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Bulimia Nervosa Among Methamphetamine Dependent Adults: Association With Outcomes 3 Years After Treatment

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Abstract

Although weight loss is among the most commonly cited reasons for using methamphetamine (MA), little is known about the association between eating disorders and treatment outcomes in this population. This study examined psychiatric, substance use, and functional outcomes of MA users (N=526) with bulimia nervosa 3 years after treatment for MA dependence. Bulimia nervosa was observed among 2.4% (N=13) of the participants and was associated with poorer MA use outcomes, increased health service utilization, and higher levels of functional impairment. Addressing MA use among adults with eating disorders may be helpful as a means of improving treatment outcomes.

Although substance use disorders are underdiagnosed in patients with eating disorders, a number of studies have documented a robust link between these two conditions. Despite wide ranges in prevalence estimates, recent epidemiological data indicate that up to 50% of individuals with eating disorders abuse alcohol or illicit drugs; conversely, up to 35% of those who abuse substances have eating disorders (The National Center on Addiction and Substance Abuse [CASA], 2003). Among eating disordered populations, stimulants may have heightened potential for abuse relative to other substances, given their anorexic effects. Consistent with this assumption, several clinical studies report that cocaine and amphetamines are among the most frequently reported drugs of abuse among adults with anorexia nervosa and bulimia nervosa (e.g., Herzog et al., 2006; Lacey, 1993), and weight loss is among the commonly cited reasons for initiation of methamphetamine (MA) use (Sherman et al., 2008; Willis & Hillhouse, 2003). Nevertheless, little is known about the association between eating disorders and MA dependence.

At present, there is a paucity of data available to inform the treatment needs of individuals with comorbid eating disorders and stimulant dependence. To the extent that studies have examined the association between stimulant use and eating disorders, most have focused on

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describing of rates of lifetime substance use, rather than substance abuse and dependence per se. Those that have examined abuse and dependence, for the most part, have not distinguished between alcohol and drugs when reporting prevalence rates of such comorbidities. Moreover, the majority of published studies examining co-occurring substance use and eating disorders focus on adolescent and young adult females, thereby limiting our understanding of the relationship between eating disorders and stimulant use among adults. Clinical course and treatment outcomes of those with eating disorders and MA dependence have only been described in case studies to date (Neal, Abraham, & Russell, 2009).

Recent evidence suggests that the risk of illicit drug use is strongest among eating disordered individuals with binge eating (CASA, 2003; Herzog et al., 2006) and purging (Root et al., 2010) components characterizing their illness. Likewise, several such studies have documented higher rates of stimulant use including cocaine and amphetamines among those with bulimia nervosa, relative to individuals with anorexia nervosa (Root et al., 2010; Wiederman & Pryor, 1996). In fact, in the largest study to date examining the comorbidity of anorexia nervosa and substance use disorders, those with a lifetime history of both anorexia and bulimia were more than six times more likely to report amphetamine use when compared to those with anorexia only, a risk far greater in magnitude than that observed for any other substance of abuse, including cannabis, cocaine, and opiates (Root et al., 2010).

In a recent study of MA-dependent adults three years after treatment, the presence of psychiatric illness was associated with poorer treatment and functional outcomes at 3-year follow-up (Glasner et al., 2010). However, the course and outcomes of those with eating disorders was not examined in this study. As such, in this same cohort of MA users, the purpose of the current investigation was to characterize the relationship of eating disorders with post-treatment substance use frequency as well as healthcare utilization and functional outcomes. We hypothesized that (a) bulimia nervosa would be observed at a higher rate than anorexia nervosa in this population; and (b) the presence of an eating disorder would be associated with greater psychiatric and functional impairment and poorer substance use outcomes relative to MA users without eating disorders.

