



Childhood maltreatment in patients with binge eating disorder with and without night eating syndrome vs. control

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ARTICLE INFO

Keywords:

Bulimia nervosa
Psychopathology
Night eating
Childhood maltreatment
Binge eating disorders

ABSTRACT

This study compared women with binge eating disorders or bulimia nervosa with and without night eating syndrome regarding childhood maltreatment and psychopathology relative to healthy controls. The 426 participants (aged 18–60) were divided into two groups: eating disorders ($n = 158$) and healthy controls ($n = 268$). Eating disorders was divided into bulimia nervosa, binge eating disorder, and night eating syndrome with binge eating. Participants completed questionnaires: childhood trauma, eating disorders, self-esteem, and psychopathology. No significant differences were found for most variables in the eating disorders subgroups except physical neglect, which was more prevalent in night eating syndrome with binge eating. All variables differed significantly between eating disorders and healthy controls. Significant correlations emerged between childhood maltreatment, psychopathology, emotional abuse, and self-esteem in eating disorders. Regression showed that emotional abuse significantly predicted self-esteem in eating disorders, and group significantly moderated the effect of emotional abuse on psychopathology. Results emphasize that in this specific sample and variables, night eating syndrome with binge eating may be a variant of binge eating disorder or bulimia nervosa and not a separate diagnostic entity. The results highlight the importance of early assessment of childhood maltreatment, particularly emotional abuse, in patients with night eating syndrome.

1. Introduction

Eating disorders are characterized by objective disturbances in eating patterns (Heaner and Walsh, 2013). Both bulimia nervosa and binge eating disorder symptomatology include binge eating as a primary symptom, typically defined as the consumption of a large amount of food in a short period of time, accompanied by a sense of lack of control over eating (American Psychiatric Association, 2013). Binge eating episodes in both bulimia nervosa and binge eating disorder often occur during the evening, when alone (Fairburn and Harrison, 2003; Schreiber-Gregory et al., 2013; Tzischinsky and Latzer, 2004). Few studies have considered bulimia nervosa and binge eating disorder as similar phenomena, except for noting differences in purging behavior, age, and body mass index (BMI); patients with bulimia nervosa have binge eating episodes in addition to purging behavior, are younger, and have lower BMI compared to those with binge eating disorder (Smyth et al., 2009).

Another diagnostic subgroup that tends to experience binge eating

during the evening or night are patients with night eating syndrome (Allison et al., 2010; American Psychiatric Association, 2013). Night eating syndrome is conceptualized as a delay in the circadian pattern of food intake (Stunkard et al., 1955), reflected by two core criteria: (a) evening hyperphagia, or the consumption of large amounts of total caloric intake after the evening meal, and (b) nocturnal ingestions, or ingestion of food after sleep onset (Allison et al., 2010).

It's unclear whether night eating syndrome represents a distinct subset of eating disorders as proposed in the DSM-5 (American Psychiatric Association, 2013) or a variant of bulimia nervosa or binge eating disorder, in which binge episodes occur mainly during the evening or night (Tzischinsky et al., 2013).

Psychological factors play a prominent role in the etiology of binge eating disorder, bulimia nervosa, and night eating syndrome, with different underlying behavioral constructs. Indeed, the standard definition of binge eating includes psychological and psychiatric features, like lack of control over eating, depression, anxiety, psychological distress, and more (He et al., 2017; Tzischinsky and Latzer, 2004;

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<https://doi.org/10.1016/j.psychres.2020.113451>

Received 18 May 2020; Accepted 7 September 2020

Available online 17 September 2020

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Ulfvebrand et al., 2015). Moreover, scholars have suggested that bulimia nervosa with night eating syndrome, binge eating disorder with night eating syndrome, and night eating syndrome alone constitute a psychopathology continuum, with bulimia nervosa or binge eating disorder accompanied by night eating syndrome having higher psychopathology and night eating syndrome only having lower psychopathology (Napolitano et al., 2001; Roer et al., 2014; Stunkard et al., 1996). One risk factor related to level of psychopathology, psychiatric comorbidity, severity of symptoms, and poorer prognosis is a history of childhood traumata events (Molendijk et al., 2017; Smolak and Murnen, 2002). The relationship between childhood trauma and eating disorders has been widely reported, with a main focus on sexual abuse (Smolak and Murnen, 2002; Wonderlich et al., 1997). In addition, childhood maltreatment, including sexual, physical, and emotional abuse and physical and emotional neglect, is also an important risk factor for eating disorders and reported at a higher prevalence compared with other psychiatric disorders and healthy controls (Molendijk et al., 2017).

