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Characteristics and use of treatment modalities of patients with binge-eating disorder in the Department of Veterans Affairs

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ABSTRACT

Objective: In 2013 binge-eating disorder (BED) was recognized as a formal diagnosis, but was historically included under the diagnosis code for eating disorder not otherwise specified (EDNOS). This study compared the characteristics and use of treatment modalities in BED patients to those with EDNOS without BED (EDNOS-only) and to matched-patients with no eating disorders (NED).
Methods: Patients were identified for this study from electronic health records in the Department of Veterans Affairs from 2000 to 2011. Patients with BED were identified using natural language processing and patients with EDNOS-only were identified by ICD-9 code (307.50). First diagnosis defined index date for these groups. NED patients were frequency matched to BED patients up to 4:1, as available, on age, sex, BMI, depression, and index month encounter. Baseline characteristics and use of treatment modalities during the post-index year were compared using t-tests or chi-square tests.
Results: There were 593 BED, 1354 EDNOS-only, and 1895 matched-NED patients identified. Only 68 patients with BED had an EDNOS diagnosis. BED patients were younger (48.7 vs. 49.8 years, $p = 0.04$), more were male (72.2% vs. 62.8%, $p < 0.001$) and obese (BMI 40.2 vs. 37.0, $p < 0.001$) than EDNOS-only patients. In the follow-up period fewer BED (68.0%) than EDNOS-only patients (87.6%, $p < 0.001$), but more BED than NED patients (51.9%, $p < 0.001$) used at least one treatment modality.
Discussion: The characteristics of BED patients were different from those with EDNOS-only and NED as was their use of treatment modalities. These differences highlight the need for a separate identifier of BED.

1. Introduction

Binge-eating disorder (BED) is the most common eating disorder among adults in the United States (US) (Hudson, Hiripi, Pope, & Kessler, 2007; Kessler et al., 2013) and, with the release of the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) in 2013, was recognized as a formal diagnosis (American Psychiatric Association, 2013a). While it is known that patients with BED have a high use of healthcare services and costs,(Bellows et al., 2015; Striegel-Moore et al., 2004) most epidemiological research in BED has been performed prospectively relying on patient surveys (Birgegard, Norring, & Clinton, 2012; Blomquist et al., 2012; Fontenelle, Mendlowicz, Moreira, & Appolinario, 2005; Hsu et al., 2002; Hudson et al., 2007; Kessler et al., 2013; Mitchison, Hay, Slewa-Younan, & Mond, 2012; Taylor et al., 2013; Trace et al., 2012). While patient surveys are an important source of data, they require patient contact, are time-consuming, cannot be applied to existing data sources, and may be subject to recall bias. Though some survey studies have described patient-reported treatments for BED,(Hudson et al., 2007; Kessler et al., 2013) the use of real-world administrative claims and electronic health record (EHR) databases to describe the use of BED treatments has been limited.

This is largely due to the fact that real-world studies using administrative claims or clinical databases rely on International Classification of Diseases (ICD) diagnosis codes. While DSM and ICD codes are compatible, not all DSM-5 recognized disorders have a unique ICD code; BED is

Abbreviations: AN, anorexia nervosa; BED, binge-eating disorder; BN, bulimia nervosa; DSM, Diagnostic and Statistical Manual of Mental Disorders; EDNOS, eating disorder not otherwise specified; EHR, electronic health records; ICD, international classification of diseases; NED, no eating disorder; NLP, natural language processing.

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one such example. Prior to the DSM-5, BED was considered an area for further research within the diagnosis of eating disorder not otherwise specified (EDNOS) and was coded under the EDNOS ICD-9 (307.50). (American Psychiatric Association, 2000) However, EDNOS is a non-specific diagnosis that also includes other eating disorders such as sub-threshold anorexia nervosa (AN) and sub-threshold bulimia nervosa (BN), which have markedly different characteristics than BED (Walsh & Attia, 2012). With the implementation of the DSM-5, the American Psychiatric Association (APA) recommended providers code for BED using the ICD-9 code for BN (307.51) or the ICD-10 code for other eating disorders (F50.8) (American Psychiatric Association, 2013b). However, this is also problematic as BED patients, unlike those with BN, do not regularly use inappropriate behaviors such as purging or excessive exercise to compensate for episodes of binge-eating (American Psychiatric Association, 2013a). Furthermore, similar to EDNOS, the ICD-10 for other eating disorders is non-specific. Because of the lack of a specific ICD-9 code for BED, identifying patients with BED in administrative claims and EHR data has remained difficult.

In order to determine the real-world effectiveness of treatments for BED, it is important to first be able to identify BED patients in real-world data sources and describe their use of treatment modalities. The objective of this study was to, within the EHR of the Department of Veterans Affairs (VA) healthcare system, describe the characteristics and use of treatment modalities (i.e., psychotherapy and/or pharmacotherapy) (Vocks et al., 2010) of patients diagnosed with BED identified through natural language processing (NLP) and compare them to patients with an ICD-9 diagnosis of EDNOS without BED (EDNOS-only) and to matched-patients with no eating disorder (NED) diagnoses.

