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Anorexia Nervosa, Bulimia Nervosa, and Binge Eating Disorder in Midlife and Beyond.

Permalink

<https://escholarship.org/uc/item/4577d3x2>

Journal

The Journal of nervous and mental disease, 203(8)

ISSN

0022-3018

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Publication Date

2015-08-01

DOI

10.1097/nmd.0000000000000333

Peer reviewed

Anorexia Nervosa, Bulimia Nervosa, and Binge Eating Disorder in Midlife and Beyond

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Abstract: We examined eating disorders in midlife and beyond by comparing frequency of anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), and other specified feeding or eating disorder (OSFED) among midlife eating disorder treatment-seeking individuals and younger controls. We also compared demographic and eating disorder-related characteristics across diagnoses and age groups. Participants included 2,118 treatment-seeking adults who self-reported their eating-related symptoms on the Eating Disorder Questionnaire. Results showed that percent of patients with BN was significantly lower whereas percent of patients with BED and OSFED was significantly higher among midlife relative to younger patients. Percent of patients with AN did not differ between midlife and younger patients. Additionally, midlife and younger patients with BED and OSFED differed on several demographic (*e.g.*, marital status) and eating disorder-related characteristics (*e.g.*, BMI, compulsive exercising). This study suggests that BN is less common whereas BED and OSFED are more common among midlife eating disorder treatment-seeking individuals relative to younger controls. In addition, AN and BN present fairly similarly whereas BED and OSFED present fairly differently among midlife patients relative to younger controls. Attention to these differences and similarities is necessary to understand eating disorders in midlife.

Key Words: Eating disorders, anorexia nervosa, bulimia nervosa, binge eating disorder, midlife

(*J Nerv Ment Dis* 2015;203: 583–590)

Eating disorders have been found to be associated with several serious psychiatric (*e.g.*, mood and anxiety disorders) and medical morbidities (*e.g.*, abnormal heart rhythms, reduced bone density, electrolyte disturbances, dental enamel damage) (Fairburn and Harrison, 2003). However, the considerable majority of the existing research on eating disorders has focused on adolescents and young adults. There is thus a gap in knowledge regarding the specific presentation of eating disorders and their correlates in midlife and beyond (Maine et al., 2015; Mangweth-Matzek et al., 2014). A better understanding of eating disorders in midlife is important for several reasons. First, midlife individuals (40 years and older) comprise almost one-third of the total population of the world (Howden and Meyer, 2011). Second, some research suggests that the prevalence of eating disorders in midlife has increased in recent years (Ackard et al., 2013) and that midlife individuals with eating disorders have higher rates of poor outcome and death relative to younger individuals with eating disorders (Ackard et al., 2014). Lastly, a better

understanding of the specific presentation of eating disorders across the lifespan might help tailor interventions for patients of different ages.

There has been a paucity of studies investigating the prevalence of eating disorders across the lifespan. The research that exists suggests that up to 4.6% of midlife women, aged 40 to 60, may meet full criteria for a clinical diagnosis of an eating disorder (Mangweth-Matzek et al., 2014) and that the admission rates of midlife individuals to eating disorder clinics have risen over the past decades (Ackard et al., 2013; Forman and Davis, 2005). For example, Ackard et al. (2013) reported that the overall percent of midlife women (40 years and above) who presented to an inpatient eating disorders program in Minnesota, USA, increased significantly from an average of 4.7% of all admissions in 1989 to 2001 to an average of 11.6% of all admissions in 2002 to 2006. Forman and Davis (2005) reported that as many as 23% of women presenting for inpatient eating disorder treatment in Pennsylvania, USA, fell into the midlife group. However, this study defined midlife as 35+ years, which is in contrast to most other work in this area that has defined midlife as 40 years and above (Ackard et al., 2013; Cumella and Kally, 2008; Kally and Cumella, 2008; Mangweth-Matzek et al., 2006). This difference may have contributed to the high proportion of midlife patients reported by Forman and Davis (2005).

The aforementioned studies provide some preliminary information regarding the prevalence of eating disorders in midlife, but the specific prevalence of each eating disorder diagnosis (*i.e.*, anorexia nervosa [AN], bulimia nervosa [BN], binge eating disorder [BED], other specified feeding or eating disorder [OSFED]) across the lifespan remains unclear. Indeed, few studies have looked at the prevalence of specific eating disorder diagnoses in midlife. The few studies that have been conducted have mainly focused on AN and BN and suggest that midlife individuals present for treatment with significantly more diagnoses of AN and significantly fewer diagnoses of BN relative to younger comparison groups (Ackard et al., 2013; Kally and Cumella, 2008). Despite these data about individuals with AN and BN, little is known about BED and OSFED diagnoses across the lifespan.

Research examining the similarities and differences between young and midlife patients with eating disorders has typically examined these two groups without differentiating specific eating disorder diagnoses (Ackard et al., 2013; Cumella and Kally, 2008; Forman and Davis, 2005; Kally and Cumella, 2008; Mangweth-Matzek et al., 2006). Moreover, the research studies that exist have mostly been conducted in inpatient settings and suggest that midlife individuals with eating disorders generally have greater eating disorder severity, but less body dissatisfaction relative to younger controls (*e.g.*, Cumella and Kally, 2008). Some research suggests that midlife individuals with eating disorders have higher levels of physical and psychiatric comorbidity relative to younger controls (Forman and Davis, 2005; Scholtz et al., 2010). For instance, Forman and Davis (2005) found that midlife individuals with eating disorders experienced greater change with regard to depression and body image during residential treatment relative to young adults. These studies provide some insight on the characteristics of midlife individuals with eating disorders in inpatient and residential settings. However, research exploring the characteristics of midlife individuals across the eating disorder diagnostic spectrum in outpatient settings is relatively scarce.

