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Anti-Obesity Medication Use in 2.2 Million Adults Across 8 Large Healthcare Organizations: 2009-2015

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Abstract

Objective: To examine the prescribing patterns and use of anti-obesity medications in a large cohort of patients using data from electronic health records (EHRs).

Methods: We obtained pharmacy- and patient-level electronic health record data on 2,248,407 adults eligible for weight loss medications from 8 geographically-dispersed healthcare organizations.

Results: A total of 29,964 patients (1.3% of total cohort) filled at least one weight loss medication prescription. This cohort was 82.3% female, with median age 44.9 years, and median BMI 37.2 kg/m². Phentermine accounted for 76.6% of all prescriptions with 51.7% of prescriptions being filled for 120 days and 33.8% filled for 360 days. There was an increase of 32.9% in medication days for all medications in 2015 compared to 2009. Higher prescription rates were observed in women, black patients, and patients in higher BMI classes. Of 3,919 providers who wrote at least one filled prescription, 23.8% (n=863) were “frequent prescribers” who wrote 89.6% of all filled prescriptions.

Conclusions: Weight loss medications are rarely prescribed to eligible patients. Phentermine accounted for >75% of all medication days with a majority of patients filling it for more than 4

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months. Less than one-quarter of prescribing providers accounted for approximately 90% of all prescriptions.

Keywords

Obesity treatment; weight loss medications; practice variation; phentermine

Introduction

Obesity is widely acknowledged to be a serious public health problem with 37.7% of Americans having a body mass index (BMI) ≥ 30 kg/m², and 7.7% having a BMI ≥ 40 kg/m² (1). Currently available treatment options for weight reduction include lifestyle changes, weight loss medications and bariatric surgery. These three options vary both in the degree of weight loss that they typically produce and their relative cost, risk, and side effects. Weight loss medications are the intermediate choice between lifestyle programs and bariatric surgery in both effectiveness and cost. The National Institutes of Health (NIH) guidelines on the treatment of obesity published in 2000 advocated consideration of weight loss medications for the treatment of adults with a BMI ≥ 30 kg/m² or those with a BMI ≥ 27 kg/m² with a weight-related co-morbidity such as diabetes, hypertension, hyperlipidemia or degenerative arthritis (2). This approach to management was affirmed in the updated 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity, and the more recent Endocrine Society Clinical Practice Guideline on the pharmacological management of obesity published in 2015 (3, 4). This strategy was also advocated in recent guidelines from both the American Diabetes Association (5) and the American Association of Clinical Endocrinologists guideline on the management of type 2 diabetes mellitus (6). Research also suggests that satisfaction with weight loss may be higher when weight loss medications are used compared to lifestyle approaches including dietary modification, exercise, and use of weight loss supplements and that use of a weight loss medication is associated with greater weight loss (7, 8).

Despite support from guidelines and interest from patients, weight loss medications are seldom prescribed and practice in the prescribing habits of health care providers vary greatly. While little data on this topic currently exist, a study of patients cared for by the Veteran's Health Administration (VHA) showed that only 0.2% of over 2 million patients who met NIH criteria for consideration of a weight loss medication filled a prescription for one of these agents (9). In this study, facility level prescribing rates for those who met VHA criteria for eligibility varied from 0–21% across the 140 facilities studied. Another study examining pharmacy claims of over 80 million patients between 2008–11 showed that despite increasing concern over obesity as a clinical problem, the use of weight loss medications over this time period actually declined from 45 to 24/100,000 enrollees (10). These low rates of weight loss medication use may reflect provider or patient concerns over the safety and efficacy of these agents, providers' lack of experience with this class of medications, FDA restrictions on long-term use of older agents, lack of insurance coverage or bias that weight is primarily a behavioral problem that should be treated with behavioral measures (11, 12).

PCORnet, the National Patient-Centered Clinical Research Network, an initiative of the Patient-Centered Outcomes Research Institute (PCORI) provides a unique opportunity to examine the prescribing of weight loss medications in a large cohort of patients cared for in representative practices around the country. The Kaiser Permanente & Strategic Partners Patient Outcomes Research To Advance Learning or (PORTAL) network is one of the Clinical Data Research Networks (CDRNs) within PCORnet. PORTAL uses a common data model to aggregate data on a racially, ethnically, and geographically diverse group of about 17 million people who receive their care at one of 11 affiliated research centers including several Kaiser Permanente regions, HealthPartners, and Denver Health. Clinical data, provider characteristics as well as pharmacy records were available from 2009–2015 on patients at these sites with a BMI >25 kg/m² (n=4.9 million) during this period.