Specifically, patients with bulimia nervosa as compared with those with general psychiatric disorders and healthy controls had significantly higher rates of sexual and physical abuse (Smolak and Murnen, 2002). Patients with binge eating disorder had higher rates of sexual and physical abuse compared with healthy controls (Fairburn et al., 1998; Friedman et al., 1997).

To the best of our knowledge, only two studies (Allison et al., 2007; Tzischinsky and Latzer, 2004) have described traumatic life events in patients with night eating syndrome. Tzischinsky and Latzer (2004) found a high prevalence of sexual abuse in patients with night eating syndrome with night ingestion and binge eating disorder (60% of cases) or with bulimia nervosa (50% of cases) and a high level of psychiatric comorbidity (mainly anxiety or depression; 64% binge eating disorder with night eating syndrome, night ingestion type; 82% bulimia nervosa with night eating syndrome with night ingestion). Additionally, Allison et al. (2007) examined diverse forms of childhood maltreatment among patients with night eating syndrome, binge eating disorder, or obesity without eating disorders, communal sample. People with binge eating disorder reported significantly more forms of childhood maltreatment than people with obesity, but not the night eating syndrome group. People with binge eating disorder and night eating syndrome reported more emotional abuse than people with obesity. Tzischinsky and Latzer (2004) recruited patients seeking treatment for eating disorders, collecting their history of traumatic life events through self-report, whereas Allison et al. (2007) recruited patients from the community and used the childhood trauma questionnaire to assess childhood maltreatment.

To our knowledge, no research has compared patients with bulimia nervosa and binge eating disorder, with or without night eating syndrome, seeking treatment for eating disorders compared with normal-weight healthy controls without eating disorders. Thus, the aims of the current study were:

- (1a) To compare women with bulimia nervosa or binge eating disorder with or without night eating syndrome seeking treatment for eating disorders regarding varied forms of childhood maltreatment and level of psychopathology, and (1b) to evaluate whether night eating syndrome is a separate diagnosis as proposed by the DSM-5 or part of an eating disorders diagnosis.
- (2a) To compare eating disorders subgroups with healthy controls regarding varied forms of childhood maltreatment and level of psychopathology, and (2b) to predict the level of psychopathology based on childhood trauma (Childhood Trauma Questionnaire Subscales) between groups (eating disorders vs. healthy controls).

2. Method

2.1. Participants

The sample featured 426 participants divided into two groups: eating disorders and healthy controls. The eating disorders group consisted of 167 women aged 18–68 years ($M = 35.56$, $SD = 12.91$) referred to the Eating Disorders Institution in Israel for assessment (2011–2018). The participants were recruited at admission prior to treatment. Excluded were male patients and female patients with sleep-related eating disorders, anorexia nervosa, or other severe psychiatric illnesses (psychosis).

Nine patients (5%) were either excluded or dropped out of the study after not filling out the questionnaires or declining to continue. Thus, the sample size in the eating disorders group was 158 participants.

Eating disorders group was divided into three subgroups: (a) night eating syndrome with binge eating ($n = 74$) for participants who fulfilled the criteria for night eating syndrome (night ingestion, evening hyperphagia, or both; Allison et al., 2010; American Psychiatric Association, 1994). All night eating syndrome patients also had full diagnostic criteria of either binge eating disorder (31 with evening hyperphagia and 30 with night ingestion) or bulimia nervosa (four with evening hyperphagia and nine with night ingestion) according to DSM-IV. No significant differences were found among the diagnostic subgroups for any psychological research factor; therefore, we combined them in one group: night eating syndrome with binge eating. (b) Binge eating disorder only ($n = 44$), featuring patients diagnosed with binge eating disorder based on the DSM-IV. (c) Bulimia nervosa only ($n = 40$), featuring patients diagnosed with bulimia nervosa based on the DSM-IV (American Psychiatric Association, 1994).

Healthy controls consisted of 314 women aged 18–65 years ($M = 33.63 \pm 10.27$) recruited through social networks who completed online anonymous self-report questionnaires using Qualtrics in 2018. Participants who completed less than 75% ($n = 29$, 9%) of the questionnaire and those at risk of eating disorders as assessed by the SCOFF and night eating syndrome questionnaires were excluded (Allison et al., 2008; Morgan et al., 1999b; SCOFF > 3: $n = 15$, 4.8%; night eating syndrome questionnaire > 21: $n = 2$, 0.6%). The final healthy controls sample featured 268 participants.

2.2. Procedure

The study was approved by the Ministry of Health, the hospital's Helsinki Ethics Committee (# 40–09RAM), and the ethics committee of the Faculty of Social Welfare and Health Sciences, University of Haifa. The eating disorders group provided and signed written informed consent.