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ISSN: 0022-3018/15/20308-0583

DOI: 10.1097/NMD.0000000000000333

This study was designed to extend the research on eating disorders in midlife and beyond by examining midlife eating disorder treatment-seeking individuals with AN, BN, BED, and OSFED in several outpatient settings in the USA and comparing them to eating disorder treatment-seeking younger counterparts. Given the dearth of research in this area, we focused on two exploratory research questions: (1) The inter-age/intra-diagnosis question: What are the similarities and differences between midlife and younger individuals with AN, BN, BED, and OSFED?; (2) The intra-age/inter-diagnosis question: What are the similarities and differences between midlife individuals with AN, BN, BED, and OSFED? Findings from the current study may contribute to better understanding eating disorders across the lifespan and may have implications for treatment and prevention efforts.

METHOD

Participants

Participants were 2,118 eating disorder treatment-seeking adults aged 18 to 75 years ($M = 29.09 \pm 9.93$) who were divided into three age groups: 18 to 25 years (41.5%; $n = 880$), 26 to 39 years (41.3%; $n = 874$), and 40 years and above (17.2%; $n = 364$). The age of 40 years was selected based on the widespread definition of middle age in the scientific literature (Lachman, 2004) and based on previous studies on eating disorders in midlife (Ackard et al., 2013; Cumella and Kally, 2008; Kally and Cumella, 2008; Mangweth-Matzek et al., 2006). The 18 to 25 years age group was selected as the comparison group given that a significant majority of individuals diagnosed with an eating disorder are in this age range (Fairburn and Harrison, 2003), and that this age group is often used as a comparison group in the existing literature on eating disorders in midlife (Cumella and Kally,

2008). Participants in the second group (26–39 years) were excluded from the final analyses to ensure that the study group (40 years and above) and the comparison group (18–25 years) were distinct in age. Nevertheless, means and standard deviations for this group (26–39 years) are presented in Tables 1, 2, 3, and 4 for descriptive purposes. Participants in all three groups appeared to meet DSM-5 (American Psychiatric Association, 2013) criteria for AN (12.8%; $n = 272$), BN (43.4%; $n = 919$), BED (16.1%; $n = 342$), or OSFED (27.6%; $n = 585$) based on self-report (see below). The clinical characteristics of the OSFED group were consistent with previous reports regarding this classification (Eddy et al., 2008).

Procedures

Data were collected as part of the initial psychological evaluation at four outpatient eating disorder treatment centers (Neuropsychiatric Research Institute and the Eating Disorders Institute, Fargo, ND; Department of Psychiatry and Behavioral Neuroscience, The University of Chicago, Chicago, IL; Department of Psychiatry, University of Minnesota School of Medicine, Minneapolis, MN; and the Center for Eating Disorders and Psychotherapy, Worthington, OH). Data were collected by self-report at the baseline assessment before participants were seen by the clinician or initiated treatment. Approximately 90% of clinic cases presented with the questionnaire provided informed consent to participate in the study. Each data collection site received Institutional Review Board approval for the study.

Measures

Participants self-reported their current height and weight and current and past eating disorder symptoms on the Eating Disorder Questionnaire (EDQ version 8.1) (Mitchell, 2005). The EDQ is a

TABLE 1. Comparisons at Intake Evaluation Between Individuals With AN by Age Group: Means (Standard Deviations)

	AN Comparison Group		AN Study Group		Test Statistics ^a
	18–25 (<i>n</i> = 124)	26–39 (<i>n</i> = 104)	40 and up (<i>n</i> = 44)		
Demographic					
Age	20.77 (1.74)	30.15 (4.12)	48.77 (6.80)	$F(1,166) = 1,788.5, p < 0.001$	
Female, % (<i>n</i>)	96.8 (120)	93.3 (97)	95.5 (42)	$\chi^2(1,168) = 0.16, p = 0.685$	
Caucasian, % (<i>n</i>)	87.1 (108)	88.5 (92)	90.1 (40)	$\chi^2(1,168) = 0.81, p = 0.367$	
Never married, % (<i>n</i>)	70.2 (87)	74.0 (77)	65.9 (29)	$\chi^2(1,168) = 0.275, p = 0.600$	
Have children, % (<i>n</i>)	25.2 (29)	19.4 (19)	18.6 (8)	$\chi^2(1,158) = 0.76, p = 0.382$	
Medical and weight variables					
≥1 medical symptom, % (<i>n</i>)	9.9 (12)	19.8 (20)	60.5 (26)	$\chi^2(1,164) = 45.53, p < 0.001$	
Current BMI	16.10 (1.14)	16.09 (1.12)	16.34 (0.92)	$F(166) = 1.6, p = 0.209$	
Self-rated desired BMI	17.16 (3.44)	17.57 (1.49)	17.64 (1.73)	$F(144) = 0.7, p = 0.403$	
Feel fat at current weight ^b	1.92 (1.12)	1.77 (1.12)	2.11 (1.24)	$F(1,109) = 0.6, p = 0.420$	
Age at minimum adult BMI	23.79 (8.06)	23.92 (7.04)	23.46 (7.71)	$F(1,153) = 0.05, p = 0.823$	
Age at maximum adult BMI	20.84 (4.85)	20.27 (4.41)	20.39 (4.11)	$F(1,147) = 0.3, p = 0.597$	
Eating-related symptoms ^c					
Fasting	2.44 (2.26)	2.78 (2.58)	2.42 (2.13)	$F(104) = 0.003, p = 0.950$	
Skipping meals	5.23 (2.76)	4.89 (2.65)	4.72 (2.78)	$F(148) = 1.0, p = 0.317$	
Exercising	4.66 (2.19)	4.88 (1.91)	4.53 (1.94)	$F(1,157) = 0.1, p = 0.752$	
Binge eating	3.31 (2.71)	3.07 (2.67)	3.60 (2.64)	$F(153) = 0.4, p = 0.546$	
Self-induced vomiting	3.46 (2.96)	2.81 (2.69)	3.28 (2.82)	$F(152) = 0.1, p = 0.732$	
Use of laxatives	2.61 (2.55)	2.07 (2.13)	2.26 (2.19)	$F(154) = 0.6, p = 0.434$	

