



Pain and modifiable risk factors among weight loss seeking Veterans with overweight



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ABSTRACT

Objective: Overweight/obesity and chronic pain frequently co-occur and demonstrate a bidirectional relationship. Modifiable risk factors, such as eating behaviors and mental health symptoms, may be important to understand this relationship and improve interventions in Veterans.

Design: Cross-sectional.

Setting: Veterans Health Administration Medical Center outpatient clinic.

Subjects: The sample of Veterans ($N = 126$) was mostly male (89.7%), White (76%), and non-Hispanic (94%) with average age of 61.9 years ($SD = 8.5$) and average body mass index (BMI) of 38.5 ($SD = 7.5$).

Methods: Veterans referred for weight loss treatment (MOVE!) at VA Connecticut completed self-report questionnaires, and electronic medical records were reviewed.

Results: Mean self-reported pain rating was 4.5 out of 10 ($SD = 2.3$). Moderate to severe pain was endorsed by 60% of the sample. Veterans with higher pain intensity and interference reported higher global eating disorder symptoms, emotional overeating, night eating, insomnia severity, and mental health symptoms (all p 's < 0.01). However, pain intensity and interference were not associated with BMI.

Conclusions: For Veterans seeking behavioral weight loss treatment, higher pain intensity and interference were associated with more severe eating disorder, sleep, and mental health symptoms. A better description of the clinical characteristics of Veterans with pain who participate in MOVE! highlights their unique needs and may improve treatments to address pain in the context of weight loss treatment.

1. Introduction

Rates of overweight/obesity approach 80% among Veterans (Breland et al., 2017). Pain is also highly prevalent with 50–70% of Veterans reporting regular or chronic pain (Driscoll et al., 2015; Haskell et al., 2009; Kerns, Otis, Rosenberg, & Reid, 2003). Pain-related conditions, such as joint and back disorders, are the most common diagnoses in the Veterans Healthcare Administration (VHA) (Department of Veterans Affairs, 2017). Overweight/obesity and chronic pain frequently co-occur, augmenting the public health and individual burden of these two conditions. Veterans with chronic pain have higher body mass index (BMI) compared to Veterans without pain (Higgins et al., 2014), and over 70% of Veterans initiating behavioral weight management treatment report pain-related conditions (Higgins et al., 2016).

The co-occurrence of overweight/obesity and pain is likely developed and sustained through a bidirectional relationship (Janke, Collins, & Kozak, 2007; Okifuji & Hare, 2015). Numerous potential mediators or mechanisms of this relationship, such as structural or biomechanical pressures, metabolic factors, inflammatory processes, and genetic and familial factors, have been studied but less work has been done to uncover the impact of mental health, behavioral, and lifestyle factors (Janke et al., 2007; Okifuji & Hare, 2015; Wright et al., 2010). Disordered eating (Mitchell, Porter, Boyko, & Field, 2016), poor sleep quality (Janke et al., 2007; Koffel et al., 2016), and mental health symptoms (Higgins et al., 2014; LeardMann et al., 2015) have been linked to obesity and pain independently. Unlike some risk factors for pain, including injury, traumatic events, and genetics, these risk factors may be modifiable as there are evidence-based treatments for these

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conditions and disorders. Examining modifiable risk factors shared by obesity and pain may be important to understand the possible mechanisms and clinical complexities of their co-occurrence.

Weight loss can reduce pain intensity and improve performance on functional tests, quality of life, and self-efficacy in individuals with overweight/obesity and pain (Focht, Rejeski, Ambrosius, Katula, & Messier, 2005; Foy et al., 2011; Janke et al., 2007; Messier et al., 2000, 2004; Rejeski et al., 2002) with a positive correlation between amount of weight lost and functional improvements (Miller et al., 2006). Studies that compare or combine treatments show that behavioral weight loss alone or combined with pain management interventions result in better pain and weight outcomes (Bond et al., 2018; Janke et al., 2014; Somers et al., 2012), but higher baseline pain and weight are associated with dropout (Somers et al., 2012). Research within the Veteran population suggests that pain itself may limit success in both behavioral weight loss programs (Masheb et al., 2015a) and weight loss surgery (Kubat, Giori, Hwa, & Eisenberg, 2016). Limited engagement in physical activity may be one reason individuals with obesity and pain struggle to benefit from weight loss treatment. Veterans and civilians state that pain is a barrier to exercise (Amy & Kozak, 2012; Jay, Mateo, Squires, Kalet, & Sherman, 2016), and Veterans with higher levels of pain have lower adherence to physical activity intervention (Mori, Sogg, Guarino, & Skinner, 2006). However, little is known about how pain is related to other risk factors for obesity, such as eating behaviors and mental health symptoms.

Further, findings from previous treatment studies may not generalize to Veterans. Behavioral weight loss trials tend to have samples of exclusively or majority female participants, and there is some evidence that men and women have different preferences for and outcomes from weight loss treatment (Robertson et al., 2016). Clinical trials often exclude individuals with the common mental health comorbidities found in high prevalence among Veterans and therefore findings may not generalize to or meet the specific needs of the Veteran clinical population. More research is needed to elucidate the multifactorial relationship between obesity and pain in Veterans, especially within clinically-relevant samples, to detect underlying population health complexities and inform changes that may improve interventions.