Data for the eating disorders group were collected during the assessment meeting. Participants completed a full psychiatric evaluation and diagnosis as part of general admission. Diagnosis of eating disorders was obtained by the institution's psychiatrist using the Mini International Neuropsychiatric Interview (Sheehan et al., 1998) for bulimia nervosa and binge eating disorder (DSM-IV; American Psychiatric Association, 1994). Night eating syndrome was diagnosed by the proposed diagnostic criteria (Allison et al., 2010) and according to the night eating questionnaire (Latzer et al., 2014). The mean scores of the latter are as follows: binge eating disorder (19.6 ± 7.1), bulimia nervosa (20.1 ± 6.54), and night eating syndrome with binge eating (37.44 ± 6.64). The diagnostic criteria for night eating syndrome were significantly increased intake during the evening or night, at least 25% of food intake, or at least two episodes of nocturnal eating per week; awareness and recall of evening and nocturnal eating episodes were present. Additionally, the daily pattern had to involve at least three of the following features: morning anorexia, a strong urge to eat between dinner and sleep onset or during the night, insomnia, a belief that one must eat to fall back to sleep, and depressed or deteriorating mood in

the evening. The disorder is associated with significant distress, maintained for at least 3 months, and not secondary to a medical or psychiatric disorder. Patients with night binges, bulimia nervosa, or binge eating disorder were recruited for the study. After the psychiatric evaluation, demographic and clinical information were collected. Those who agreed to participate received an in-depth explanation of the study and procedures from the principal investigator, signed their informed consent, and filled out self-report questionnaires.

2.3. Measures

2.3.1. The childhood trauma questionnaire

Bernstein and Fink, (1998); Bernstein et al., (2003) explores a self-report recall of childhood trauma experiences. The 28-item questionnaire identifies childhood experience across five types of childhood maltreatment: emotional neglect (cutoff = 15, Cronbach's $\alpha = 0.91$); emotional abuse (cutoff = 10, $\alpha = 0.84$); sexual abuse (cutoff = 8, $\alpha = 0.87$); physical neglect (cutoff = 8, $\alpha = 0.48$); and physical abuse (cutoff = 8, $\alpha = 0.86$). Participants rated items about their childhood experiences (prior to age 18) on 5-point Likert scales anchored with *never true* to *very often true*. The reliability and validity of the childhood trauma questionnaire have been established. The reported cutoff scores indicate the occurrence of that type of maltreatment (Walker et al., 1999). In the analysis, we analyzed the sum of subscale scores and the five types of childhood maltreatment separately according to the cutoff points.

2.3.2. The brief symptom inventory

BSI; Derogatis and Melisaratos, (1983) is a self-report questionnaire that evaluates the psychological state of patients receiving psychiatric and other care (level of psychopathology). It features 53 items, chosen from the 90 original items in the Symptom Checklist-90. Each item represents a symptom, and the participant marks the frequency of its occurrence in the past month on a 5-point Likert-type scale, ranging from 0 (*did not appear*) to 4 (*appeared very frequently*). The present study used the mean of all 53 items. This index describes the respondent's psychiatric state without relating to specific symptoms. The Brief Symptom Inventory was translated into Hebrew (Gilbar and Ben-Zur, 2002). Cronbach's alpha in the current study was 0.96 (Gilbar and Ben-Zur, 2002), and in the present study $\alpha = 0.96$.

2.3.3. The beck depression inventory

BDI; Beck et al., (1997) is a 21-item inventory that addresses symptoms of depression; each item is rated on a 4-point Likert scale ranging from 0 to 3. The Hebrew translation was examined and validated in many studies, including with populations with eating disorders (Stein et al., 2002; Yackobovitch-Gavan et al., 2009). Cronbach's alpha in the current study was 0.87.

2.3.4. The rosenberg self-esteem scale

Rosenberg, (1979) is a widely used measure that assesses global feelings of self-worth and self-esteem. The scale features 10 items rated on a 4-point Likert scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*; Corning et al., 2006; Hawkins et al., 2004). Cronbach's alpha in the current study was 0.85.

2.3.5. The eating disorder inventory

EDI-2; Garner et al., (1983) is a widely used self-report questionnaire for assessing psychological characteristics related to eating disorder psychopathology among Western populations. It is not intended as a diagnostic instrument, but rather provides a profile of symptoms common among patients with eating disorders. The EDI-2 contains 91 items scored on a 3-point Likert scale. There are six response options: *always*, *usually*, *often*, *sometimes*, *rarely*, and *never*. Responses are scored from 0 to 3, with answers of *never*, *rarely*, and *sometimes* assigned a 0 and *always*, *usually*, and *often* assigned scores of

3, 2, and 1, respectively. Total scores range from 0 to 273, with higher scores indicating more eating disorder psychopathology. The EDI-2 consists of 11 subscales. In the current study, we used the total score and Cronbach's alpha was 0.96.