^aComparisons were conducted between the study and the control groups.

^bRange = 1 to 5 (1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always).

^cRefers to the past month only. Range = 1 to 8 (1 = never; 2 = once a month or less; 3 = several times a month; 4 = once a week; 5 = twice a week; 6 = three to six times a week; 7 = once a day; 8 = more than once a day).

TABLE 2. Comparisons at Intake Evaluation Between Individuals With BN by Age Group: Means (Standard Deviations)

	BN Comparison Group		BN Study Group		Test Statistics ^a
	18–25 (<i>n</i> = 416)	26–39 (<i>n</i> = 394)	40 and up (<i>n</i> = 109)		
Demographic					
Age	20.98 (1.62)	29.49 (4.211)	46.10 (5.55)	$F(523) = 6,463.3, p < 0.001$	
Female, % (<i>n</i>)	96.1 (399)	96.4 (380)	93.6 (102)	$\chi^2(1,524) = 1.35, p = 0.244$	
Caucasian, % (<i>n</i>)	86.1 (358)	89.1 (351)	85.3 (93)	$\chi^2(1,525) = 0.11, p = 0.741$	
Never married, % (<i>n</i>)	73.8 (307)	69.3 (273)	69.7 (76)	$\chi^2(1,525) = 0.726, p = 0.394$	
Have children, % (<i>n</i>)	18.3 (72)	22.1 (83)	18.8 (19)	$\chi^2(1,494) = 0.01, p = 0.910$	
Medical and weight variables					
≥1 medical symptom, % (<i>n</i>)	15.3 (63)	15.9 (62)	46.5 (46)	$\chi^2(1,510) = 46.03, p < 0.001$	
Current BMI	22.87 (5.95)	23.01 (5.63)	24.17 (6.45)	$F(510) = 3.9, p = 0.048$	
Self-rated desired BMI	19.63 (2.12)	19.78 (2.13)	20.36 (2.08)	$F(490) = 9.4, p = 0.002$	
Feel fat at current weight ^b	3.24 (1.3)	3.25 (1.19)	3.26 (1.30)	$F(1,291) = 0.008, p = 0.931$	
Age at minimum adult BMI	21.30 (4.42)	22.07 (5.49)	21.19 (5.01)	$F(1,477) = 0.04, p = 0.842$	
Age at maximum adult BMI	21.75 (5.74)	21.98 (5.19)	23.37 (8.02)	$F(1,474) = 5.3, p = 0.021$	
Eating-related symptoms ^c					
Fasting	2.93 (2.32)	2.69 (2.13)	2.51 (2.08)	$F(308) = 2.2, p = 0.135$	
Skipping meals	4.66 (2.51)	4.86 (2.51)	4.73 (2.53)	$F(478) = 0.05, p = 0.827$	
Exercising	5.00 (1.70)	4.96 (1.62)	4.41 (1.72)	$F(1,505) = 10.0, p = 0.002$	
Binge eating	6.78 (1.21)	6.82 (1.17)	6.48 (1.28)	$F(523) = 5.2, p = 0.023$	
Self-induced vomiting	6.07 (2.29)	6.14 (2.23)	5.76 (2.35)	$F(522) = 1.6, p = 0.212$	
Use of laxatives	2.54 (2.22)	2.64 (2.32)	2.33 (2.16)	$F(1,505) = 0.8, p = 0.382$	

^aComparisons were conducted between the study and the control groups.^bRange = 1 to 5 (1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always).^cRefers to the past month only. Range = 1 to 8 (1 = never; 2 = once a month or less; 3 = several times a month; 4 = once a week; 5 = twice a week; 6 = three to six times a week; 7 = once a day; 8 = more than once a day).

self-report measure used to collect current and historical information on patients being evaluated for eating disorders. Although the EDQ was not designed as a diagnostic instrument, DSM-5 criteria (*e.g.*, current body mass index [BMI] ≤ 17.5 for AN, binge eating ≥ 1 time per week and regular use [*i.e.*, ≥ 1 time per week] of compensatory behaviors for BN, absence of use of compensatory behaviors for BED) were used to generate eating disorder diagnoses as described by Mitchell et al. (2007). EDQ-generated eating disorder diagnoses show relatively good agreement with those derived from a semi-structured interview (Eddy et al., 2009; Keel et al., 2002; Mitchell et al., 2007).