Given that eating, sleep, and mental health variables are shared across obesity and pain, and are potentially modifiable, they are promising targets for tailoring and improving interventions in this population. This study aimed to examine the relationship between pain and modifiable risk factors among weight loss seeking Veterans. Consistent with research conducted in civilian populations examining correlates of pain severity and interference, we hypothesized there would be significant relationships between pain and obesity, pain and mental health, and pain and sleep in a sample of Veterans with overweight and obesity. Expanding on the findings from civilian research, the current study also examined the relationship between pain and eating pathology. We hypothesized that measures of pain severity and interference would be related to measures of eating pathology and night eating in a sample of Veterans with overweight.

2. Methods

2.1. Participants

This sample was made up of Veterans ($N = 126$) who were clinician or self-referred to outpatient behavioral weight loss treatment (MOVE!) at the VA Connecticut Healthcare System (VACHS). MOVE! is the VA's evidence-based behavioral weight management program. The intervention is run by an interdisciplinary team of providers in group or individual format and can incorporate home telehealth or telephone coaching. The protocol spans nutrition, physical activity, and behavioral modules. Before beginning the MOVE! program, referred Veterans attend an orientation session to learn about the program and treatment options. Veterans attending MOVE! orientation sessions

between October 2014 and November 2015 completed questionnaires as part of routine clinical care. As this was a clinical sample, no set inclusion or exclusion criteria were used. However, a BMI $> 25 \text{ kg/m}^2$ is the primary reason for referral into MOVE!. No compensation or other incentives were provided for participation. The study was approved by the Institutional Review Board at the VACHS. Written consent was waived as the measures were collected as part of ongoing clinical activities with implied consent.

2.2. Measures

Self-report measures were collected in person at the MOVE! orientation sessions.

Demographics. Self-reported demographic information included sex, age, ethnicity, and race and was reported the entire sample, except one Veteran who declined to identify race.

Pain. Average pain intensity on a 0 to 10 numeric pain rating scale (NRS) and pain interference with enjoyment of life and general activity were measured with a three-item pain, enjoyment, activity scale (PEG-3) and equivalent items from the Brief Pain Inventory (BPI), both of which have demonstrated reliability and validity (Cleeland, 1991; Krebs et al., 2009). The PEG-3 timeframe was the past week, and the BPI interference items were framed for the 24 h prior to the assessment. The BPI was completed by 35 Veterans (missing 1) before the study protocol was changed to the PEG-3, which was completed by 82 Veterans (missing 7).

Disordered eating symptoms. The Eating Disorders Examination Questionnaire (EDE-Q) (Fairburn & Beglin, 1994) is a widely used self-report measure used to assess the core features of eating pathology such as dietary restraint and concerns about shape, eating, and weight. A brief version of the EDE-Q with good internal consistency and convergent validity (Grilo, Henderson, Bell, & Crosby, 2013) was used in the current study to assess global eating disorder symptoms. The EDE-Q was scored for the 123 Veterans (missing 3) who completed all items of the measure. The Emotional Overeating Questionnaire (EOQ), a measure with good concurrent validity, was used to assess eating in response to emotions (Masheb & Grilo, 2006). Items of the EOQ were completed by 118–120 Veterans (missing 8–6 Veterans per item), and a mean score was calculated for the 120 Veterans who had no more than 2 missing items on the. Symptoms associated with night eating were measured with the Night Eating Questionnaire (NEQ) (Allison, Stunkard, & Thier, 2004), which has shown sufficient internal consistency, concurrent validity, and discriminant validity (Allison et al., 2008). Individual NEQ items were completed by 86–123 Veterans with item 7 having the lowest response rate. This item asks about the timing of low mood when it occurs and therefore was not applicable to Veterans not reporting low mood on item 6. A total NEQ score was calculated for all Veterans who had non-missing data for every item, except item 7.

Sleep symptoms. Insomnia symptoms were measured with the Insomnia Severity Index (ISI), which has demonstrated adequate internal consistency and concurrent validity (Bastien, Vallieres, & Morin, 2001). ISI scores of greater than or equal to 15 are interpreted as clinical insomnia. Item-level data were available for 120–126 Veterans, and a total ISI score was calculated for the 119 Veterans (missing 7) who had data for all items.

Mental health symptoms. A commonly used 2-item screener, the Patient Health Questionnaire (PHQ-2) assessed symptoms of depression in this sample with a cutoff of 3 to indicate screening positive for major depression (Kroenke, Spitzer, & Williams, 2003). The PHQ-2 total score was calculated for 125 Veterans as one Veteran was missing responses for one item. PTSD symptoms were measured with the Primary Care PTSD Screen (PC-PTSD), a 4-item measure that is often used in the VA and a score of 3 indicates screening positive for PTSD (Prins et al., 2003). PC-PTSD item-level data were available for 121–126 Veterans, and the total PC-PTSD score was calculated for the 117 Veterans who

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