2.3.6. The night eating questionnaire was validated by Allison et al. (2008)

The questionnaire features 14 items assessing morning hunger and timing of first food consumption (two items); food cravings and control over eating behavior both before bedtime (two items) and during night awakenings (two items); percentage of food consumed after dinner (one item); initial insomnia (one item); frequency of nocturnal awakenings and ingestion of food (three items); mood disturbance (two items); and awareness of nocturnal eating episodes (one item). The scores range from 0–64. The original English version (Allison et al., 2008) had a Cronbach's alpha of 0.70. The questionnaire was translated and validated in Hebrew (Latzer et al., 2014). Cronbach's alpha for the current study, $\alpha = 0.62$.

2.3.7. The scoff questionnaire

Morgan et al., (1999a) is an effective screening instrument for eating disorder behaviors and includes four items adapted from the original SCOFF questionnaire. The SCOFF has demonstrated good validity compared with DSM-IV diagnosis via clinical interview (Rueda et al., 2005). The original questionnaire was translated into Hebrew and back-translated. In the present study, Cronbach's alpha for the healthy controls group was 0.46.

2.4. Data analysis

All statistical analyses were conducted using SPSS version 25.0. To test within-group differences, a one-way analysis of variance was performed. Differences between the eating disorders and healthy controls groups were tested using independent sample *t*-tests.

Pearson correlations for the relationships between variables and between the eating disorders and healthy controls groups were calculated. To predict eating disorders psychopathology based on childhood trauma subscales, regression analysis was conducted with group as a potential moderator.

3. Results

The results are divided into two parts. The first describes patients with night eating syndrome with binge eating, binge eating disorder, and bulimia nervosa regarding traumatic childhood events and psychopathology. It also outlines whether night eating syndrome is a separate diagnosis as proposed by the DSM-5 or part of an eating disorders diagnosis. The second part describes a comparison between eating disorders and healthy controls groups regarding childhood trauma, childhood maltreatment and eating disorders psychopathology (EDI-2, BDI, BSI, and Rosenberg self-esteem) and their relationships.

3.1. Part one

Table 1 presents the demographic data for the eating disorders groups. Significant differences existed between groups in age, BMI, and family status (after adjusting for age, there was no statistically significant difference in family status); patients with bulimia nervosa were significantly younger and had significantly lower BMI.

Table 2 presents eating disorders psychopathology and Childhood Trauma Questionnaire subscale scores by research subgroup. After adjusting for age, no statistical differences were found in any psychopathology parameters (EDI-2, BDI, BSI Rosenberg self-esteem) or Childhood Trauma Questionnaire variables. Similar results were found after adjusting for age and BMI (not shown).

Regarding the prevalence of childhood maltreatment, patients with night eating syndrome with binge eating reported significantly higher

Table 1

Demographic data in research groups: Comparison between Bulimia Nervosa, Binge Eating Disorders, and Night Eating Syndrome with Binge Eating.

	Bulimia Nervosa (N = 40)	Binge Eating Disorder (n = 44)	Night Eating Syndrome with Binge Eating (n = 74)	Significance
Age (M ± SE)	27.05 ± 1.25	34.49 ± 1.75	40.70 ± 1.54	$P < 0.001$
BMI (M ± SE)	23.96 ± 0.76	32.62 ± 1.0	30.71 ± 0.8	$P < 0.001$
Family Status				$P = 0.004$
Single	24 (64.9%)	22 (53.7%)	18 (26.9%)	After controlling for age $p > 0.51$
Married	9 (24.3%)	14 (34.1%)	32 (47.8%)	
Divorced	3 (8.1%)	5 (12.2%)	14 (20.9%)	
Other(W/r/n)	1 (2.7%)	0 (0.0%)	3 (4.5%)	

physical neglect (57.7%) compared to those with bulimia nervosa or binge eating disorder (43.6% and 32.6%, respectively; $p < 0.04$). However, no other childhood maltreatment factor significantly differed among patients with bulimia nervosa, binge eating disorder, or night eating syndrome with binge eating: sexual abuse (25.6%, 21.4%, and 32.4%, respectively); physical abuse (23.1%, 9.3%, and 25.0%); emotional neglect (33.3%, 27.9%, and 36.1%); and emotional abuse (46.2%, 58.1%, and 44.4%).

No significant differences were found between eating disorders subgroups; therefore, they were combined into one clinical group for further analysis. Additionally, night eating syndrome was considered part of an eating disorders diagnosis and not a separate diagnosis (see Table 2).