Statistical Analysis

Data were analyzed using SPSS version 19. Participants in the study group (40 years and above) and in the comparison group (18–25 years) were compared using analyses of variance (ANOVAs) and χ^2 analyses on demographic information (*i.e.*, age, sex, race, marital status, having children), medical and weight variables (*i.e.*, medical symptoms, BMI, subjective ideal BMI, feeling of being fat, age at minimum BMI, age at maximum BMI), and eating disorder behavioral symptoms experienced over the past month (*i.e.*, fasting, skipping meals, exercising, binge eating, self-induced vomiting, use of laxatives). To reduce the possibility of type I error, and due to the large number of analyses that were conducted, α was adjusted to $p < 0.01$.

RESULTS

Results indicated that 12.1% (*n* = 44) of midlife treatment-seeking individuals were diagnosed with AN, 29.9% (*n* = 109) with BN, 24.7% (*n* = 90) with BED, and 33.2% (*n* = 121) with OSFED. Percent of individuals with AN did not differ significantly ($\chi^2(1,1244) = 0.884, p = 0.347$) between the midlife group and the comparison group

(18–25 years). In contrast, percent of patients with BN was significantly lower ($\chi^2(1,1244) = 31.695, p < 0.001$), and percent of patients with BED and OSFED was significantly higher (BED: $\chi^2(1,1244) = 24.83, p < 0.001$; OSFED: $\chi^2(1,1244) = 7.791, p = 0.005$) among the midlife group relative to the comparison group (see Fig. 1).

Examination of the differences between midlife individuals with AN and the younger comparison group revealed that midlife individuals with AN did not differ from the comparison group on the demographic variables of sex ($\chi^2(1,168) = 0.16, p = 0.685$), race ($\chi^2(1,168) = 0.81, p = 0.367$), marital status ($\chi^2(1,168) = 0.275, p = 0.600$), or having children ($\chi^2(1,158) = 0.76, p = 0.382$) (Table 1). In addition, no differences were found between midlife individuals with AN and the younger comparison group on BMI ($F(166) = 1.6, p = 0.209$), subjective ideal BMI ($F(144) = 0.7, p = 0.403$), feeling fat ($F(1,109) = 0.6, p = 0.420$), age at minimum and maximum BMI ($F(1,153) = 0.05, p = 0.823$; $F(1,147) = 0.3, p = 0.597$), or frequency of eating disorder behavioral symptoms (see Table 1). The only significant difference that was found between midlife individuals with AN and the younger comparison group was on reported medical symptoms ($\chi^2(1,164) = 45.53, p < 0.001$). That is, 60.5% of middle-aged individuals with AN reported one or more medical symptoms *vs.* 9.9% of participants in the comparison group.

Examination of the differences between midlife individuals with BN and the younger comparison group revealed that midlife individuals with BN did not differ from the comparison group on the demographic variables of sex ($\chi^2(1,524) = 1.35, p = 0.244$), race ($\chi^2(1,525) = 0.11, p = 0.741$), marital status ($\chi^2(1,525) = 0.726, p = 0.394$), or having children ($\chi^2(1,494) = 0.01, p = 0.910$) (Table 2). Midlife individuals with BN tended to have higher BMIs relative to the younger comparison group ($F(510) = 3.9, p = 0.048$), but this difference only approached the selected level of significance. Subjective ideal BMI

TABLE 3. Comparisons at Intake Evaluation Between Individuals With BED by Age Group: Means (Standard Deviations)

	BED Comparison Group		BED Study Group	
	18–25 (<i>n</i> = 116)	26–39 (<i>n</i> = 136)	40 and up (<i>n</i> = 90)	Test Statistics ^a
Demographic				
Age	20.55 (1.6)	30.58 (4.41)	46.67 (6.48)	$F(204) = 1749.8, p < 0.001$
Female, % (<i>n</i>)	91.4 (106)	91.9 (125)	83.3 (75)	$\chi^2(1,206) = 3.08, p = 0.079$
Caucasian, % (<i>n</i>)	85.3 (99)	88.2 (120)	87.8 (79)	$\chi^2(1,206) = 0.14, p = 0.708$
Never married, % (<i>n</i>)	56.9 (66)	49.3 (67)	33.3 (30)	$\chi^2(1,206) = 11.31, p = 0.001$
Have children, % (<i>n</i>)	33.3 (34)	45.6 (57)	48.1 (39)	$\chi^2(1,183) = 4.13, p = 0.042$
Medical and weight variables				
≥1 medical symptom, % (<i>n</i>)	40.4 (44)	41.4 (55)	83.1 (64)	$\chi^2(1,186) = 33.87, p < 0.001$
Current BMI	33.85 (12.05)	33.43 (10.78)	40.17 (11.75)	$F(199) = 13.9, p < 0.001$
Self-rated desired BMI	22.53 (4.49)	22.75 (3.16)	24.57 (4.32)	$F(198) = 10.5, p = 0.001$
Feel fat at current weight ^b	4.22 (1.08)	4.09 (1.19)	4.49 (0.78)	$F(1,172) = 3.58, p = 0.060$
Age at minimum adult BMI	21.81 (4.72)	22.64 (6.06)	23.28 (6.69)	$F(1,190) = 3.1, p = 0.079$
Age at maximum adult BMI	29.23 (10.20)	30.65 (11.21)	35.51 (10.39)	$F(1,196) = 18.1, p < 0.001$
Eating-related symptoms^c				
Fasting	1.75 (1.57)	1.88 (1.69)	1.28 (0.79)	$F(174) = 6.45, p = 0.012$
Skipping meals	3.80 (2.44)	3.67 (2.60)	2.70 (2.15)	$F(194) = 10.8, p = 0.001$
Exercising	3.82 (1.96)	3.95 (1.79)	3.04 (1.76)	$F(1,200) = 8.5, p = 0.004$
Binge eating	6.45 (1.13)	6.3 (1.13)	5.91 (1.04)	$F(204) = 12.3, p = 0.001$
Self-induced vomiting	1.0 (0.0)	1.0 (0.0)	1.0 (0.0)	$F(197) = 0.0, p = 1$
Use of laxatives	1.0 (0.0)	1.0 (0.0)	1.0 (0.0)	$F(202) = 0.0, p = 1$