The purpose of this study was to identify patterns of prescribing and usage rates of FDA-approved weight loss medications in a large cohort of eligible patients cared for in a variety of typical care environments between 2009 and 2015 using data from electronic health records (EHRs). The time period examined constitutes a period when sibutramine was removed from the market (October 2010) and the FDA granted approval of several new weight loss medications (lorcaserin in May 2012, phentermine/topiramate ER in July 2012, naltrexone/bupropion SR in September 2014, and liraglutide 3.0 mg in December 2014). We also sought to characterize the providers who prescribed these medications as well as look for variations in local prescribing practices. The overall goal was to examine if data from EHRs support the notion that prescribing rates for weight loss medications to eligible patients are low and to lay a foundation for future studies using data from EHRs that could help understand the factors leading to low rates of prescribing of weight loss medications.

Methods

Study Setting:

The PORTAL network is a clinical data research network funded by the PCORI to promote collaboration across several large health systems with EHRs (13). For purposes of this analysis, eight health networks were studied: Kaiser Permanente regions (Northwest [Oregon], Southern California, Mid-Atlantic States [Virginia, Maryland, and District of Columbia], Hawaii, Colorado and Washington State), Health Partners, and Denver Health and Hospital Association. From these sites, a cohort of adults with overweight and obesity was constructed to enable large-scale observational research across diverse clinical care settings. The development and description of this cohort has been previously described (14). For all sites except Denver Health, plan members >18 years were identified with at least 12 months of continuous membership between January 1, 2009 and December 31, 2015 who were not pregnant and had a weight and height recorded in the EHR during the inclusion period. Denver Health is a safety-net institution and does not enroll members. Therefore, eligibility criteria at this site included all adults who had any medical encounter with a weight and height during the specified period.

The Kaiser Permanente Southern California Institutional Review Board approved the research. The IRBs at the other sites reviewed the protocol and subsequently ceded review.

Study Population:

Patients within the PORTAL Obesity Cohort who were identified as having received weight loss medication between 2009 and 2015 or were eligible for weight loss medication during this period were selected for this study. Eligibility criteria included patients with a BMI ≥ 30 kg/m², or patients with a BMI between 27–29.9 kg/m² who also had a diagnosis of at least one weight-related comorbidity (based on ICD-9 codes) recorded in the EHR. Providers who prescribed weight loss medications that were filled by an Obesity Cohort patient between 2009 and 2015 were also identified. Care providers were classified as being primary care providers if they practiced general internal medicine, family medicine or obstetrics and gynecology. All other care providers were classified as specialists. We were not able to determine if a provider had special training in obesity treatment (e.g. American Board of Obesity Medicine certification) or a focused practice in treating patients with obesity. Medication days were determined by the number of prescriptions written for a specific patient times the number of pills in the prescription during the period specified.

Data Analysis:

BMI was calculated as weight (kg) divided by height squared (m²). If more than one weight, height or BMI was available during the study period, the first recorded BMI and the most recent value was used.

SAS Enterprise Guide 5.2 (Cary, NC) was used to calculate descriptive statistics. Demographic and sociodemographic characteristics of those receiving at least one fill for weight loss medication were compared to the overall cohort of eligible individuals.

Results

From 2009–15, a cohort of 3,306,484 patients who were overweight or obese were identified of which 2,248,407 (68.4%) were considered to be eligible for weight loss medications based on the NIH criteria. Of the medication eligible cohort, 76.7% were obese (BMI ≥ 30 kg/m²) and 23.3% had a BMI 27–29.9 kg/m² with at least one weight-related comorbidity. Medication eligible patients varied across sites from the smallest site having 35,941 patients to the largest site with 1,335,734 patients.

Table 1 describes demographic characteristics of patients eligible for a weight loss medication and those who received at least one prescription for one of these drugs. Overall, 1.3% (n=29,964) of eligible patients received a weight loss medication prescription. Rates of prescription receipt varied across the eight sites ranging from 0.6% in the region with the lowest rate of prescribing to 2.9% of eligible patients in the region with the highest rate of prescribing. Of those receiving a prescription, 83.7% were female, 45.1% were non-Hispanic white, and the mean BMI was 37.2 kg/m². Those receiving a prescription for a weight loss medication had a median age of 44.9 yrs. Overall, 0.5% of medication eligible men and 2.1% of medication eligible women received a prescription for a weight loss medication. Rates of prescribing rose as BMI increased and varied depending on race/ethnicity (Figure 1).