3.2. Part two

Table 3 compares eating disorders and healthy controls groups by all research variables. Statistically, differences emerged for age and BMI between groups; significant differences were also found for all research variables, after controlling for age.

Child maltreatment rates significantly differed between eating disorders and healthy controls groups: sexual abuse (27.6% vs. 12.3%, respectively, $p < 0.001$), physical abuse (20.1% vs. 6.7%, $p < 0.001$), physical neglect (46.8% vs. 19.4%, $p < 0.001$), emotional neglect (33.1% vs. 12.3%, $p < 0.001$), and emotional abuse (48.7% vs. 14.2%, $p < 0.001$).

Significant correlations emerged between psychopathology (BSI), emotional abuse, sexual abuse, physical neglect, and self-esteem in the eating disorders group (see Table 4a.), compared to no significant correlations in the Healthy Control group (see Table 4b).

Regression analysis was conducted to predict level of psychopathology by Childhood Trauma Questionnaire scores, with group (healthy controls vs. eating disorders) as a potential moderator, and to predict self-esteem by emotional abuse (from significant correlations),

group, and interaction of emotional abuse and group, controlling for age. Emotional abuse was a significant predictor of self-esteem ($F = 6.427$, $df = 1$, $p = 0.012$, partial $\eta = 0.02$), and there was a significant interaction between group and emotional abuse ($F = 15.226$, $df = 1$, $p < 0.001$, partial $\eta = 0.05$).

Group was a significant moderator of the effect of emotional abuse on self-esteem. The slope for the eating disorders group was significant ($t[289] = -3.93$, $p < 0.001$, effect slope = -0.0619), whereas the slope for the healthy controls group was not significant ($t[289] = 1.19$, $p > 0.23$, effect slope = 0.1973).

Regression analysis was conducted to predict psychopathology (BSI) by significant childhood trauma subscales (from significant correlations), group, and interaction of childhood trauma subscales and group, controlling for age. Emotional abuse was a significant predictor of BSI ($F = 18.58$, $df = 1$, $p < 0.001$, partial $\eta = 0.054$), and there was a significant interaction between group and emotional abuse ($F = 6.77$, $df = 1$, $p < 0.01$, partial $\eta = 0.02$).

Group was a significant moderator of the effect of emotional abuse on level of psychopathology (BSI). The slope for the eating disorders group was significant ($t[331] = 7.12$, $p < 0.001$, effect slope = 0.0797), whereas the slope for the healthy controls was not significant ($t[331] = 0.11$, $p > 0.91$, effect slope = 0.0017). The moderator model used the main effects of all childhood trauma subscales except physical abuse and no other interaction. Additionally, group was a significant moderator of physical neglect and explained an additional 87% of the variance in BSI. However, the slope for the eating disorders group was not significant ($t[334] = 1.18$, $p > 0.24$, effect slope = 0.0215), whereas the slope for the healthy control was borderline statistically significant ($t[334] = -1.92$, $p > 0.05$, effect slope = -0.0523).

4. Discussion

This study examined the relationship between childhood trauma, childhood maltreatment, and level of psychopathology among patients seeking treatment for night eating syndrome with binge eating, bulimia nervosa, or binge eating disorder and healthy controls from the community.

The relationship between childhood trauma and eating disorders has been reported, mainly focused on sexual abuse among college-age participants (Smolak and Murnen, 2002; Wonderlich et al., 1997). Additionally, childhood maltreatment has also been recognized as a nonspecific risk factor for eating disorders (Jacobi et al., 2004). A recent meta-analysis reported a higher prevalence of childhood maltreatment in patients with eating disorders than both healthy controls and patients with other psychiatric disorders. Night eating syndrome was not reported. It also found an association between childhood maltreatment and early age of onset of eating disorders (Molendijk et al., 2017). To our knowledge, only two studies have

Table 2

Eating Disorders psychopathology and sum Childhood Trauma Questionnaire subscales (mean, SE) by research subgroups (Bulimia Nervosa, Binge Eating Disorder, Night Eating Syndrome with Binge Eating), adjusting for age.

group		EDI- sum	BDI	BSI-sum	Rosenberg Self Esteem	CTQ-Physical Abuse_	CTQ- Emotional Abuse_	CTQ- Sexual Abuse_	CTQ- Physical Neglect	CTQ- Emotional Neglect_
Binge Eating Disorder	Mean	89.06	15.39	1.01	2.41	5.69	10.78	6.94	6.99	12.05
	SE	6.26	1.83	0.13	.12	.46	.76	.67	.42	.78
Bulimia Nervosa	Mean	88.31	17.98	1.33	2.64	6.74	9.38	7.63	7.82	11.82
	SE	7.34	2.14	0.14	.15	.52	.85	.76	.48	.88
Night Eating Syndrome with Binge Eating	Mean	92.09	20.53	1.37	2.58	6.84	10.72	7.68	8.06	11.99
	SE	5.35	1.53	.10	.13	.37	.61	0.54	.34	.63
	P Adj for age	.91	.22	.11	.33	.19	.39	.72	.22	.89

(Age-adjusted marginal means).