METHODS

Participants

The present study included 526 MA dependent adults who participated in the Methamphetamine Treatment Project (MTP), a randomized, controlled trial of psychosocial treatments for MA dependence described elsewhere (Rawson et al., 2004). MTP participants were treatment-seeking, MA dependent adults (age 18 or over) recruited upon entry to outpatient drug treatment programs ranging from 8 to 16 weeks in duration in California, Montana, and Hawaii. To be included in the study, participants were required to meet DSM-IV criteria for MA dependence, be current MA users (having used MA within one month prior to treatment admission unless in a constrained environment, e.g., jail), a resident of the same geographic area as the treatment facility, English language proficient, and able to provide informed consent. Individuals were excluded if they exhibited medical or psychiatric impairment that warranted hospitalization or other primary treatment, required medical detoxification from any substance of abuse, had been enrolled in another treatment program within the past 30 days; and/or had medical, legal, housing, or transportation problems precluding their safety or ability to participate in treatment. Although the inclusion and exclusion criteria may have restricted the range of functional disability in the sample, participant characteristics were consistent with stimulant using cohorts previously studied in psychosocial clinical trials (Rawson et al., 2000; Rawson et al., 2004).

The follow-up interview was completed an average of 3.1 years after treatment completion ($SD=0.48$) and consisted of a medical examination, a psychiatric diagnostic interview, a psychosocial interview, and administration of self-report questionnaires. Of the 587 participants who were interviewed for the follow-up study, 61 did not complete the psychiatric diagnostic component of the interview for various reasons, including having moved out of the area, constraints due to incarceration, inability to schedule a convenient appointment, and/or declining this portion of the assessment. Thus, the final sample included 526 participants. After providing a complete description of the study to the subjects, informed consent was obtained. All procedures were performed in accord with the standards of the Committee of Human Experimentation of UCLA and the study was approved by this committee.

Procedures

Trained interviewers conducted face-to-face assessments with participants at baseline, treatment discharge, and approximately 3 years after discharge. The Addiction Severity Index (ASI; McLellan, Luborsky, Woody, & O'Brien, 1980) was administered at all assessments and provided composite scores in seven functional domains (alcohol, drug, psychiatric, medical, legal, family, employment).

The Life Experience Timeline interview (LET; Hillhouse, Marinelli-Casey, & Rawson, 2005), a measure adapted from the Natural History Interview (Nurco, Bonito, Lerner, & Balter, 1975) was used to quantify MA use in the follow-up period. Using the LET, substance use history is gathered using a month-by-month timeline approach that links substance use to important life events.

At 3-year follow-up, the The Mini-International Neuropsychiatric Interview (MINI; Sheehan et al., 1998), a brief structured diagnostic interview for assessing DSM-IV and ICD-10 psychiatric disorders was administered to provide eating, alcohol, and other substance use disorder diagnostic information. Other Axis I and Axis II diagnoses were also assessed using the MINI but were not the focus of this investigation (see Glasner-Edwards et al., 2010). All interviewers were trained to criterion on the MINI using standardized procedures including didactic instruction, practice interviews, and direct observation.

Statistical Analysis

For all statistical tests, alpha was set at the 0.05 level. Primary outcome measures included treatment adherence and frequency of MA use during follow-up. Treatment adherence was a continuous variable indicating the number of weeks of scheduled treatment during which the participant attended.

Mixed model repeated measures analyses with main effects of time and eating disorder diagnosis and the interaction among these variables were used to compare ASI scores for those with and without eating disorders across baseline, treatment-end and 3-year follow-up.

RESULTS

The original MTP sample ($N=1016$) was compared with the subset of participants who were included in the current investigation ($N=526$) by using t-tests and chi-square tests for age, education, gender, marital status, route of MA administration, employment, and baseline ASI composite scores. In all analyses, there were no significant differences between the patients in the current study and the original MTP sample.

