



# Preliminary examination of metabolic syndrome response to motivational interviewing for weight loss as compared to an attentional control and usual care in primary care for individuals with and without binge-eating disorder



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## ABSTRACT

Motivational interviewing (MI) treatment for weight loss is being studied in primary care. The effect of such interventions on metabolic syndrome or binge eating disorder (BED), both highly related to excess weight, has not been examined in primary care. This study conducted secondary analyses from a randomized controlled trial to test the impact of MI for weight loss in primary care on metabolic syndrome. 74 adult participants with overweight/obesity recruited through primary care were randomized to 12 weeks of either MI, an attentional control, or usual care. Participants completed measurements for metabolic syndrome at pre- and post-treatment. There were no statistically significant differences in metabolic syndrome rates at pre-,  $X^2(2) = 0.16, p = 0.921$ , or post-,  $X^2(2) = 0.852, p = 0.653$  treatment. The rates in metabolic syndrome, however, decreased for MI (10.2%) and attentional control (13.8%) participants, but not for usual care. At baseline, metabolic syndrome rates did not differ significantly between participants with BED or without BED across treatments. At post-treatment, participants with BED were significantly more likely to meet criteria for metabolic syndrome than participants without BED,  $X^2(1) = 5.145, p = 0.023, \phi = 0.273$ . Across treatments, metabolic syndrome remitted for almost a quarter of participants without BED (23.1%) but for 0% of those with BED. These preliminary results are based on a small sample and should be interpreted with caution, but they are the first to suggest that relatively low intensity MI weight loss interventions in primary care may decrease metabolic syndrome rates but not for individuals with BED.

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## 1. Introduction

The prevalence of people who are overweight or obese has risen dramatically, with combined estimates at 69.2% in the United States (NHHS (US), 2013). The consequences of excess weight are dire and include increased risk of cardiovascular disease, hypertension, stroke, and metabolic syndrome (Ervin, 2009; Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults, 2001; Grundy, Brewer, Cleeman, Smith, & Lenfant, 2004; Marchesini et al., 2004). Metabolic syndrome is a cluster of vascular risk factors and is defined by the presence of three out of five of the following: elevated fasting blood glucose, low serum high-density lipoprotein (HDL) cholesterol level, hypertriglyceridemia, hypertension, and central adiposity (Grundy et al., 2005; NCEPEP, 2002). While related to excess weight, metabolic syndrome cannot be accounted for exclusively by overweight/obesity as

the syndrome also is relatively common within healthy weight individuals (i.e., 17%; Suliga, Kozieł, & Głuszek, 2016). A diagnosis of metabolic syndrome increases risk for cardiovascular disease, type II diabetes, and all-cause mortality (Isomaa et al., 2001; Lakka et al., 2002; Ninomiya et al., 2004). Similarly, metabolic syndrome also has additional significant negative impacts on individuals' health-related quality of life (Sullivan, Ghushchyan, Wyatt, Wu, & Hill, 2007) and represents a growing health-care economic burden in the United States (Sullivan, Ghushchyan, Wyatt, & Hill, 2007). The degree of excess weight is directly associated with metabolic syndrome, and as rates of obesity have increased, so too has the prevalence of metabolic syndrome (Ervin, 2009). While the prevalence of metabolic syndrome in U.S. adults is estimated at 24%, nearly 30% and 65% of individuals with overweight or obesity, respectively, are estimated to meet criteria for metabolic syndrome (Barber, Schumann, Foran-Tuller, Islam, & Barnes, 2015; Ervin, 2009; Ford, Giles, & Dietz, 2002; Park et al., 2003). With such life-threatening consequences of excess weight and metabolic syndrome, there is a dire need for effective and easily accessible interventions (Pagoto & Appelhans, 2013).