Note: CTQ: Childhood Trauma Questionnaire; EDI: Eating Disorder Inventory; BSI: Brief Symptom Inventory. BDI: Beck Depression Inventory.

Table 3
Comparison between Eating Disorders and healthy control groups in all research variables.

	Eating Disorders (N = 156)	Healthy Controls (N = 268)	F	P
Age (Mean ± SE)	35.62 ± 1.03	30.03 ± 0.35	5.13	<0.001
BMI (Mean ± SE)	29.60 ± 0.57	23.13 ± 0.26	10.06	<0.001
Family Status			$\chi^2=54.20$	<0.001
Single	64 (44.1%)	145 (34.0%) (=2)		
Married	55 (37.9%)	118 (27.7%) (=1)		
Divorced	22 (15.2%)	3 (0.7%) (=4)		
Other	4 (2.8%)	1 (0.2%) (=3)		
	Eating Disorders Mean ± SE	Healthy Controls Mean ± SE	F (df1, df2)	P (controlling for age and BMI)
BDI	18.54 ± 0.91 (n = 120)	7.62 ± 0.76 (n = 165)	F(1281)=73.71	p<0.001; $\eta^2=0.208$
EDI-sum	88.25 ± 3.45 (n = 118)	40.65 ± 2.84 (n = 165)	F(1, 279)=98.71	p<0.001; $\eta^2=0.261$
BSI-sum	1.27 ± 0.06 (n = 141)	0.45 ± 0.06 (n = 165)	F(1, 302)=82.92	p<0.001 $\eta^2=0.215$
Rosenberg self- esteem	2.52 ± 0.09 (n = 52)	3.26 ± 0.04 (n = 165)	F(1, 213)=50.44	p<0.001 $\eta^2=0.191$
	CTQ-sum-(N = 305)			
CTQ- Physical Abuse	6.47 ± 0.22 (n = 140)	5.44 ± 0.20 (n = 165)	F(1, 301)=11.10	p<0.001; $\eta^2=0.04$
CTQ- Emotional Abuse	10.25 ± 0.38	7.34 ± 0.34	F(1, 301)=28.45	p<0.001; $\eta^2=0.086$
CTQ- Sexual Abuse	7.47 ± 0.30	5.63 ± 0.27	F(1, 301)=17.89	p<0.001; $\eta^2=0.056$
CTQ- Physical Neglect	7.57 ± 0.21	6.09 ± 0.19	F(1, 301)=24.53	p<0.001; $\eta^2=0.075$
CTQ- Emotional Neglect	11.56 ± 0.42	9.06 ± 0.38	F(1, 301)=16.96	p<0.001; $\eta^2=0.053$

Note: CTQ: Childhood Trauma Questionnaire; BDI: Beck Depression Inventory; EDI: Eating Disorder Inventory; BSI: Brief Symptom Inventory.

Table 4

Pearson correlation between (Childhood Trauma Questionnaire: CTQ-sub-scales) level of psychopathology (BDI, EDI-sum, BSI-sum, Rosenberg self-esteem) by groups and beyond groups (after adjusted to Bonferroni, $p = 0.01$).

	CTQ- Physical Abuse	CTQ- Emotional Abuse	CTQ- Sexual Abuse	CTQ- Physical Neglect	CTQ- Emotional Neglect
A: Eating Disorders-group					
BDI	0.139	0.182*	0.129	-0.02	0.058
EDI-sum	-0.051	0.183*	0.149	0.093	0.183
BSI-sum	0.313***	0.523***	0.295***	0.285***	0.279***
Rosenberg self-esteem	0.005	-0.453***	-0.174	-0.086	-0.296*
B: Healthy Controls group					
BDI	0.041	-0.012	0.004	0.037	-0.065
EDI-sum	-0.067	0.017	0.037	0.022	-0.047
BSI-sum	0.023	-0.015	-0.004	-0.128	-0.063
Rosenberg self-esteem	-0.019	0.079	0.033	0.089	0.103

Note: CTQ: Childhood Trauma Questionnaire; BDI: Beck Depression Inventory; EDI: Eating Disorder Inventory; BSI: Brief Symptom Inventory.

assessed traumatic life events and night eating syndrome (Allison et al., 2007; Tzischinsky and Latzer, 2004).

