

Chapter 2

Childhood Sexual Abuse Increases Risks for Eating Disorder Symptoms and Eating Disorder-Related Health Problems in Females



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Childhood sexual abuse (CSA) has gained considerable recognition as a potent risk factor for the development of eating disorders (ED) in females (Johnson, Cohen, Kasen, & Brook, 2002; Molendijk, Hoek, Brewerton, & Elzinga, 2017; Sanci et al., 2008; Smolak & Murnen, 2002; Wonderlich et al., 2001) as well as for numerous adverse health problems later in life (Chen et al., 2010; Felitti et al., 1998; Irish, Kobayashi, & Delahanty, 2010).

Research to date on the link between CSA and ED consists mostly of cross-sectional studies that have produced evidence to support the association between CSA and symptoms of anorexia nervosa (AN) and bulimia nervosa (BN). Histories of CSA tend to appear more frequently among cases of BN and binge-purge rather than anorexic restrictive types of ED (Brewerton, 2007; Carter, Bewell, Blackmore, & Woodside, 2006; Steiger & Zanko, 1990). A recent meta-analysis by Molendijk et al. (2017) reported a strong, consistent association of CSA with BN and AN binge-purge subtype, but a weak, inconsistent association with AN restrictive subtype. Only a few longitudinal studies of CSA and ED exist to confirm these associations. Johnson et al. (2002) found in a community sample of 782 mothers and their offspring an association between CSA assessed through child protection registry report and maternal interview with increased risks for ED and problems with eating

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or weight. Temporal overlap between CSA and ED assessments limited the ability to ascertain the correct temporal relationship, however. Sancı et al. (2008) found in a population sample of 999 female adolescents an association between self-reported CSA and elevated rates of incident partial bulimic syndrome, but unconfirmed retrospective accounts of abuse weakened validity. These methodological challenges and inconsistencies in the literature limit the ability to draw definitive conclusions about the relation between CSA and ED.

Although only a small percentage of female adolescents are diagnosed with ED (0.3% for AN, 1.3% for BN) (Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011), ED symptoms are widespread, reported in more than 50% of female adolescents (Neumark-Sztainer et al., 2006; Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011). However, only a minority of adolescents (27.5% for AN, 21.5% for BN), receive treatment for their ED symptoms (Swanson et al., 2011). There is evidence to suggest that ED symptoms that fall short of diagnoses may still warrant clinical attention, as untreated symptoms may evolve into more severe ED (Kotler, Cohen, Davies, Pine, & Walsh, 2001) and place the individual at risk for experiencing severe ED-related physical health problems (Campbell & Peebles, 2014). Such problems may include muscle wasting and weakness, anemia, and cardiac damage for individuals exhibiting AN symptoms. Similarly, individuals exhibiting BN symptoms may experience damages to the teeth and gum, esophageal and respiratory tracts, and gastrointestinal and excretory system.

Furthermore, many of these ED-related health problems, including musculoskeletal pain, cardiopulmonary symptoms, and gastrointestinal problems, have been identified to be prevalent among CSA populations (Felitti et al., 1998; Irish et al., 2010). It is possible that untreated ED symptoms may contribute to the development of these health problems over time. Therefore, detecting early signs of ED may be critical for identifying high-risk individuals for whom timely interventions can be provided in order to prevent fully-developed EDs and related health problems.

Designing targeted intervention requires understanding about the precise relations among CSA, ED, and health problems. The literature to date on this information has been inconclusive, as much of the existing studies rely on correlational design and unconfirmed self-report of CSA (Irish et al., 2010) and do not account for potential confounds. For example, ED is highly comorbid with other psychiatric disorders, such as depression and anxiety (Swanson et al., 2011), which are also associated with health problems and CSA (Chen et al., 2010). This comorbidity renders the sequence of influence from CSA to ED to ED-related health problems unclear. Prospective studies with substantiated CSA and subsequent ED and related health problems can help to clarify these associations and inform clinical decision-making regarding which risk factors to target in interventions.

The present report utilized a prospective longitudinal design to investigate ED symptomatology in adolescence and ED-related health problems in adulthood across a 17-year period for two groups of female participants: (1) those who were referred by child protective services (CPS) for experiencing substantiated familial sexual abuse and (2) a demographically-similar group of nonabused comparisons. It was hypothesized that abused participants would report more AN and BN symptomatology in

adolescence and AN- and BN-related health problems in adulthood, relative to comparison participants. It was also hypothesized that AN and BN symptomatology in adolescence would account for the associations between CSA and AN- and BN-related health problems, respectively, in adulthood.