Figure 2 depicts the time course of the total number of weight loss medication treatment days between 2009 and 2015. During this period, there was a 32.9% increase in the total number of weight loss medication treatment days due to an increase in the number of unique patients who received a prescription for one of these medications. Overall, phentermine was the most commonly used medication accounting for 76.6% of medication treatment days in 25,637 unique patients. This was followed by diethylpropion, orlistat, sibutramine, and lorcaserin at 12.2%, 4.3%, 2.8%, and 2.0% of medication treatment days respectively. In 2015, 2.7% (248 of 9,184) of all patients prescribed a weight loss medication received one of the newer agents (lorcaserin, phentermine/topiramate ER, naltrexone/bupropion SR, and liraglutide 3.0mg). There was marked regional variation in the rate of prescribing individual medications. Table 2 depicts the fraction of total medication days accounted for by each weight loss medication in the overall sample as well as the rates of use in regions that had the highest and lowest rates of prescribing for each individual agent. There was a 12% increase in phentermine use from 2011 to 2012, which corresponded to the period when sibutramine was removed from the market. Sibutramine accounted for 6.0% of treatment days in 2010, the year it was withdrawn from the market in October. The mean number of medication days per patient during the period of observation was 178.3 $\pm$ 236.3 days. In total, 51.7% filled for $\leq$ 120 days and 33.8% filled for $\leq$ 360 days.

Figure 3 depicts the duration of therapy for those individuals who received a prescription for phentermine. Even though phentermine is only FDA approved for short term use, more than 50% of patients receiving a prescription for this medication used it for more than 4 months and a third used it for more than a year.

Of those providers who ever prescribed a weight loss medication (n=3,902), 72.9% (n=2,856) prescribed to five or fewer patients. These prescribers were responsible for only 3.25% of all prescriptions written. On the other hand, 8.3% of prescribers (n=376) prescribed to 21 or more patients. These frequently prescribing care providers wrote 89.6% of all filled prescriptions. Overall 84.4% (n=3,308) of providers were identified as primary care providers and 92.5% (n=863) of clinicians who prescribed to 21 or more patients were primary care providers.

Discussion

In this study, data from EHRs from 8 geographically dispersed clinical sites providing care to >11 million patients demonstrate that only 1.3% of patients who were eligible for treatment with weight loss medications received a prescription for one of these medicines over a six-year period. As has been seen in other studies, phentermine was the most commonly prescribed weight loss medication. It was prescribed for greater than the FDA approved 3-month period in more than 50% of those receiving a prescription. Patients with higher BMIs were more likely to receive a prescription for a weight loss medication and women received 85% of all prescriptions. Finally, a small number of clinicians wrote a vast majority of these prescriptions and there was marked practice variation between sites in the rate of prescribing and the frequency of prescribing specific agents.

Low weight loss medication utilization rates have previously been noted with several studies showing uptake in 2–3% of eligible individuals (15, 16). A study that used data from a national electronic prescription database in 2015 showed that despite obesity being substantially more common than type 2 diabetes, the total number of prescriptions for glucose lowering medications was 15 times higher than those for weight loss medications. These data suggest that providers view obesity and diabetes differently with regards to the appropriateness of using pharmacotherapy. This same study found that 74% of all prescriptions for weight loss medications were for phentermine and that the adoption of sodium-glucose cotransporter-2 inhibitors (a newer class of glucose lowering medications) was nearly exponential while adoption of new weight loss medications was linear over time (17). This finding suggests that providers are more open to prescribing medications and adopting new classes of medications when the disease being treated is diabetes as compared to obesity. Women predominantly received weight loss medications (85% of all prescriptions), which is consistent with previous national trends from 1991–2011 (25). In this study receipt of a weight loss medication also varied by race/ethnicity. Such variation has not been comprehensively investigated in the literature.

Despite the low weight loss medication utilization rates seen in the current study and others mentioned above, an interesting finding within this PORTAL network cohort was the 32.9% increase in medication days in 2015 compared to 2009, led by the increase in phentermine prescriptions. Previous studies reporting on U.S. national trends in weight loss medications showed higher rates in the early 2000s compared to the 1990s (but recognizing peak utilization of weight loss medications in 1996, the year prior to the removal of fenfluramine and dexfenfluramine from the market); however, phentermine was still consistently the most commonly used weight loss medication (24, 25). From 2003 to 2011, U.S. national trends also showed increasing use of phentermine, which remained the most prescribed weight loss medication during that period (25). While the earlier data showed a plateau in phentermine use between 2010 and 2011, our results shed new light about the increasing weight loss medication days among the geographically-dispersed PORTAL health networks through 2015, possibly associated with another finding from this study that phentermine was more commonly prescribed for more than four months.

