov. 2017. [WWW document]. URL https://clinicaltrials.gov/ct2/show/NCT01922934
23. Bleich SN, Gudzune KA, Bennett WL, Cooper LA. Do physician beliefs about causes of obesity translate into actionable issues on which physicians counsel their patients? Prev Med. 2013; 56:326–328. [PubMed: 23399006]
24. Antognoli EL, Smith KJ, Mason MJ, et al. Direct observation of weight counselling in primary care: alignment with clinical guidelines. Clin Obes. 2014; 4:69–76. [PubMed: 25826730]
25. Bessesen DH, Van Gaal LF. Progress and challenges in anti-obesity pharmacotherapy. Lancet Diabetes Endocrinol. 2017
26. Jolly K, Lewis A, Beach J, et al. Comparison of range of commercial or primary care led weight reduction programmes with minimal intervention control for weight loss in obesity: lighten Up randomised controlled trial. BMJ. 2011; 343:d6500. [PubMed: 22053315]
27. Gudzune KA, Doshi RS, Mehta AK, et al. Efficacy of commercial weight-loss programs: an updated systematic review. Ann Intern Med. 2015; 162:501–512. [PubMed: 25844997]
28. Knowler WC, Barrett-Connor E, Fowler SE, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med. 2002; 346:393–403. [PubMed: 11832527]
29. Diabetes Prevention Program Research Group. Knowler WC, Fowler SE, et al. 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. Lancet. 2009; 374:1677–1686. [PubMed: 19878986]
30. Thomas CE, Mauer EA, Shukla AP, Rathi S, Aronne LJ. Low adoption of weight loss medications: A comparison of prescribing patterns of antiobesity pharmacotherapies and SGLT2s. Obesity. 2016; 24:1955–1961. [PubMed: 27569120]
31. Jakicic JM. The effect of physical activity on body weight. Obesity. 2009; 17(Suppl 3):S34–38. [PubMed: 19927144]
32. Catenacci VA, Wyatt HR. The role of physical activity in producing and maintaining weight loss. Nat Clin Pract Endocrinol Metab. 2007; 3:518–529. [PubMed: 17581621]
33. Office of Disease Prevention and Health Promotion. Guidelines Index-2008 Physical Activity Guidelines - health.gov. 2017. [WWW document]. URL https://health.gov/paguidelines/guidelines/
34. Smith AW, Borowski LA, Liu B, et al. U.S. primary care physicians' diet-, physical activity-, and weight-related care of adult patients. Am J Prev Med. 2011; 41:33–42. [PubMed: 21665061]
35. Heintze C, Metz U, Hahn D, et al. Counseling overweight in primary care: an analysis of patient-physician encounters. Patient Educ Couns. 2010; 80:71–75. [PubMed: 19962848]
36. Schauer GL, Woodruff RC, Hotz J, Kegler MC. A qualitative inquiry about weight counseling practices in community health centers. Patient Educ Couns. 2014; 97:82–87. [PubMed: 24976627]
37. Salinas GD, Glauser TA, Williamson JC, Rao G, Abdolrasulnia M. Primary care physician attitudes and practice patterns in the management of obese adults: results from a national survey. Postgrad Med. 2011; 123:214–219. [PubMed: 21904104]
38. Ruelaz AR, Diefenbach P, Simon B, Lanto A, Arterburn D, Shekelle PG. Perceived barriers to weight management in primary care–perspectives of patients and providers. J Gen Intern Med. 2007; 22:518–522. [PubMed: 17372803]
39. Rose SA, Poynter PS, Anderson JW, Noar SM, Conigliaro J. Physician weight loss advice and patient weight loss behavior change: a literature review and meta-analysis of survey data. Int J Obes. 2013; 37:118–128.
40. Chugh M, Friedman AM, Clemow LP, Ferrante JM. Women weigh in: obese African American and White women's perspectives on physicians' roles in weight management. J Am Board Fam Med. 2013; 26:421–428. [PubMed: 23833157]
41. Petrin C, Kahan S, Turner M, Gallagher C, Dietz WH. Current practices of obesity pharmacotherapy, bariatric surgery referral and coding for counselling by healthcare professionals: Obesity therapy, referral and counselling. Obes Sci Pract. 2016; 2:266–271. [PubMed: 27708843]

42. Del Re AC, Frayne SM, Harris AHS. Antiobesity medication use across the veterans health administration: patient-level predictors of receipt. Obesity. 2014; 22:1968–1972. [PubMed: 24931332]

43. Block JP, Choudhry NK, Carpenter DP, et al. Time series analyses of the effect of FDA communications on use of prescription weight loss medications. Obesity. 2014; 22:943–949. [PubMed: 23929685]

44. Centers for Disease Control and Prevention. Prevalence of Self-Reported Obesity Among US Adults by State and Territory, BRFSS, 2014. 2017. [WWW document] URL https://www.cdc.gov/obesity/data/table-adults.html

45. Centers for Disease Control and Prevention. Physical Activity. CDC; 2017. State Indicator Report on Physical Activity, 2014. [WWW document]. URL https://www.cdc.gov/physicalactivity/resources/state-action-guides.html

STUDY IMPORTANCE QUESTIONS

1. What is already known about the subject?

- Weight loss counseling is inconsistent in primary care.
- More information is needed regarding primary care providers' (PCPs) views on obesity treatment options.
- PCPs tend to overvalue exercise and undervalue weight loss medications in treating obesity.