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An important and accessible place to address metabolic syndrome may be at individuals' primary care provider appointments (Mehring et al., 2013; Plourde & Prud'homme, 2012). Unfortunately, while both patient and provider understand the importance of addressing excess weight, primary care providers often are overburdened and treatment provided by primary care offices is limited (Bleich, Pickett-Blakely, & Cooper, 2011; Davis, Emerenini, & Wylie-Rosett, 2006; Galuska, Will, Serdula, & Ford, 1999; Malterud & Ulriksen, 2010; Scott et al., 2004; Tsai & Wadden, 2009). Patients do want their medical providers to discuss weight loss but feel their providers' ability to provide resources is insufficient (Malterud & Ulriksen, 2010), and medical providers are unlikely to provide weight loss counseling at appointments (Bleich et al., 2011; Jackson, Wardle, Johnson, Finer, & Beeken, 2013; Kraschnewski, Sciamanna, Pollak, Stuckey, & Sherwood, 2013; Kraschnewski, Sciamanna, Stuckey et al., 2013).

A promising option for primary care providers may be motivational interviewing. Fortunately, general medical practitioners without prior psychotherapy training can be trained to provide motivational interviewing (Barnes, White, Martino, & Grilo, 2014). Motivational interviewing is a directive and client-centered method of intervention focused on enhancing intrinsic motivation by discussing and addressing ambivalence (Miller & Rollnick, 2012). Reviews of the literature (Barnes & Ivezaj, 2015; DiLillo & West, 2011) and meta-analyses (Armstrong et al., 2011; Burke, Arkowitz, & Menchola, 2003; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010) support the effectiveness of motivational interviewing for weight-related behavior change and weight loss. Consequently, medical offices started incorporating relatively low intensity motivational interviewing treatments. Preliminary evidence suggests motivational interviewing interventions in primary care may positively impact individual components of metabolic syndrome such as blood pressure (Hardcastle, Taylor, Bailey, & Castle, 2008; Hardcastle, Taylor, Bailey, Harley, & Hagger, 2013; Williams, Hollis, Collins, & Morgan, 2014; Woollard et al., 1995) and high-density lipoproteins (Drevenhorn, Bengtson, Nilsson, Nyberg, & Kjellgren, 2012). None of the primary care motivational interviewing for weight loss treatments, however, examined the impact of motivational interviewing on these variables combined as in metabolic syndrome (Barnes & Ivezaj, 2015). Another limitation of the motivational interviewing for weight loss in primary care literature is the lack of attentional control comparison conditions. The vast majority of randomized controlled trials compared motivational interviewing to conditions such as usual care. Therefore, based on the existing literature, we cannot determine if motivational interviewing specifically results in weight loss or if the additional attention to the weight loss is responsible (Barnes & Ivezaj, 2015).

The motivational interviewing for weight loss in primary care literature also has overlooked binge-eating disorder (BED) (Barnes & Ivezaj, 2015; APA, 2013). BED, defined by recurrent binge eating without regular compensatory behaviors, is now officially recognized as an eating disorder in the *Diagnostic and Statistical Manual of Mental Disorders-5* (APA, 2013). BED is related to excess weight (Kessler et al., 2013) and increased medical co-morbidity and health-care utilization even after accounting for weight (Johnson, Spitzer, & Williams, 2001; Marques et al., 2011). Unhealthy eating behaviors common in individuals with BED (e.g., consuming large quantities of calories in brief amount of time, meal skipping) are associated with metabolic syndrome and metabolic abnormalities (Kral, Buckley, Kissileff, & Schaffner, 2001; Roehrig, Masheb, White, & Grilo, 2009; Sierra-Johnson et al., 2008). In fact, a longitudinal study reported individuals who reported binge eating were at greater risk for newly diagnosed metabolic syndrome symptoms, compared with non-binge eaters (Hudson et al., 2010). Consequently, individuals with BED and excess weight have been underscored as a significant subgroup with increased risk for developing metabolic syndrome (Abraham, Massaro, Hoffmann, Yanovski, & Fox, 2014; Barnes et al., 2011; Blomquist et al., 2012; Hudson, Hiripi, Pope, & Kessler, 2007; Mitchell, 2015; Sheehan & Herman, 2015; Udo et al., 2014a; Udo et al., 2014b). It is critical, therefore, to examine these individuals,