There are a number of barriers to the prescribing of weight loss medications. A lack of consistent, uniform and complete insurance coverage for these medications may be a significant barrier to use for many patients. Furthermore, the uptake of insurance coverage for weight loss medications tends to evolve over time and can be slow. In the case of liraglutide 3.0mg, it is likely that insurance coverage was very low during the last year of the time period investigated in this study as this medication was only FDA-approved in December 2014. Current use of liraglutide 3.0mg is likely to be higher now as insurance coverage for it has improved nationally. A recent survey of 4,465 consumers about insurance coverage for weight loss treatments found that only 21% of respondents reported that their insurance would cover weight loss medications. This was a level of coverage that was less than that for weight loss surgery (23%) (18). Safety of these agents is also a concern for many patients and providers following the highly publicized problems seen with of fenfluramine, dexfenfluramine, sibutramine, rimonabant and herbal preparations containing ephedra alkaloids (19). This history of adverse events associated with this class of

medications has made many patients and prescribers cautious. Patients and physicians may feel that these medications provide insufficient weight loss to justify their use. Although there is a growing body of evidence that a 5% weight loss provides health benefits, a survey of patients seeking behavioral weight loss treatment reported hoping to achieve a 32% weight loss and would be disappointed if they only lost 17 kg (20). Finally, it may be that many care providers think that obesity is a behavioral problem and that the use of weight loss medications is an inappropriate form of treatment (11, 21). Many of these barriers are unique to the treatment of obesity and are not seen with the pharmacotherapy of other conditions.

One effect of these barriers to prescribing is that it appears a small number of prescribers are responsible for the majority of prescriptions written for weight loss medications. We found that the providers that most frequently prescribed weight loss medications were primary care physicians (PCPs) not specialists. This was also the finding of previous studies (17). However, we cannot determine from the available data whether these individuals were practicing in primary care clinics or were prescribing weight loss medications in clinics devoted to the treatment of patients with obesity. In addition, we are not able to determine how many providers at these care sites saw patients with obesity but never prescribed weight loss medications. Recent data from a provider survey found that 76% of PCPs did not prescribe weight loss medications long term and 58% had negative views of weight loss medications although rates of prescribing may be increasing (22, 23). In a previous study, we surveyed PCPs in an integrated health care system serving a medically underserved population about obesity treatment. PCPs were less comfortable discussing weight loss medications than other obesity treatments and thought that weight loss medications were less effective than lifestyle change (12).

A second effect of the barriers to prescribing weight loss medications is that there appears to be wide practice variation between clinical sites both in the rates of prescribing and the agents prescribed. This may be due to geographic differences in the insurance coverage for these medications or differences in the preferred medications prescribed by ‘frequently prescribing’ providers. This marked degree of practice variation was seen in a previous study of VHA facilities (9).

As has been seen in previous studies, phentermine was found to be the most commonly prescribed weight loss medication (24, 25). Phentermine is only FDA-approved for short-term use. However, current understanding of the role of weight loss medications in obesity management is that long-term use is required for sustained benefits. In the earlier period examined by Hampp (1991–2011), <5% of patients used phentermine for >1 year but in this study, almost a third did so and more than half used this medication for more than 3 months. Despite the availability of several new weight loss medications since 2012, the number of unique patients receiving these medications did not change much during the time period examined. A recent study found that in low-risk individuals a longer duration of phentermine use was associated with clinically significant greater weight loss up to 2 years after initiating medication, with no observed increase in risk for incident cardiovascular events or death over 3 years of follow-up (26). Despite this promising observational evidence, there remains concern among clinicians about the long term safety and efficacy of

this agent. There is a need for a long term randomized controlled trial to definitively establish the safety and effectiveness of protracted phentermine monotherapy.