^aComparisons were conducted between the study and the control groups.^bRange = 1 to 5 (1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always).^cRefers to the past month only. Range = 1 to 8 (1 = never; 2 = once a month or less; 3 = several times a month; 4 = once a week; 5 = twice a week; 6 = three to six times a week; 7 = once a day; 8 = more than once a day).

was also significantly higher among the midlife BN group relative to the comparison group ($F(490) = 9.4, p = 0.002$). Two eating disorder behavioral symptoms were found to differ between the BN groups: frequency of exercising was lower among the BN midlife group at a significant level ($F(1,505) = 10.0, p = 0.002$) and frequency of binge eating was lower in this group at a level that approached significance ($F(523) = 5.2, p = 0.023$). Reported medical symptoms were higher for midlife individuals with BN (46.5%) compared to the comparison group (15.3%) ($\chi^2(1,510) = 46.03, p < 0.001$).

Examination of the differences between midlife individuals with BED and the younger comparison group revealed that midlife individuals with BED did not differ from the comparison group on the demographic variables of sex ($\chi^2(1,206) = 3.08, p = 0.079$) or race ($\chi^2(1,206) = 0.14, p = 0.708$) (Table 3). However, a smaller proportion of midlife individuals with BED reported being never married (33.3%) compared to the younger comparison group (56.9%) ($\chi^2(1,206) = 11.31, p = 0.001$). Additionally, a greater proportion of midlife individuals with BED had children (48.1%) compared to the younger comparison group (33.3%) ($\chi^2(1,183) = 4.13, p = 0.042$); however, this difference only approached the selected level of significance. In addition, midlife individuals with BED had significantly higher BMIs ($F(199) = 13.9, p < 0.001$) as well as subjective ideal BMIs ($F(198) = 10.5, p = 0.001$) relative to the younger comparison group. Several eating disorder behavioral symptoms were found to differ between the BED groups: frequency of skipping meals ($F(194) = 10.8, p = 0.001$), exercising ($F(1,200) = 8.5, p = 0.004$), and binge eating ($F(204) = 12.3, p = 0.001$) were significantly lower among the BED midlife group relative to the younger comparison group. Reported medical symptoms were higher for midlife individuals with BED (83.1%) compared to the comparison group (40.4%) ($\chi^2(1,186) = 33.87, p < 0.001$).

Examination of the differences between midlife individuals with OSFED and the younger comparison group revealed that midlife individuals with OSFED did not differ from the comparison group on the demographic variables of sex ($\chi^2(1,344) = 0.08, p = 0.722$), race ($\chi^2(1,345) = 0.34, p = 0.558$), or having children ($\chi^2(1,322) = 1.86, p = 0.172$) (Table 4). Marital status was the only demographic variable to differ between the groups ($\chi^2(1,345) = 6.92, p = 0.009$), such that a smaller proportion of midlife individuals with BED reported being never married (48.8%) compared to the younger comparison group (63.4%). Midlife individuals with OSFED reported significantly higher BMIs ($F(330) = 35.6, p < 0.001$) as well as subjective ideal BMIs ($F(320) = 26.2, p < 0.001$) relative to the younger comparison group. The OSFED midlife group was also significantly more likely to feel fat at their current weight ($F(1,287) = 9.9, p = 0.002$) relative to the comparison group. Two eating disorder behavioral symptoms were found to differ between the OSFED groups: frequency of exercising ($F(1,336) = 10.0, p = 0.002$) and using laxatives ($F(1,339) = 13.3, p < 0.001$) were lower among the OSFED midlife group relative to the comparison group. Reported medical symptoms were higher for midlife individuals with OSFED (75.7%) compared to the comparison group (35.3%) ($\chi^2(1,325) = 46.85, p < 0.001$).

Comparisons of midlife individuals across diagnoses (*i.e.*, AN, BN, BED, and OSFED) revealed several significant differences (Table 5). Although the demographic characteristics of sex ($\chi^2(1,364) = 9.43, p = 0.024$) and race ($\chi^2(1,364) = 1.26, p = 0.738$) did not differ between the diagnostic groups, greater proportions of midlife individuals with AN and BN were never married ($\chi^2(1,364) = 30.29, p < 0.001$) and had no children ($\chi^2(1,340) = 22.84, p < 0.001$) relative to individuals with BED (and OSFED in the case of having children). In addition, smaller proportions of individuals with AN and BN reported

TABLE 4. Comparisons at Intake Evaluation Between Individuals With OSFED by Age Group: Means (Standard Deviations)