Demographic characteristics of the original MTP sample are described elsewhere (Rawson et al., 2004; Zweben et al., 2004). At 3-year follow-up, the sample was 68% Caucasian, 2%

African American, 12% Asian, and 14% Hispanic, with an average age of 36.2 (SD=8.0); 76% completed high school and 4% had college education and/or beyond. More than half (60%; n=316) of the participants were female. Regarding employment, 60% were working full- or part-time and 32% were unemployed; 4% were students, 2% were retired and 2% were in a controlled environment. Forty-seven percent were never married, 37% were divorced or separated, and 16% were married. At the baseline (i.e., pretreatment) assessment, participants reported using MA an average of 12 days out of the past 30 (SD=9.6). The preferred route of administration was smoking (62%), followed by intravenous injection (28%) and intranasal use (10%). There were no differences in demographic or substance use characteristics among those who completed the psychiatric assessment (n=526) relative to those who did not (n=61).

Of the 526 participants, 2.4% (N=13) met criteria for Bulimia Nervosa at 3-year follow-up. The majority of those with this diagnosis were female (n=9). None of the participants met criteria for Anorexia Nervosa. Self-reported MA use frequency during the follow-up period was significantly higher among those with (M=21.8 months, SD=4.1) versus without (M=13.9 months, SD=0.6) bulimia, $t=-1.98$, $df=521$, $p=0.02$. In addition, those with bulimia had five-fold greater odds of having been hospitalized within the 12 months prior to the 3-year follow-up interview relative to those without this diagnosis (Odds Ratio [OR]=5.0, 95% Confidence Interval [C.I.], 1.6-15.8) and reported more hospitalizations than those without bulimia ($\beta=0.66$, $SE=0.25$; $p<0.001$).

ASI composite scores at baseline, discharge and follow-up for those with and without bulimia are plotted in Figures 1 and 2, respectively, and the results of mixed model linear regressions testing the effects of time, eating disorder diagnosis, and their interaction on ASI scores are provided in Table 1. Controlling for demographics, pre-treatment MA use frequency and route of MA administration, these analyses revealed a significant time x diagnosis interaction on three of the ASI composites (psychiatric, family, and employment). These interactions indicated that the group with bulimia reported problems of significantly greater severity over time in these areas, with evidence of notable declines in functioning from discharge to 3-year follow-up.

DISCUSSION

This is the first study to examine the relationship between eating disorders and both substance use and functional outcomes in MA-dependent adults. In this study, comorbid bulimia nervosa was observed in more than 2% of MA users, a prevalence rate consistent with U.S. population estimates (National Institute of Mental Health, 2008). Though none of the subjects met criteria for anorexia nervosa, these findings parallel the low prevalence rate of anorexia nervosa relative to bulimia in the general population (American Psychiatric Association Work Group on Eating Disorders, 2000). Moreover, the findings are consistent with an emerging body of work indicating a stronger association between substance use disorders and eating disorders among those with bulimic symptomatology, as compared to individuals with anorexia (Herzog et al., 2006; Holderness, Brooks-Gunn, & Warren, 1994; Lacey, 1993; Root et al., 2010;). In a study of outpatients with eating disorders, for example, amphetamine use was reported in 18% of women with bulimia but only 3% of those with anorexia (Wiederman & Pryor, 1996), a pattern of findings that has been replicated in other clinical samples (e.g., Root et al., 2010).

Though extant literature concerning the potential impact of MA dependence and eating disorder comorbidity on clinical course and treatment outcomes is limited, findings from this study demonstrate a substantially increased frequency of post-treatment MA use and more frequent hospitalizations among individuals with bulimia, relative to those without a

concomitant eating disorder. These poorer treatment outcomes might be anticipated in light of the shared risk factors and characteristics between MA use and eating disorders, including impulsivity, more frequent psychiatric comorbidity, and higher rates of suicide attempts (CASA, 2003; Glasner-Edwards et al., 2009; MacLaren & Best, 2009; Newton, De La Garza, Kalechstein, Tziortzis, & Jacobsen, 2009).