2.1 Methods

2.1.1 Participants

Originally begun by Drs. Penny Trickett and Frank Putnam in 1987, the Female Growth and Development Study (FGDS; R01 HD072468) is an on-going longitudinal study designed to prospectively examine the long-term developmental impacts of CSA in females. Sexually abused girls ($N = 84$) were referred by Child Protective Services (CPS) agencies in the Washington, DC area between the years of 1987 and 1989. Eligibility criteria for the overall sample included (1) age 6–16 years, (2) participation within 6 months of disclosure of the abuse, (3) substantiated sexual abuse, including genital contact and/or penetration, (4) perpetration by a family member (e.g. parent, grandparent, older sibling, uncle), and (5) participation of a nonabusing caregiver (usually the biological mother) in the study. Comparison girls ($N = 82$) were recruited through advertisements in newspapers and posters in welfare, child care, and community facilities in the same neighborhoods in which the abused girls lived. Comparison families contacted study personnel and were screened for eligibility, which included having no previous contact with CPS agencies (assessed via the Comprehensive Trauma Interview [CTI; Barnes, Noll, Putnam, & Trickett, 2009]) and being demographically similar with one or more same-aged abused participant. Abused and comparison participants were recruited to be matched on residing zip codes, race/ethnicity, age, predisclosure socioeconomic status (SES), family constellation (1- or 2-parent households), and other nonsexual traumatic events as assessed using the CTI.

Subsequent to study enrollment, 13 comparison participants disclosed some form of sexual abuse and were excluded from current analyses to maintain the integrity of the groups. Twenty new comparison girls were recruited utilizing the original recruitment method to fortify the sample for longitudinal follow-up, resulting in a comparison sample of 89. Participants completed five additional assessments across development with a 96% retention rate ($N = 166$ returned for times 4, 5, and/or 6; see Fig. 2.1).

The study received approval from the affiliated institutional review board and was awarded a federal certificate of confidentiality. At each assessment, caregivers provided informed consent and participants provided assent. The sample was 54% White, 43% Black, 2% Hispanic, and 1% Asian. Households ranged from low- to mid-socioeconomic status, with mean Hollingshead (Hollingshead, 1976) scores of approximately 36. No statistical differences in mean SES or percentage of minority

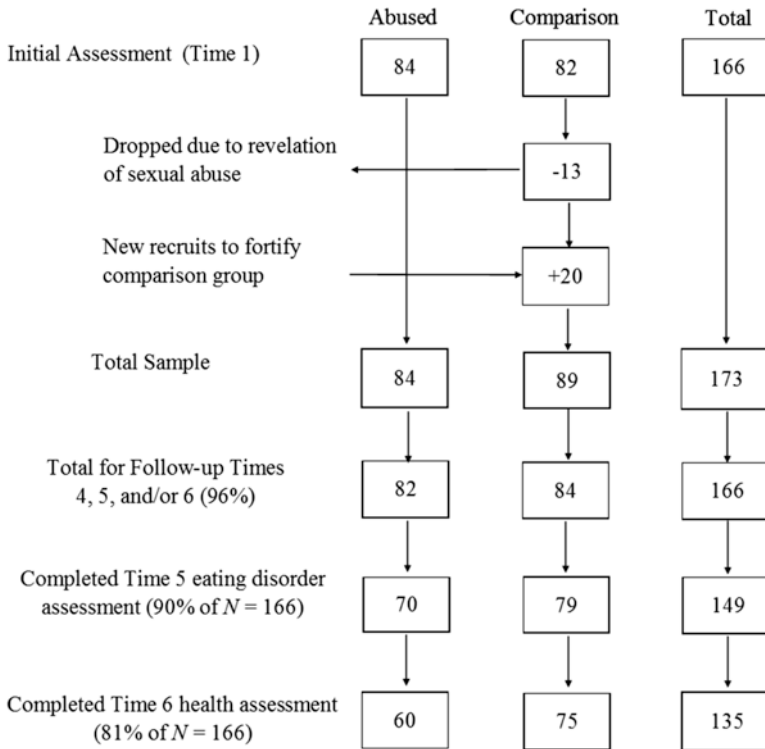


Fig. 2.1 The sample flow

(i.e., white versus all minority categories) existed across groups. The abused sample is highly representative of national statistics in number of perpetrators, age of onset, and duration of abuse (National Center of Child Abuse and Neglect, 1988; Trickett, Noll, Reiffman, & Putnam, 2001). Moreover, the comparison sample is representative of the larger US population on several key outcomes such as the rates of obesity and teenage pregnancy (Trickett, Noll, & Putnam, 2011).