	OSFED Comparison Group		OSFED Study Group	Test Statistics ^a
	18–25 (<i>n</i> = 224)	26–39 (<i>n</i> = 240)	40 and up (<i>n</i> = 121)	
Demographic				
Age	20.98 (1.63)	30.09 (4.26)	47.29 (6.59)	$F(343) = 3211.9, p < 0.001$
Female, % (<i>n</i>)	94.2 (210)	92.9 (223)	93.4 (113)	$\chi^2(1,344) = 0.08, p = 0.722$
Caucasian, % (<i>n</i>)	90.2 (202)	92.5 (222)	91.7 (111)	$\chi^2(1,345) = 0.34, p = 0.558$
Never married, % (<i>n</i>)	63.4 (142)	57.9 (139)	48.8 (59)	$\chi^2(1,345) = 6.92, p = 0.009$
Have children, % (<i>n</i>)	30.0 (62)	32.3 (70)	37.4 (43)	$\chi^2(1,322) = 1.86, p = 0.172$
Medical and weight variables				
≥1 medical symptom, % (<i>n</i>)	35.3 (77)	44.6 (104)	75.7 (81)	$\chi^2(1,325) = 46.85, p < 0.001$
Current BMI	25.64 (10.43)	28.15 (12.2)	34.05 (15.14)	$F(330) = 35.6, p < 0.001$
Self-rated desired BMI	20.48 (3.16)	20.84 (3.40)	22.64 (4.33)	$F(320) = 26.2, p < 0.001$
Feel fat at current weight ^b	3.09 (1.41)	3.38 (1.42)	3.63 (1.44)	$F(1,287) = 9.9, p = 0.002$
Age at minimum adult BMI	21.94 (5.01)	22.39 (5.77)	22.54 (6.45)	$F(1,307) = 0.8, p = 0.363$
Age at maximum adult BMI	25.0 (8.81)	26.70 (10.25)	29.13 (11.67)	$F(1,307) = 12.3, p = 0.001$
Eating-related symptoms ^c				
Fasting	2.33 (2.16)	2.20 (2.06)	2.10 (2.05)	$F(291) = 0.8, p = 0.359$
Skipping Meals	4.20 (2.71)	4.29 (2.64)	4.16 (2.68)	$F(318) = 0.02, p = 0.896$
Exercising	4.55 (1.89)	4.31 (1.82)	3.88 (1.82)	$F(1,336) = 10.0, p = 0.002$
Binge eating	2.24 (1.35)	2.24 (1.39)	2.23 (1.29)	$F(318) = 0.002, p = 0.966$
Self-induced vomiting	2.54 (2.28)	2.36 (2.06)	2.08 (2.06)	$F(331) = 3.3, p = 0.070$
Use of laxatives	1.97 (1.89)	1.70 (1.63)	1.28 (1.06)	$F(1,339) = 13.3, p < 0.001$

^aComparisons were conducted between the study and the control groups.^bRange = 1 to 5 (1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always).^cRefers to the past month only. Range = 1 to 8 (1 = never; 2 = once a month or less; 3 = several times a month; 4 = once a week; 5 = twice a week; 6 = three to six times a week; 7 = once a day; 8 = more than once a day).

medical symptoms ($\chi^2(1,326) = 32.18, p < 0.001$) relative to individuals with BED. Lastly, midlife individuals with AN and BN were more likely to be younger at the age when they reached their maximum BMI ($F(3,340) = 34.28, p < 0.001$) relative to individuals with BED and OSFED.

DISCUSSION

The purpose of the current study was to investigate eating disorders in midlife and beyond by examining midlife individuals (40 years and above) with AN, BN, BED, and OSFED compared to younger

adults (18–25 years) across the eating disorder diagnostic spectrum. We also examined differences among midlife individuals across eating disorder diagnoses. Results showed that a lower proportion of midlife treatment-seeking individuals were diagnosed with BN and a higher proportion of midlife treatment seeking individuals were diagnosed with BED and OSFED relative to the younger comparison group. Proportions of patients with AN did not differ across age groups. In addition, midlife and younger individuals with AN and BN were quite similar, whereas midlife and younger individuals with BED and OSFED differed on several demographic (e.g., having never been

FIGURE 1. Percent of treatment-seeking individuals with AN, BN, BED, and OSFED by age group: young adults (18–25) vs. middle-aged individuals (40+). *Significant differences between percent of young adults and middle-aged individuals with this diagnosis $p < 0.01$.

TABLE 5. Comparisons at Intake Evaluation Between Middle-Aged Individuals With AN, BN, BED, and OSFED: Means (Standard Deviations)

