



Women Veterans' Health

Sex Differences in Weight Loss among Veterans with Serious Mental Illness: Observational Study of a National Weight Management Program



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ABSTRACT

Purpose: Obesity disproportionately burdens individuals with serious mental illness (SMI), especially women. This observational study investigated whether there were sex differences in weight loss and program participation among veterans with SMI enrolled in the Veterans Health Administration's (VHA) MOVE! weight management program.

Procedures: Participants were identified from a national cohort of 148,254 veterans enrolled in MOVE! during fiscal years 2008 through 2012 who attended two or more sessions within 12 months of enrollment. The cohort included those with *International Classification of Disease, 9th Edition, Clinical Modification* (ICD-9-CM) diagnoses for SMI, age less than 70 years, and weight data at baseline and one or more follow-up timepoints within approximately 1 year of enrollment ($n = 8,943$ men; $n = 2,245$ women). Linear mixed models assessed associations of sex with 6- and 12-month weight change from baseline, adjusting for demographic- and site-level variables.

Findings: Both sexes averaged 6.4 (standard deviation, 4.6) sessions within 12 months; however, women with and without SMI participated at rates double their respective proportion rates among all VHA users. Participants averaged statistically significant weight loss at 6 months (men, -2.5 lb [95% CI, -2.8 to -2.1]; women, -2.4 lb [95% CI, -3.1 to -1.7]) and 12 months (men, -2.5 lb [95% CI, -2.8 to -2.2]; women, -2.9 lb [95% CI, -3.6 to -2.2]), but no sex-based difference in absolute weight loss at either timepoint. Slightly more women achieved 5% or greater (clinically significant) weight loss at the 12-month follow-up than did men (25.7% vs. 23.0%; $p < .05$).

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Conclusions: Women with SMI participated in MOVE! at rates equivalent to or greater than men with SMI, with comparable weight loss. More women were Black, single, had bipolar and posttraumatic stress disorder, and higher service-connected disability, suggesting areas for program customization.

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Individuals with serious mental illnesses (SMI), such as bipolar disorder and schizophrenia, are burdened by higher rates of obesity than the general population (Foley et al., 2013; McElroy & Keck, 2012). Obesity is an independent risk factor for premature morbidity and mortality from cardiovascular disease (CVD; Goldstein, Liu, Schaffer, Sala, & Blanco, 2013), which is the leading cause of preventable death for individuals with SMI (Kilbourne, Ignacio, Kim, & Blow, 2009; Morden et al., 2012; Walker, McGee, & Druss, 2015). The risks for CVD and unhealthy weight gain among individuals with SMI are further increased by high rates of physical inactivity and substance use (Chwastiak, Rosenheck, & Kazis, 2011; Kilbourne, Morden, et al., 2009).

Despite the evidence for behavioral weight management programs for individuals with SMI (Dixon et al., 2010), little research has addressed the disproportionately high rates of obesity among women with SMI. Compared with men, women with SMI have a higher body mass index (BMI) at psychiatric illness onset (Correll et al., 2014; Hakko et al., 2006; Homel, Casey, & Allison, 2002). Women with SMI also have a greater propensity for weight gain than men with SMI because of pregnancy, menopause, greater exposure to childhood trauma, and the side effects caused by many psychopharmacologic treatments (Baskaran, Cha, Powell, Jalil, & McIntyre, 2014; Gentile, 2009). Women are subsequently at increased risk for higher lifetime prevalence rates of obesity, with rates reaching as high as 91% in some population studies (Baskaran et al., 2014; Galletly et al., 2012; Goldstein et al., 2011; McEvoy et al., 2005; Subramaniam et al., 2014). These differences have implications for long-term obesity-related morbidity, disability, and treatment costs (Kilbourne, Ignacio, et al., 2009; Ratliff, Palmese, Reutenauer, Srihari, & Tek, 2013; Zulman et al., 2015).