Data for analyses were obtained from study enrollment (Time 1) when CSA status was determined and the total sample's mean age was 11 (standard deviation [SD] = 3), the adolescent assessment (Time 5) approximately 12 years after study enrollment when ED symptoms were assessed and mean age was 20 ($SD = 3$), and the adulthood assessment (Time 6) approximately 17 years after study enrollment when health status was most recently assessed and mean age was 24 ($SD = 3$). Ninety percent of the retained sample ($N = 149$) completed the ED assessment at Time 5. Eighty-one percent of the retained sample ($N = 135$) additionally completed the health assessment at Time 6 and were eligible for analyses (see Fig. 2.1). Participants with missing data at Times 5 and 6 did not differ significantly from participants with available data on any demographic factor (i.e., CSA status, minority status, socioeconomic status, or age).

2.1.2 Measures

Childhood Sexual Abuse At Time 1, CSA was substantiated through CPS agency records. Median age at abuse onset was 7.8 years, median duration was 24 months, 70% experienced vaginal and/or anal penetration, and 60% of perpetrators were the primary father figure (biological fathers, stepfathers, or mothers' live-in boyfriends). For use as predictor to test the hypotheses, a dummy-coded variable was created to indicate CSA status ("1" = abused, "0" = comparison).

Eating Disorder Symptomatology At Time 5, trained female clinical interviewers who were blinded to participants' CSA status administered an in-person interview to assess symptoms of AN and BN during the lifetime based on *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV) criteria (American Psychiatric Association, 1994). The interview was modeled based on the Structured Clinical Interviews for the DSM-IV (SCID-IV-TR; First, Spitzer, Gibbon, & Williams, 2002), but modified to explicitly inquire about each symptom. Fourteen AN symptoms were assessed, including extremely low body weight, refusal to maintain weight, intense fear of weight gain, distorted perception and significance of body weight, and amenorrhea. Sixteen BN symptoms were assessed, including recurrent binge eating episodes with a sense of lack of control and eating larger amounts of food than are normal, recurrent inappropriate compensatory behaviors (vomiting, fasting, excessive exercise, diuretics or laxatives), and minimum frequency of behaviors of at least twice weekly for the past 6 months. *Diagnoses* for AN and BN during the lifetime were made based on DSM-IV criteria (American Psychiatric Association, 1994) and recorded as dummy-coded variables ("0" = no diagnoses, "1" = diagnosis). *Symptom counts* for AN and for BN were calculated as the total numbers of symptoms endorsed for each category.

Eating Disorder-Related Health Problems At Time 6, participants completed a set of self-report questionnaire about a series of health problems that they experienced during the past 2 years. The health problems selected for analyses were based on *a priori* hypotheses regarding health consequences of each type of ED (Herpertz-Dahlmann, 2015). AN-related health problems included *swollen or painful joints* to indicate injuries due to muscle wasting and weakness; *dizziness or fainting spells* to indicate symptoms of inadequate energy intake; *excessive bleeding or bruising* to indicate symptoms of anemia; and *chest pressures or pains, heart pounding or palpitation*, and *other heart problems* to indicate symptoms of cardiac damage. BN-related health problems included *severe tooth or gum trouble* to indicate symptoms of teeth and gum damages; *ear, nose, or throat trouble* to indicate symptoms of esophageal and respiratory tract damages; *frequent indigestion* to indicate symptoms of digestive and gastrointestinal distresses; and *kidney stone or hematuria* and *hemorrhoid or rectal diseases* to indicate symptoms of excretory system problems resulting from laxative and diuretic abuse. Participants endorsed on a binary scale ("0" = no, "1" = yes) whether they had experienced each health problem. The total

numbers of health problems endorsed for each of the AN- and BN-related health problems categories indicated *AN-* or *BN-related health problem counts*.