	AN (<i>n</i> = 44)	BN (<i>n</i> = 109)	BED (<i>n</i> = 90)	OSFED (<i>n</i> = 121)	
Demographic					
Age	48.77 (6.80)	46.10 (5.55)	46.67 (6.48)	47.29 (6.59)	$F(3,360) = 2.06, p = 1.05$
Female, % (<i>n</i>)	95.5 (42)	93.6 (102)	83.3 (75)	93.4 (113)	$\chi^2(1,364) = 9.43, p = 0.024$
Caucasian, % (<i>n</i>)	29.5 (13)	35.8 (39)	57.8 (52)	52.1 (63)	$\chi^2(1,364) = 1.26, p = 0.738$
Never married, % (<i>n</i>)	65.9 (27)a	68.7 (68)a	29.5 (23)b	49.5 (55)ab	$\chi^2(1,364) = 30.29, p < 0.001$
Have children, % (<i>n</i>)	18.6 (8)a	18.8 (19)a	48.1 (39)b	37.4 (43)b	$\chi^2(1,340) = 22.84, p < 0.001$
Medical and weight variables^a					
≥1 medical symptom, % (<i>n</i>)	60.5 (26)ab	46.5 (46)a	83.1 (64)c	75.7 (81)bc	$\chi^2(1,326) = 32.18, p < 0.001$
Current BMI	16.34 (0.92)a	24.17 (6.45)b	40.17 (11.75)d	34.05 (15.14)c	$F(3,354) = 62.29, p < 0.001$
Self-rated desired BMI	17.64 (1.73)a	20.36 (2.08)b	24.57 (4.32)d	22.64 (4.33)c	$F(3,337) = 43.11, p < 0.001$
Feel fat at current weight ^b	2.11 (1.24)a	3.26 (1.30)b	4.49 (0.78)c	3.63 (1.44)b	$F(3,331) = 36.02, p < 0.001$
Age at minimum adult BMI	23.46 (7.71)	21.19 (5.01)	23.28 (6.69)	22.54 (6.45)	$F(3,340) = 2.23, p = 0.084$
Age at maximum adult BMI	20.39 (4.11)a	23.37 (8.02)a	35.51 (10.39)d	29.13 (11.67)c	$F(3,340) = 34.28, p < 0.001$
Eating-related symptoms^c					
Fasting	2.42 (2.13)a	2.51 (2.08)a	1.28 (0.79)b	2.10 (2.05)a	$F(3,324) = 7.62, p < 0.001$
Skipping meals	4.72 (2.78)a	4.73 (2.53)a	2.70 (2.15)b	4.16 (2.68)b	$F(3,341) = 11.76, p < 0.001$
Exercising	4.53 (1.94)a	4.41 (1.72)a	3.04 (1.76)b	3.88 (1.82)ac	$F(3,358) = 11.36, p < 0.001$
Binge eating	3.60 (2.64)b	6.48 (1.28)a	5.91 (1.04)a	2.23 (1.29)c	$F(3,351) = 189.44, p < 0.001$
Self-induced vomiting	3.28 (2.82)b	5.76 (2.35)a	1.0 (0.0)d	2.08 (2.06)c	$F(3,352) = 104.44, p < 0.001$
Use of laxatives	2.26 (2.19)a	2.33 (2.16)a	1.0 (0.0)b	1.28 (1.06)b	$F(3,354) = 7.02, p < 0.001$

Differing letters indicate significant differences in alpha <0.01 level. Comparisons were conducted between the study and the control groups.

^aComparisons were conducted between the study and the control groups.

^bRange = 1 to 5 (1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always).

^cRefers to the past month only. Range = 1 to 8 (1 = never; 2 = once a month or less; 3 = several times a month; 4 = once a week; 5 = twice a week; 6 = three to six times a week; 7 = once a day; 8 = more than once a day).

married) and eating disorder-related characteristics (e.g., BMI, compulsive exercising). This study builds on the extant literature about eating disorders in midlife (Bulik, 2013) by identifying differences and similarities between midlife and younger individuals with eating disorders and suggesting several implications and new developments for treatment of eating disorders in midlife.

In terms of eating disorder diagnosis, our data showed that the percentage of patients with BN among our midlife sample was significantly lower, whereas the percentages of patients with BED and OSFED among our midlife sample were significantly higher relative to the younger sample. These findings are consistent with previous studies suggesting that midlife individuals present for treatment with fewer diagnoses of BN relative to younger comparison groups (Ackard et al., 2013; Cumella and Kally, 2008) and support the notion that BN may be less likely to occur in midlife in comparison to other eating disorder diagnoses. The fact that a relatively high proportion of our midlife sample was diagnosed with BED is not surprising given that previous research has suggested that individuals with BED often present to treatment for the first time in their forties (Grilo, 2002; Guerdjikova et al., 2012; Striegel-Moore et al., 2004).

Examination of the demographic characteristics of our AN and BN groups suggested few significant differences between midlife individuals with these diagnoses and their younger counterparts. However, examination of the demographic characteristics of our BED and OSFED groups suggested several differences. For example, rates of individuals who reported having never been married were significantly lower among midlife individuals with BED and OSFED relative to younger comparison groups. This significant difference between older and younger adults is not surprising given that the median age of first marriage in the USA is 25 (Kreider, 2005). Additionally, when comparing our midlife sample

across eating disorder diagnoses, we found that as many as two-thirds of our midlife individuals with AN and BN reported having never been married and as many as three-fourths of the individuals in these groups reported having no children. In contrast, less than one-third of our midlife BED group reported having never been married and about one-half of this group reported having no children. It could be that interpersonal relational problems, which are commonly experienced by individuals with AN and BN (Holt and Espelage, 2002), potentially interfere with finding a partner, getting married, and having children (Whisman and Donald, 2012). Future studies may further explore the demographic profiles of individuals with eating disorders across the lifespan to understand more fully why midlife individuals with AN and BN do not differ demographically from younger comparison groups in ways expected due to age differences.