with excess weight, metabolic syndrome, and binge eating disorder, as they may be at extreme risk for harmful health-related consequences. In fact, researchers recently stressed the importance of not overlooking psychological disorders such as BED as they are an important part of the obesity crisis (Amianto, Lavagnino, Abbate-Daga, & Fassino, 2011). To our knowledge, no study has compared how metabolic syndrome responds to a motivational interviewing weight loss trial in primary care for individuals with BED.

It currently is unknown if a brief motivational interviewing weight loss intervention delivered in primary care can decrease incidence of metabolic syndrome and the role that a diagnosis of BED may play in an individual's response. Since metabolic syndrome and BED both confer health-related risks beyond those attributable to excess weight, assessing the impact of such an intervention on metabolic syndrome may provide primary care providers a means of helping their patients. Therefore, in the current study, we sought to conduct a preliminary examination of metabolic syndrome before and after motivational interviewing treatment for weight loss in primary care for participants with BED and without BED. This will include one of the first comparisons of motivational interviewing for weight loss in primary care to not only usual care but also an attentional control condition. Weight loss data previously were published and secondary analyses currently are presented (Barnes et al., 2014). It was hypothesized that when compared the attentional control and usual care conditions, participants in the motivational interviewing group would experience significant decreases in the rates of metabolic syndrome. Weight loss was expected to be related to decreases in metabolic syndrome diagnosis. Participants without BED were hypothesized to experience greater decreases in metabolic syndrome compared to participants with BED.

## 2. Materials and methods

### 2.1. Participants

Adult participants were 74 individuals with overweight or obesity (body mass index (BMI)  $\geq 25$ ,  $\leq 55$ ) receiving primary care services at an urban university-based medical healthcare center. Participants between the ages of 18 and 65 were recruited through primary care provider referrals and flyers placed in waiting/patient rooms. Exclusion criteria included: severe psychiatric problems (e.g., schizophrenia); severe medical problems (e.g., cardiac disease); pregnancy/breastfeeding; or uncontrolled liver; thyroid disease (TSH  $> 6.75$ ); hypertension ( $> 160/95$ ); or diabetes (HbA1c  $> 8.0$ ).

Participants had a mean age of 47.8 years ( $SD = 10.9$ ) and a mean BMI of 35.1 kg/m<sup>2</sup> ( $SD = 7.1$ ). Women accounted for 73.0% ( $n = 54$ ) of the sample. BED was diagnosed in 27.0% ( $n = 20$ ) of the participants. The sample was relatively diverse: 68.9% ( $n = 51$ ) of participants identified as White, not Hispanic, 2.7% ( $n = 2$ ) as White, Hispanic, 21.6% ( $n = 16$ ) as Black, and as 6.8% ( $n = 5$ ) as bi/multiracial. Metabolic syndrome was defined by the National Cholesterol Education Program Adult Treatment Panel III (ATP III) and updated in 2005 by the American Heart Association and the National Heart Lung and Blood Institute (see Table 1) (Grundy et al., 2005; National Cholesterol Education Program Expert Panel, 2002). Participants' medication use was not assessed at post-treatment so diagnosis was based solely on objective measurements, consistent with previous BED and metabolic syndrome literature (Barnes et al., 2011; Blomquist et al., 2012). Based on these criteria, 35.1% ( $n = 26$ ) met criteria for metabolic syndrome.

### 2.2. Materials

#### 2.2.1. Physical and metabolic measurements

Height was measured at baseline only, using a wall-mounted measure within a quarter of an inch. At baseline and post-treatment assessment, measurements were obtained in a standardized manner by the

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