To our knowledge, no research has compared patients with binge eating disorder or bulimia nervosa with or without night eating syndrome seeking treatment for eating disorders as compared to normal-weight healthy controls without eating disorders.

The first aim was to compare women with binge eating disorder, bulimia nervosa, or night eating syndrome with binge eating regarding childhood trauma, childhood maltreatment, and level of psychopathology.

Significant differences were found among the three groups in age, BMI, and family status, with the bulimia nervosa group being younger, with lower BMI, and more likely to be unmarried than the other two groups. These findings are in line with previous results showing that patients with bulimia nervosa are usually younger and at normal weight compared to patients with binge eating disorder or night eating syndrome with binge eating, who tend to be overweight and older (Fairburn and Harrison, 2003; Latzer et al., 2014). Additionally, significant differences were found in childhood maltreatment among these subgroups in physical neglect, with higher prevalence in the night eating syndrome with binge eating group. Thus, we combined these

subgroups into one clinical research group for further analysis.

According to these results, it seems that night eating syndrome with binge eating is similar to binge eating disorder and bulimia nervosa in level of psychopathology and most childhood maltreatment variables (except physical neglect). This suggests that night eating syndrome with binge eating is part of eating disorders rather than a separate diagnostic entity, as proposed by the DSM-5 and other researchers (American Psychiatric Association, 2013; Allison et al., 2010). It's unclear whether night eating syndrome with night ingestion is a separate diagnosis compared with night eating syndrome with evening hyperphagia. Further research is needed to answer this question.

These findings are in contrast to previous results indicating that people with night eating syndrome with binge eating had a higher level of psychopathology than those with night eating syndrome or binge eating disorder (Napolitano et al., 2001; Roer et al., 2014; Stunkard et al., 1996). However, they are in line with a recent study indicating a similar level of depression among people with binge eating disorder and night eating syndrome (Allison et al., 2007).

These discrepancies may be explained by differences in the samples recruited by studies. Initially, night eating syndrome was viewed mainly in the context of populations with obesity seeking weight-loss treatment, with no eating disorder diagnosis. Later, most studies assessing the relationship between night eating syndrome and eating disorders have featured women with obesity from the community with or without binge eating disorder (Adami et al., 2002; Allison et al., 2005; Grilo and Masheb, 2004; Lundgren et al., 2006; O'Reardon et al., 2004) and with or without bulimia nervosa (Lundgren et al., 2008, 2011). In the current study, all participants were seeking treatment for eating disorders. Thus, those who seek treatment for eating disorders may tend to have higher psychiatric comorbidity and level of psychopathology. Additionally, participants with night eating syndrome in our study had an additional diagnosis of bulimia nervosa or binge eating disorder and therefore, a higher level of psychopathology. Thus, the need to study night eating syndrome among patients with eating disorders is of increasing importance. Conflicting findings may also relate to differences in diagnostic criteria. Allison et al. (2007) assessed night eating syndrome before new diagnostic criteria were established (Allison et al., 2010).

The second aim was to compare eating disorders and healthy control groups regarding all study variables. Results indicate significant differences between the groups in all variables, with higher level of psychopathology, childhood trauma, and childhood maltreatment in the eating disorders group. These results are in line with previous findings (Molendijk et al., 2017), indicating these issues extend beyond

geographical and cultural differences.

However, healthy control results in the Israeli sample had lower scores for most childhood maltreatment subscales as compared to other healthy control groups in the United States. These results may reflect some cultural differences relating to overall well-being or tendencies to under- or over-report. They also may be related to differences in health systems between the United States and Israel. In Israel, the health system features national insurance, is relatively inexpensive and equal, and provides a high level of medical public service for all. In the United States, most services are private and high cost (Hinson et al., 2016). This situation may affect help-seeking patterns, and thus, patients in Israel might seek and receive more treatment (Levinson et al., 2007).

Regression analysis was conducted to predict eating disorder psychopathology based on childhood trauma subscales, with group as a potential moderator. Results showed that emotional abuse was a significant predictor of self-esteem only in the eating disorders group. In addition, group was a significant moderator of the effect of emotional abuse on level of psychopathology (BSI).

This finding is line with previous communal studies featuring undergraduate students in the United States (aged 18–24) and evaluating a model suggesting that negative self-perception mediates the relationship between emotional abuse and disordered eating. Students reporting a high level of evening hyperphagia were more likely to meet binge eating disorder or night eating syndrome criteria (Hymowitz et al., 2017). The current results are also in line with another study (Monteleone et al., 2019) that assessed the association between childhood maltreatment and eating disorder psychopathology, including patients with anorexia or bulimia nervosa, using network analysis with mediation analysis. All childhood maltreatment types influenced eating disorder symptoms through emotional abuse. Yet a recent meta-analysis found that childhood maltreatment, regardless of type, was strongly associated with all types of eating disorders (Molendijk et al., 2017).