2. Material and methods

2.1. Study design and data source

The national population of US patients who received care in the VA between 2000 and 2011 was used in this historical cohort study. This study used both administrative and clinical data in the EHR captured from inpatient and outpatient visits within the VA healthcare system. Data included demographic information, diagnosis codes, vital signs, prescription medication fills, narrative clinical notes, and resource utilization. The VA is the largest integrated health system in the US and uses one EHR for the entire system, which captures all aspects of patient care provided in the VA and contains data for more than 20 million patients. While the VA population is generally older with more men and white individuals than the general population,(Department of Veterans Affairs National Center for Veterans Analysis and Statistics, 2014) data from the VA has been used previously to study eating disorders and the large comprehensive data has proven to be a valuable tool in researching relatively uncommon diseases (Striegel-Moore, Garvin, Dohm, & Rosenheck, 1999a, 1999b).

2.2. Natural language processing (NLP) identification of BED patients

An NLP tool was developed to identify patients with a clinician-documented diagnosis of BED using narrative clinical notes from the VA. The development and application of the NLP tool has been described in detail previously (Bellows et al., 2014). Briefly, the NLP tool searched narrative clinical notes, in a manner similar to human chart review, from the VA between January 1, 2000 and December 31, 2011 for keywords and phrases used by clinicians to describe a diagnosis of BED (Fig. 1). It is important to note the tool did not infer a BED diagnosis from descriptions of eating behaviors, but rather from statements regarding a diagnosis of BED (e.g., "the patient has a diagnosis of binge-eating disorder" or "this patient meets the criteria for a diagnosis of BED"). The tool identified instances of these statements in the medical chart and classified each as the provider affirming, ruling out, or considering a diagnosis of BED. The NLP tool was iteratively modified to improve the sensitivity and accuracy until, in the final iteration, it identified 1487 unique patients with a clinician-documented diagnosis of BED with 96.2% sensitivity and 91.8% accuracy (Bellows et al., 2014). The first identified BED diagnosis found in the chart was considered to be the index date.

2.3. Identification of EDNOS-only and NED patients

Also identified were patients with a diagnosis of EDNOS (307.50) on at least two or more encounters during the study period, between January 1, 2000 and December 31, 2011. This was done because there is potential for errors in coding and because EDNOS may be used as a "rule out" diagnosis prior to establishing a more specific diagnosis. Thus the second ICD-9 code served as a confirmatory diagnosis of EDNOS. A second BED diagnosis was not required because the NLP tool identified instances where the provider affirmed a diagnosis of BED. The index date for these patients was defined as the date of the first EDNOS ICD-9 code.

A cohort of patients with NED was identified and frequency matched to the BED cohort for comparison (matching procedure described in patient selection section below). This group was identified as patients with an encounter in the VA between January 1, 2000 and December 31, 2011 without a diagnosis of any eating disorder [BN (307.51), AN (307.1), EDNOS (307.50), pica (307.52), rumination disorder (307.53), psychogenic vomiting (307.54), and no NLP identified BED diagnosis]. NED patients were required to have an encounter in the VA system within one month of the index date of a BED patient. This encounter defined the index date.

2.4. Patient selection

To be included in the study, patients were required to have ≥1 year of pre- and post-index date activity (e.g., an office visit, prescription fill, inpatient stay). Additionally, patients were required to be ≥18 years of age and have a BMI (or height and weight to calculate BMI) recorded on index date (±60 days, closest value used). Patients were excluded if they had a diagnosis of any other eating disorder, including BN (307.51), AN (307.1), pica (307.52), rumination disorder (307.53), and psychogenic vomiting (307.54) during the study period. If a patient with NLP-identified BED also had an ICD-9 diagnosis of EDNOS, they were included in the BED cohort and were excluded from the EDNOS cohort (EDNOS-only). NED patients were randomly matched up to 4:1, as available, to patients with BED on year of birth, sex, BMI category, index date month, and diagnosis of major depressive disorder in the 1-year pre-index period. Patients were matched on these characteristics in order to examine a population without an eating disorder that would be similar in terms of cardiometabolic and psychiatric risk to the BED population. Given the correlation between BED and depression, major depressive disorder was used as a measure of psychiatric risk (Grucza, Przybeck, & Cloninger, 2007; Munn-Chernoff et al., 2015; Mustelin, Raevuori, Hoek, Kaprio, & Keski-Rahkonen, 2015).

2.5. Analysis

The baseline demographic (i.e., age, sex, and race) and clinical (i.e., BMI, comorbidities, and prescription fills) characteristics were examined in the 1-year pre-index period using descriptive statistics [means and standard deviations (SD) for continuous variables, frequencies and percent for categorical variables]. Comorbidities associated with BED or obesity were selected and identified by the presence of an ICD-9 code (i.e., major depressive disorder, anxiety, hyperlipidemia, hypertension, diabetes, cardiovascular disease, overweight, obesity, morbid obesity, asthma, sleep apnea, osteoarthritis, gallbladder disease, lower back pain, and non-alcoholic steatohepatitis) (Guh et al., 2009; Hudson et al., 2010). Prescription medication fills were examined by class and were included if they were associated with treatment of either BED or the comorbidities examined (i.e., antidepressants, antipsychotics, anxiolytics,