Covariates Given the potential role of age and psychiatric disorders in ED etiology (Fairburn & Harrison, 2003), initial *depressive symptoms score* measured via the Child Depression Inventory (CDI; Kovacs, 1981) score and *trait anxiety score* measured via the State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973) at Time 1 and current *age* at Time 5 were included as covariates in the analyses.

2.1.3 Statistical Analysis

The first step in the analyses tested whether CSA would predict more ED symptomatology and related health problems. Logistic regression models estimated the likelihood of receiving a diagnosis for AN or for BN at Time 5 based on CSA group membership at Time 1. Odds ratios (OR) and 95% confidence intervals (95% CI) were estimated. Referent category for all analyses was the comparison group. AN and BN were tested in separate models.

Because both ED symptom count and ED-related health problem count variables showed high skewness with substantial weight on zero, zero-inflated Poisson (ZIP) regression models were estimated for AN and BN symptom counts (Time 5) and for AN- and BN-related health problems (Time 6) predicted by CSA. ZIP regression independently models count values from excess zeros via separate processes (Lambert, 1992) to estimate the number of ED symptoms and ED-related health problems based on CSA membership while including covariates in the models. The diagnosis rate, symptom count, and ED-related health problem count within the AN and the BN categories were tested in separate models and Bonferroni α corrections were applied accordingly (i.e., $\alpha/3$).

The second step in the analyses tested whether ED symptomatology in adolescence would explain the association between CSA and increased ED-related health problems in adulthood. Only the ED symptomatology and ED-related health problem count variables that showed significant associations with CSA in the first step of the analyses were retained for use in this set of analyses. The indirect effect of CSA for ED-related health problem count through ED symptomatology was estimated using the *a* path, representing CSA predicting ED symptomatology, obtained from the ZIP regression coefficient in the first step of the analyses. The *b* path, representing CSA and ED symptomatology predicting ED-related health problem count, was obtained from the ZIP regression coefficients for ED-related health problem count predicted by ED symptomatology, controlling for CSA and covariates. RMediation package (Tofghi & MacKinnon, 2011) was used to obtain estimates of the indirect effect estimate (*ab* path) and the 95% confidence interval (CI) via the distribution-of-product method (MacKinnon, Lockwood, & Williams, 2004).

All models included the covariate variables depressive symptoms and trait anxiety level at Time 1 and age at Time 5. Covariates were mean-centered in order to facilitate the interpretation of parameter estimates as effects for individuals scoring at “average” values on the covariates.

2.2 Results

Table 2.1 presents the descriptive statistics for the sample and numbers for analyses. Abused participants had higher levels of depressive symptoms at Time 1 relative to the comparison participants ($t(1, 145) = 2.56, p = 0.01$). No other variables showed significant differences between abused and comparison participants.

The mean ages at onset of AN and BN symptoms were 15.94 ($SD = 3.76$) and 15.46 ($SD = 3.46$), respectively (not presented in table). For one comparison and one abused participant, the age at onset of AN and BN symptoms, respectively, occurred prior to their ages at study entry at Time 1 and were identified to have had pre-existing symptoms. These participants were excluded from analyses to strengthen causal inference about effects of CSA on ED through ensuring proper temporal ordering, resulting in final analysis samples of $N = 134$ (abused: 60, comparison: 74) for AN analyses and $N = 134$ (abused: 59, comparison: 75) for BN analyses.

Table 2.2 presents the descriptive statistics for the adolescent ED symptomatology, including diagnoses and symptom counts, for AN and BN by CSA status. No

Table 2.1 Summary statistics for the sample

Parameters	Total ($N = 173$)	Abused ($n = 84$)	Comparison ($n = 89$)
% Minority ^a	46	39	51
SES, $M \pm SD$ (range) ^b	36 ± 12 (11–44)	35 ± 14 (10–47)	37 ± 11 (12–43)
Age, $M \pm SD$ (range)			
Time 1 (years 1987–1989)	11 ± 3 (6–16)	11 ± 3 (6–16)	11 ± 3 (6–16)
Time 5 (years 1999–2001)	20 ± 3 (13–26)	21 ± 5 (13–26)	20 ± 3 (13–26)
Time 6 (years 2004–2006)	24 ± 3 (18–27)	25 ± 4 (18–27)	24 ± 3 (18–27)
Depressive symptoms score at Time 1, ^c $M \pm SD$	10 ± 7	11 ± 8	8 ± 6
Trait anxiety score at Time 1, ^d $M \pm SD$	35 ± 8	35 ± 8	34 ± 7