In terms of BMI, studies using community samples have shown that Americans tend to gain weight until middle age, stabilize, and begin to lose weight near age 60 (Sheehan et al., 2003). Our study suggested that midlife individuals with BED and OSFED have significantly higher BMIs relative to younger comparison groups but that younger and midlife individuals with AN and BN present with the same average BMI, although the differences between the average BMIs of the midlife BN group and their younger counterparts approached the level of significance. It could be that individuals with BN, BED, and OSFED tend to have fairly chaotic and inconsistent dietary patterns (Masheb et al., 2011) that may contribute to their higher BMI in midlife. Alternatively, individuals with AN generally have relatively strict and rigid eating patterns (Burd et al., 2009; Huse and Lucas, 1984) that may aid them in maintaining low body weight across the lifespan. Lastly, the average BMI of our BED group was found to be fairly high and well into the obesity range (i.e., BMI >30). These results support previous studies

suggesting an association between BED and obesity and that BED predicts weight gain over time (Goldschmidt et al., 2011).

Interestingly, our findings suggest that midlife individuals with BN, BED, and OSFED had several less severe behavioral eating disorder symptoms relative to the younger comparison groups. In particular, binge eating episodes were less common among our BED midlife group, laxative use was less common among our OSFED midlife group, and compulsive exercising was less common among our BN, BED, and OSFED midlife groups in the month before the assessment relative to the younger comparison groups. These data contradict Cumella and Kally's findings (2008), which showed that eating disorder patients in midlife generally have greater eating disorder severity relative to younger patients. However, Cumella and Kally did not differentiate between eating disorder diagnoses, which may have contributed to the discrepancy between their findings and the results of the current study.

Additionally, our midlife OSFED group reported feeling significantly "fatter" at their current weight relative to the younger comparison group, which may imply that midlife individuals with OSFED struggle with more severe cognitive eating disorder-related symptoms and potentially more severe body image distortions relative to the younger comparison group. In contrast, Cumella and Kally (2008) suggested that midlife inpatients with eating disorders struggle with fewer body image distortions relative to younger controls. It may be that these contradicting findings are due not only to sample selection but also to lack of measures specifically designed to evaluate body distortion across the lifespan. Future research may address this gap in the literature as it could be that individuals in midlife and beyond are concerned with specific aspects of body image (e.g., wrinkles, graying or thinning hair, decrease in skin elasticity) that are not a concern among young adults (Tiggemann, 2004; Tiggemann and McCourt, 2013). Of additional note is the fact that body dissatisfaction (as measured by "how fat currently feel") was found to be similar across younger and midlife patients with AN, BN, and BED. This finding supports previous research among nonclinical samples suggesting that body dissatisfaction does not differ across young, middle-aged, and older women (Mangweth-Matzek et al., 2006; Tiggemann, 2004) but is in contrast to past work suggesting that middle-aged individuals with eating disorders have less body dissatisfaction relative to younger controls (Cumella and Kally, 2008).

Our findings indicated that medical symptoms (e.g., severe weakness, headaches, toothache) were more commonly reported among midlife individuals with AN, BN, BED, and OSFED relative to the younger comparison groups. These results may be attributable to the physical consequences of a long-lasting eating disorder (Fairburn and Harrison, 2003) and/or to the normative negative effect of older age on one's physical health (Heckhausen and Brim, 1997). Of additional note is the fact that midlife individuals with BED reported significantly more medical symptoms relative to midlife individuals with AN and BN. This result may require further attention given that the extant literature mainly suggests that AN has more negative physical consequences in comparison to all other eating disorder diagnoses (Fairburn and Harrison, 2003). However, it may also be that the frequent medical symptoms reported by our BED group are related to their relatively high BMI (average BMI = 34.05), as it is known that obesity is linked with negative physical consequences (Dixon, 2010).

To our knowledge, this study is the first to address similarities and differences between midlife outpatients and a younger comparison group across the eating disorder diagnostic spectrum. One strength of the study is the use of relatively large samples that were collected from four separate treatment sites in different geographic locations. We believe that this multisite data collection design may enhance the generalizability of these findings. Several limitations should be noted. First, the study population consisted of a sample of adults who presented for eating disorder treatment, which limits generalization to non-treatment-seeking samples. Second, our study population included only individuals with a diagnosis of an eating disorder, which limits our understanding of

how midlife individuals with eating disorders compare to the general population. Third, we did not assess menopause status, which has shown to be associated with midlife eating disorder symptoms (Mangweth-Matzek et al., 2013). Last, eating disorder symptoms and diagnoses were determined by self-report questionnaire (EDQ) (Mitchell, 2005), as opposed to a semi-structured interview. Nevertheless, previous studies have found that EDQ-derived eating disorder diagnoses are generally quite accurate (Eddy et al., 2009; Keel et al., 2002; Mitchell et al., 2007). Future work should examine additional variables, such as age of onset and psychological or physical comorbidities. In addition, future research should be longitudinal in nature to better understand the effect of age on treated and untreated individuals with eating disorders across the diagnostic spectrum.

These findings can inform future treatment development for midlife individuals with eating disorders. Midlife is often seen as a time for reflection: accepting the end of youth and beginning the process of aging (Lachman, 2004). We would like to suggest that interventions for midlife individuals with eating disorders focus on the eating disorder behavioral and cognitive symptoms, while also helping this unique subset of patients cope with the specific challenges of midlife. These challenges may include the physical changes associated with aging (Paquette et al., 2002), the possible questioning of decisions made years earlier (e.g., decisions about getting married or having children), and the acceptance of life achievements in different areas including career, family, and social relationships (Lachman, 2004) that may have been influenced by the eating disorder.

DISCLOSURE

The authors declare no conflict of interest.

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