2. What does your study add?

- A one-year pragmatic obesity trial that provided education about and experience with weight loss treatments demonstrated a shift in PCPs' perspectives, specifically regarding exercise and weight loss medications.
- PCPs felt more comfortable discussing and gave higher effectiveness ratings to weight loss medications after this pragmatic trial, bringing their views more in line with published effectiveness data.

Table 1

Characteristics of the Surveyed Primary Care Providers

Demographic		Pre-intervention survey n=80* n (%)		Post-intervention survey n=82 n (%)	
		PCP-C† 37 (46)	PCP-I‡ 43 (54)	PCP-C 41 (57)	PCP-I 41 (43)
Gender	Female	25 (68)	32 (74)	29 (71)	25 (61)
Degree	Physician§	24 (63)	33 (77)	24 (59)	33 (80)
	Non-physician//	13 (35)	10 (23)	17 (41)	8 (20)

*Demographics missing for five providers on the pre-intervention survey

†PCP-C = Control Clinic PCPs

‡PCP-I = Intervention Clinic PCPs

§Included MD or DO

//Included NP, PA-C, Pharm D, RN

Table 2

Provider Views on Obesity and Weight Loss Counseling

Question*	Control Clinic PCPs (PCP-C) n=78			Intervention Clinic PCPs (PCP-I) n=89		
	Pre-intervention n=37	Post-intervention n=41		Pre-intervention n=48	Post-intervention n=41	
	Median (IQR)†	Median (IQR)	p-value‡	Median (IQR)	Median (IQR)	p-value
How significant a problem do you think obesity is for your patients?	8 (8–10)	9 (8–9)	0.52	9 (8–10)	8 (8–9)	0.45
How comfortable are you overall in discussing weight with your patients?	8 (7–9)	8 (7–9)	0.53	8 (6–9)	8 (7–9)	0.25
Do you think your advice to a patient to take action to lose weight has an impact?	6 (5–7)	5 (4–6)	0.11	5.5 (5–7)	6 (5–7)	0.28
How comfortable are you in counseling patients on your own for weight loss?	7 (6–8)	7 (6–8)	0.85	7 (6–8)	7 (5–8)	0.93

*Questions rated from 0 (Least significant, comfortable, or impact) to 10 (Most significant, comfortable, or impact)

†IQR = Interquartile range (Q1–Q3)

‡p-values calculated using Wilcoxon rank sum test

Table 3

Perceived Comfort in Discussing Various Weight Loss Tools *

	Control Clinic PCPs (PCP-C) n=78			Intervention Clinic PCPs (PCP-I) n=89		
	Pre-intervention n=37	Post-intervention n=41		Pre-intervention n=48	Post-intervention n=41	
	Median (IQR)†	Median (IQR)	p-value‡	Median (IQR)	Median (IQR)	p-value
Lifestyle modification programs/commercial weight loss programs	7 (5–8)	7 (6–9)	0.19	7 (6–8)	7 (6–8)	0.56
Portion-controlled foods/meal replacements	6 (3–7)	6 (4–7)	0.54	5 (4–7)	6 (5–7)	0.29
Exercise	8 (7–9)	8 (7–10)	0.84	8 (7–9)	8 (7–9)	0.90
Phentermine	5 (3–7)	6 (4–8)	0.23	**7// (4–8)**	**8 (7–9)**	**0.026**
Phentermine/topiramate ER	2 (1–5)	4§ (1–5.5)	0.17	**4// (2–6)**	**6 (5–8)**	**<0.001**

* Questions rated from 0 (Least comfortable) to 10 (Most comfortable)

† IQR = Interquartile range (Q1–Q3)

‡ p-values calculated using Wilcoxon rank sum test

§ n=40 for post-intervention PCP-C and phentermine/topiramate ER

// n=47 for pre-intervention PCP-I and phentermine and phentermine/topiramate ER

Table 4

Perceived Effectiveness of Various Weight Loss Tools *

	Control Clinic PCPs (PCP-C) n=78			Intervention Clinic PCPs (PCP-I) n=89		
	Pre-intervention n=37	Post-intervention n=41		Pre-intervention n=48	Post-intervention n=41	
	Median (IQR)†	Median (IQR)	p-value‡	Median (IQR)	Median (IQR)	p-value
Lifestyle modification programs/commercial weight loss programs	8 (6–9)	7 (5–8)	0.13	7# (5–8)	7 (6–8)	0.75
Portion-controlled foods/meal replacements	6 (5–7)	6 (4–8)	0.99	7 (5–8)	7 (6–8)	0.21
Exercise	8 (6–9)	7 (5–9)	0.12	**7 (4–8.5)**	**5 (3–7)**	**0.035**
Phentermine	5 (4–7)	6// (4–7)	0.27	**5** ** **(5–7)**	**7 (6–8)**	**<0.001**
Phentermine/topiramate ER	**4§ (2–5)**	**6¶ (4–7)**	**0.005**	**6†† (5–8)**	**7 (6–8)**	**0.002**

* Questions rated from 0 (Least effective) to 10 (Most effective)

† IQR = Interquartile range (Q1-Q3)

‡ p-values calculated using Wilcoxon rank sum test

§ n=32 for pre-intervention PCP-C and phentermine/topiramate ER

// n=40 for post-intervention PCP-C and phentermine

¶ n=38 for post-intervention PCP-C and phentermine/topiramate ER

n=47 for pre-intervention PCP-I and lifestyle

** n=46 for pre-intervention PCP-I and phentermine

†† n=45 for pre-intervention PCP-I and phentermine/topiramate ER