Note: SES socioeconomic status, M mean, SD standard deviation, $No.$ number

^aMinority status includes Black (90%), Hispanic (9%), or Asian (1%)

^bSES was defined using Hollingshead ratings (Hollingshead, 1976)

^cDepressive symptoms score at Time 1 was measured using the Child Depression Inventory (CDI; score: ≥ 25 ; Kovacs, 1981)

^dTrait anxiety score at Time 1 was measured using the trait anxiety scale of the State-Trait Anxiety Inventory for Children (Spielberger, 1973)

Table 2.2 Time 5 adolescent eating disorder symptomatology and Time 6 adulthood eating disorder-related health problems for sexually-abused and nonabused comparison girls

Eating Disorder Category	Total (<i>N</i> = 135)	Abused (<i>n</i> = 60)	Comparison (<i>n</i> = 75)
Anorexia nervosa^a			
Diagnosis, ^b frequency (%)	0 (0%)	0 (0%)	0 (0%)
Symptom count, ^c <i>M</i> ± <i>SD</i> (range)	5.71 ± 3.82 (1–14)	5.08 ± 3.48 (1–11)	6.56 ± 4.30 (2–14)
Related health problem count, ^d <i>M</i> ± <i>SD</i> (range)	1.33 ± 1.65 (0–5)	1.17 ± 1.59 (0–5)	1.56 ± 1.81 (0–5)
Bulimia nervosa^e			
Diagnosis ^b , frequency (%)	5 (3.73%)	3 (5.08%)	2 (2.67%)
Symptom count ^f , <i>M</i> ± <i>SD</i> (range)	7.31 ± 3.38 (2–14)	8.13 ± 3.64 (4–14)	6.00 ± 2.74 (2–9)
Related health problem count, ^g <i>M</i> ± <i>SD</i> (range)	1.07 ± 1.12 (0–4)	1.13 ± 1.36 (0–4)	1.00 ± 0.71 (0–2)

Note: *M* mean, *SD* standard deviation

^aAnalysis sample minus one comparison participant with pre-existing anorexia nervosa symptoms. *N* = 134, abused: 60, comparison: 74

^bDiagnoses for anorexia nervosa and bulimia nervosa as defined by the *Diagnostic and Statistical Manual of Mental Disorders*, 4th Edition (DSM-IV)

^cSymptom counts for participants who reported at least one anorexia nervosa symptom: *N* = 21, abused: 12, *N* = 9 comparison

^dAnorexia nervosa-related health problems included swollen or painful joints; dizziness or fainting spells; excessive bleeding or bruising; chest pressures or pains; heart pounding or palpitation; and other health problems. Health problems experienced during the past 2 years

^eAnalysis sample minus one abused participant with pre-existing bulimia nervosa symptoms. *N* = 134, abused: 59, comparison: 75

^fSymptom counts for participants who reported at least one bulimia nervosa symptom: *N* = 13, abused: 9, comparison: 5

^gBulimia nervosa-related health problems included severe tooth or gum trouble; ear, nose, or throat trouble; frequent indigestion; kidney stone or hematuria; and hemorrhoid or rectal disease. Health problems experienced during the past 2 years

participant received a diagnosis for AN based on DSM-IV criteria and group differences could not be examined. Twenty-one participants (abused: 12, comparison: 9) reported at least one AN symptom. After adjusting for covariates, there were no statistically significant effect of CSA for AN symptom count ($\beta = 0.06$, standard error [*SE*] = 0.25, Wald $\chi^2 = 0.06$, $p = 0.81$) or AN-related health problem count ($\beta = 0.11$, *SE* = 0.33, Wald $\chi^2 = 0.77$, $p = 0.73$).

Five (3.73%; abused: 3 comparison: 2) participants received a diagnosis for BN based on DSM-IV criteria. After adjusting for covariates, CSA was not a significant predictor for the likelihood of receiving a BN diagnosis (OR: 0.43, 95% CI: 0.20–28.37). There was, however, a statistically significant effect of CSA for BN symptom count ($\beta = 0.78$, *SE* = 0.32, Wald $\chi^2 = 5.97$, $p = 0.01$), indicating that abused participants reported more BN symptoms in adolescence relative to comparison participants. There was also a statistically significant effect of CSA for BN-related

health problem count ($\beta = 0.74$, $SE = 0.28$, Wald $\chi^2 = 6.81$, $p = 0.009$), indicating that abused participants reported more BN-related health problems in adulthood relative to comparisons.