These differences may be related to the tendency of patients with bulimia nervosa, binge eating disorder, and night eating syndrome to be overweight during childhood and bullied and teased by their family members, friends, and peer groups. This emotional abuse likely led them to develop emotional eating behaviors (Olvera et al., 2013; Rojo-Moreno et al., 2013).

However, no significant correlations were found in the healthy control group. These results may indicate a different maladaptive coping mechanism to deal with stress. This explanation is supported by previous studies demonstrating a significant link between immature defense styles, sexual and physical abuse, and the extent of overall psychological distress and somatization (Nickel and Egle, 2006).

5. Study limitations and future directions

Several potential limitations should be considered. First, a larger sample size would have permitted differentiation among patients with bulimia nervosa, binge eating disorder, and night eating syndrome with binge eating; between night eating syndrome with night ingestion or evening hyperphagia; and between night eating syndrome with binge eating disorder or bulimia nervosa. Larger samples would also permit identification of differences in childhood maltreatment and childhood trauma. It's important to note that binge eating disorder and night eating syndrome with evening hyperphagia with objective binge episodes during the evening may have indicators of both conditions and may confuse clinicians when applying diagnostic criteria.

Second, our findings may not apply to patients with night eating syndrome without an eating disorders diagnosis in the community, because they may have different eating patterns than those seeking treatment for eating disorders.

Third, the childhood trauma questionnaire was used to assess childhood maltreatment. This tool has been widely used for decades to estimate childhood maltreatment in populations with eating disorders.

It provides quantitative information on subtypes of childhood maltreatment. However, in-depth interviews may provide better information about the type, age of onset, and length, and intensity of the trauma. Moreover, research identifying coping mechanisms in patients with childhood maltreatment is also recommended.

Forth, the results of the study were based on self-report questionnaires; therefore, further research assessing the experience of childhood maltreatment and traumatic life events using semistructured in-depth interviews is suggested.

To summarize, to the best of our knowledge, the current study is among the first to assess childhood maltreatment in patients seeking treatment for bulimia nervosa or binge eating disorder with or without night eating syndrome, using the new diagnostic criteria for night eating syndrome (Allison et al., 2010). This study adds new observations of night eating syndrome, moving from the field of obesity research to the eating disorders field.

No significant differences were found in the level of psychopathology and childhood maltreatment between patients with binge eating disorder or bulimia nervosa with or without night eating syndrome. No significant differences were found for most research variables in eating disorder subgroups, although patients with night eating syndrome with binge eating reported more physical neglect than other groups. However, significantly higher level of psychopathology (BSI) and child maltreatment were found in the eating disorders group compared to healthy controls. Additionally, significant correlations were found between childhood trauma subscales and level of psychopathology (BSI) in the eating disorders group. Regression analysis showed that emotional abuse was a significant predictor of self-esteem in the eating disorders group. Additionally, group significantly moderated the effect of emotional abuse on level of psychopathology (BSI).

These results showed no significant differences between patients with night eating syndrome with binge eating disorder or bulimia nervosa in level of psychopathology (BSI) and childhood maltreatment. This suggests that night eating syndrome with eating disorders may represent a variant of binge eating disorder or bulimia nervosa in this sample and not necessarily a separate entity, as suggested by the DSM-5. Further research comparing night eating syndrome with night ingestion or evening hyperphagia is needed.

Clinically, these results highlight the importance of early assessment of night eating syndrome and childhood maltreatment in patients with eating disorders and suggest that special treatment attention should be given to the role of emotional abuse in the level of distress and psychopathology.

Financial support

Funding Statement: This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

Ethical standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008 (#40–09 RAM).

Informed consent was obtained for experimentation with human subjects.

CRediT authorship contribution statement

Yael Latzer: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Visualization, Writing - original draft, Writing - review & editing. **Michal Rozenstain-Hason:** Investigation, Methodology, Writing - review & editing. **Orna Kabakov:** Data curation, Writing - review & editing. **Miri Givon:** Data curation. **Shiran Mizrahi:** Data curation,

Methodology. **Sigal Alon:** Data curation, Writing - review & editing.
Orna Tzischinsky: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Visualization, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors have no conflicts of interest to declare.

Acknowledgments

We are grateful to the eating disorder staff members at the Eating Disorder Institution, Psychiatric Division, Rambam Health Care Campus, Haifa, Israel, for their valuable contributions to this study. We are grateful to Eden Shachar for her help in collecting data and coding on the computer.

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