In the present study, individuals with bulimia suffered declines in functioning over time in several domains, including psychiatric, family and employment, relative to those without bulimia. These findings are consistent with prior literature demonstrating impairments in functional outcomes associated with co-occurring psychiatric and substance use disorders (Ritsher, McKellar, Finney, Otilingam, & Moos, 2002). In prior studies of the same cohort of MA users, psychiatric comorbidity was also associated with functional decline in several areas among those with affective, anxiety, and psychotic disorders (Glasner-Edwards et al., 2009, 2010). However, the significant deterioration evidenced in the family domain was unique to the bulimic subgroup that was the focus of the present investigation. Though the etiology and clinical significance of this association is difficult to ascertain, it is consistent with an accumulating literature on the importance of family dysfunction in the development of disordered eating (e.g., Kluck, 2008).

Study Limitations

This study had several potential limitations. First, the MINI diagnostic interview was performed at a single time point after treatment, thereby limiting the ability to characterize the effects of treatment on eating disorders or to fully elucidate the clinical course of bulimia in this population. As such, although it is possible that some bulimic symptomatology emerged among successfully treated MA users in a compensatory manner (i.e., compulsive binge eating in lieu of MA or other substance use), we were not able to evaluate this question empirically. Moreover, the MINI does not distinguish between subtypes of eating disorders apart from the broader categories of Anorexia and Bulimia; as such, the prevalence and treatment outcomes of Eating Disorder NOS cases often observed in clinical settings remains unknown. Likewise, the frequency of eating disorders may have been somewhat underestimated in this sample, thereby limiting the generalizability of the findings. Because the subgroup with eating disorders was small and few studies have examined MA users with concomitant eating disorders, it is unclear whether this subgroup is representative of other eating disordered MA users. In addition, due to the limited statistical power resulting from the size of the eating disordered subgroup, the impact of other comorbidities on treatment outcomes could not be assessed. Thus, replication of this investigation with more rigorous diagnostic procedures is warranted.

Conclusions

Findings from the current investigation highlight the importance of identifying and addressing MA use among individuals with bulimia nervosa. These results replicate and extend prior reports demonstrating that substance use and eating disorder comorbidity is a significant and clinically relevant concern and provide evidence that co-occurring bulimia in MA users is associated with greater overall functional impairment, healthcare utilization, and poorer treatment outcomes. As such, the present findings underscore the clinical utility of screening, identification, and treatment of stimulant use disorders in patients with eating disorders as well as awareness of stimulants as potential agents to promote weight loss. Further research is warranted to investigate the temporal relationship between eating disorders and MA use disorders and to further elucidate the clinical course and prognostic implications of MA use in individuals with bulimia.

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Figure 1.
Mean Addiction Severity Index (ASI) scale scores as a function of time among MA dependent adults with bulimia nervosa at 3-year follow-up (N=13).

Figure 2. Mean Addiction Severity Index (ASI) scale scores as a function of time among MA dependent adults without bulimia nervosa at 3-year follow-up (N=513).

Table 1

Changes in psychosocial, psychiatric, and substance-related impairment among MA dependent adults at 3-year follow-up: linear mixed-effects models

Scale	Bulimia Diagnosis		Time		Bulimia Diagnosis $\times$ Time	
	β	p	β	p	β	p
Addiction Severity Index						
Psychiatric Composite	– 0.05	0.41	–0.01	<0.001	0.03	0.03
Medical Composite	0.08	0.34	0.00	0.70	–0.01	0.72
Employment Composite	–0.14	0.11	–0.02	<0.001	0.05	0.01
Alcohol Composite	–0.01	0.78	–0.01	<0.001	0.01	0.39
Drug Composite	0.01	0.86	–0.03	<0.001	0.00	0.59
Legal Composite	–0.07	0.23	–0.04	<0.001	0.02	0.22
Family Composite	–0.11	0.09	–0.03	<0.001	0.03	0.04