Our study has a number of important limitations. First, it is possible that some patients are misclassified if weight loss medication prescriptions occurred outside of our health systems. Second, we do not know the details on the insurance coverage for these medications in each region during the period of study and as a result cannot determine to what extent this drives low rates of prescribing or practice variation. Third, we do not know the total number of health care providers that saw these patients and so cannot determine the number of providers who did not prescribe any weight loss medications. It should be noted that since 2015 several thousands of clinicians have received American Board in Obesity Medicine certification and this number is increasing each year, therefore the time period covered in this study may not be representative of modern day weight loss medication prescribing practices as there may be a greater number of “high prescribers” today. Fourth, we may have underestimated the overall rate of weight loss medication prescribing as the study was not designed to capture data on medications commonly prescribed off-label for weight loss when insurance coverage is low such as metformin, bupropion, and topiramate. However, the strengths of the study are the use of EMRs to collect data on both the types of patients receiving these medications and the providers prescribing them.

Future studies could use qualitative methods to understand the patient, provider and care environment factors that may be responsible for the low rates of prescribing observed. In particular, factors that might explain the wide practice variations in prescribing rates and specific medications used between sites could be examined as well as why women were 5.6 times more likely to use one of these agents. Important questions also remain about the effectiveness and safety of weight loss medications as they are used in clinical practice. The use of data from EMRs could help answer these important questions as well.

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What is already known about this subject?

1. Many health care providers do not regularly prescribe weight loss medications.
2. Data from pharmacy databases suggests that overall rates of prescribing of weight loss medications is low.
3. Data from pharmacy databases suggests that phentermine is the most commonly prescribed weight loss medication.

What does this study add?

1. This study provides data on the prescription of weight loss medications obtained from electronic health records from a large group of patients with obesity cared for in geographically diverse clinical settings, including information on the types of physicians writing these prescriptions, how often they are prescribed and practice variation in rates of prescribing to eligible patients.
2. The study confirms prior research showing that weight loss medications are rarely prescribed to eligible patients and that less than one quarter of prescribing providers accounted for approximately 90% of all prescriptions.
3. The study also found that phentermine accounted for >75% of all weight loss medication days with most patients filling it for more than 4 months.

Figure 1. Weight Loss Medication Prescriptions by Sex, BMI, and Race/Ethnicity. Percentage of eligible patients who received a weight loss medication prescription by (A) gender, (B) BMI (kg/m²), and (C) race/ethnicity. AIAN, American Indian or Alaskan Native. NHPI, Native Hawaiian or Pacific Islander.

Figure 2. Temporal Trends in Medication Days by Medication Type

During 2009–2015 the total number of weight loss medication days increased due to an increase in the amount of phentermine prescribed.

Figure 3.
Phentermine Treatment Duration (N = 25,637 Patients)

Table 1:

Demographics and Characteristics of Those Eligible for and Prescribed Weight Loss Medications

	Eligible (N = 2,248,407)	Prescribed (N = 29,964)
Race & Ethnicity – no. of patients (%)		
White	1,061,429 (47.2)	13,519 (45.1)
Hispanic	625,045 (27.8)	7,560 (25.2)
Black or African American	287,397 (12.8)	6,049 (20.2)
Asian	129,366 (5.8)	916 (3.1)
Native Hawaiian or Pacific Islander	42,091 (1.9)	730 (2.4)
American Indian or Alaska Native	14,247 (0.6)	215 (0.7)
Other or Unknown	88,832 (4.0)	975 (3.3)
Gender – no. of patients (%)		
Male	1,070,126 (47.6)	4,878 (16.3)
Female	1,178,132 (52.4)	25,086 (83.7)
Unknown	149	
Initial BMI Group – no. of patients (%)		
Less than 27	92 (0)	0
27 – 29.9	523,662 (23.3)	1,940 (6.5)
30 – 34.9	1,156,479 (51.4)	12,960 (43.3)
35 – 39.9	341,177 (15.2)	7,399 (24.7)
40 or greater	226,997 (10.1)	7,665 (25.6)

Table 2:**Regional Variation in Rates of Prescribing Weight Loss Medications**

	Overall	High Region	Low Region
Total Medication Days	6,475,480		
Phentermine	4,961,729 (76.6%)	96.3%	60.9%
Diethylpropion	788,359 (12.2%)	20.3%	0%
Orlistat	277,209 (4.3%)	7.4%	0.1%
Sibutramine	182,599 (2.8%)	17%	0.4%
Lorcaserin	132,136 (2%)	3.6%	0.1%
Phendimetrazine	83,250 (1.3%)	2%	0%
Phentermine/Topiramate	25,930 (0.4%)	2.5%	0%
Naltrexone/Bupropion	23,438 (0.3%)	0.6%	0%
Liraglutide 3 mg	830 (<0.1%)	<1%	0%