The Veterans Health Administration (VHA) offers a unique setting in which to investigate sex-based differences in weight management among adults with SMI. In 2006, VHA nationally implemented the MOVE! weight management program to mitigate the downstream costs of obesity (Kinsinger et al., 2009). Veterans with SMI not only have access to comprehensive, recovery-oriented mental health services (Goldberg & Resnick, 2010) but also to MOVE! Although women and individuals with SMI both represent priority VHA patient populations who have historically faced barriers accessing preventive medicine services (Drapalski, Milford, Goldberg, Brown, & Dixon, 2008; Washington, Bean-Mayberry, Riopelle, & Yano, 2011), MOVE!, as designed, does not specifically address the unique challenges of these populations (Goldberg et al., 2013). One early MOVE! study found that, although female veterans and veterans with SMI were more likely to participate in the program, women were less likely to attain clinically meaningful weight loss than men (Littman, Boyko, McDonnell, & Fihn, 2012). However, this study did not provide a comparison between sexes for outcomes among participants with SMI. To address these uncertainties and to guide future programming, a quality improvement evaluation was conducted.

The primary aims of this program evaluation were to investigate whether sex differences existed among veterans with SMI enrolled in MOVE! with respect to weight change following enrollment in MOVE! A secondary aim was to compare the rates of

MOVE! participation among male and female patients with SMI. This allowed for an evaluation of whether female patients with SMI were participating in MOVE! at a level that would be expected based on their representation among all SMI VHA patients.

Material and Methods

This observational cohort study of weight loss outcomes within a database of VHA patients included patients with a diagnosis of an SMI (bipolar disorder, schizophrenia spectrum, or other psychotic disorders) and enrolled in the MOVE! weight management programming during fiscal years (FY) 2008 through 2012 (October 1, 2007 through September 30, 2012) with follow-up observations through November 30, 2013. Per VHA policy, this study was considered a nonresearch quality improvement evaluation, obviating the need for institutional review board review (VHA & Office of Research Oversight, 2011).

Participants and Procedures

Program data were obtained from a database of MOVE! participants maintained by the VHA National Center for Health Promotion and Disease Prevention. This database included program use and outcome data for 358,647 VHA patients who had one or more MOVE! encounters within 12 months of enrollment during FY 2008 through 2012. MOVE! participation was determined by administrative clinic stop codes (372, 373) for individual and group MOVE! treatment encounters, respectively. Data from this database were merged with the VHA National Psychosis Registry (NPR), developed by the VHA Serious Mental Illness Treatment and Evaluation Center (McCarthy, Blow, Valenstein, Bowersox, & Visnic, 2014). The NPR includes comprehensive administrative data from national patient care databases regarding demographics, diagnoses, use, and treatment costs for all VHA patients with an *International Classification of Disease, 9th Edition, Clinical Modification* (ICD-9-CM) diagnosis (Table 1) of bipolar disorder, schizophrenia spectrum, or other psychotic disorders. Of all VHA patients in FY2012 (8,762,548), 2.88% (252,036) were identified as SMI via NPR methods (Bagalman, 2014).

To be eligible for this cohort evaluation, patients had to be enrolled in MOVE! MOVE! is targeted to veterans who 1) seek medical care within VHA, 2) are between the ages of 18 and 69 years, 3) have a BMI 30 kg/m² or greater or a BMI of 25 to 29.9 kg/m² and with at least one obesity-related comorbidity (diabetes, hypertension, dyslipidemia, obstructive sleep apnea, or metabolic syndrome) or an increased waist circumference (>40 inches for men; >35 inches for women), and 4) have no contraindications to weight loss such as pregnancy or an acute/terminal illness (Kinsinger et al., 2009). Second, cohort inclusion criteria required two or more 2 MOVE! encounters on separate days within 1 year, indicative of minimum engagement in treatment beyond attending an initial orientation encounter (Kahwati, Lance, Jones, & Kinsinger, 2011). Third, cohort criteria required participants to have a baseline weight documented within 1 month before or after MOVE! enrollment (index date) and at least one follow-up weight at 6 or 12 months after enrollment that is

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