Based on results from the first set of analysis, the indirect effect analyses of CSA for health problems through ED symptomatology proceeded with BN symptom count only. After adjusting for covariates and CSA group membership, there was a statistically significant effect of BN symptom count in adolescence on BN-related health problem count in adulthood ($\beta = 0.08$, $SE = 0.03$, Wald $\chi^2 = 4.97$, $p = 0.03$). The indirect effect estimate of CSA for BN-related health problem count through BN symptom count was 0.061 ($SE = 0.04$) and the distribution of the product of coefficients method 95% CI was 0.002–0.16. Because the 95% CI did not include zero, the indirect effect was statistically significant at the $p < 0.05$ level, indicating that BN symptom count in adolescence accounted for a significant portion of the association between CSA and increased BN-related health problems in adulthood. Even after including BN symptom count in the model, the estimated CSA effect for BN-related health problem count remained statistically significant ($\beta = 0.61$, $SE = 0.27$, Wald $\chi^2 = 4.99$, $p = 0.03$), indicating that BN symptom count in adolescence did not completely explain the association between CSA and increased BN-related health problems in adulthood.

2.3 Discussion

The present report utilized prospective longitudinal data from the Female Growth and Development Study to investigate the relations among substantiated CSA, ED, and ED-related health problems. Results indicated that, despite not having received an official ED diagnosis at higher rates, sexually abused females reported having experienced a larger number of BN symptoms and BN-related health problems relative to their nonabused peers. Furthermore, BN symptoms in adolescence accounted for a significant portion of the association between CSA and increased BN-related health problems in adulthood. Findings from this study support the following recommendations for practice and policy, as outlined below.

2.3.1 *Implications for Practice*

1. **Resources and expertise should be made available for trauma-informed eating disorder screening and treatment.**

Current standards of care for treatment of ED for children and adolescents include individual- and family-based approaches that focus on increasing caloric intake and weight-restoration. Recovery success rates, however, continue to remain low (Campbell & Peebles, 2014). Consistent with previous studies that found stron-

ger associations between CSA and binge-purge, rather than restrictive forms of ED (Brewerton, 2007; Carter et al., 2006; Caslini et al., 2015; Fuemmeler, Dedert, McClernon, & Beckham, 2009; Johnson et al., 2002; Sanci et al., 2008; Steiger & Zanko, 1990), the present report found that CSA participants reported a greater number of BN symptoms relative to the comparison participants, indicating that adolescents who have a history of CSA may be at risk for BN symptomatology and its related health problems. The ED behaviors may be a manifestation of trauma symptoms or may serve as a coping strategy for distresses related to the abuse (Ross, 2009). Thus, clinicians who evaluate and treat ED should also include assessment for present and past abuse as a part of routine practice. If an abuse history is known, clinicians should evaluate the patient for the presence of trauma-related symptoms.

The effectiveness of ED treatment efforts may be enhanced by the incorporation of, or referral to, psychotherapeutic treatments that directly address the abuse-related distresses in order to overcome potential barriers to recovery that stem from trauma sequelae. For example, Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT) is an evidence-based trauma treatment that has demonstrated effectiveness in alleviating posttraumatic stress symptoms in youth who have experienced various types of trauma, including sexual abuse (Cohen, Deblinger, Mannarino, & Steer, 2004; Cohen, Mannarino, & Deblinger, 2016; Cohen, Mannarino, & Knudsen, 2005; Deblinger, Steer, & Lippmann, 1999; King et al., 2000). For ED patients with abuse history and posttraumatic symptoms, TF-CBT could accompany ED treatments to more effectively address all concerns. Training in TF-CBT or other evidence-based trauma treatments should also be made available to clinicians who treat ED. Additionally, pediatricians and other primary care clinicians who serve as gatekeepers for mental health treatments would benefit from having a basic understanding of trauma-informed treatments in order to provide education and decrease anxiety about seeking interventions for patients.

2. Eating disorder treatments should be made available to patients with sub-threshold eating disorder symptoms.

Despite the high prevalence of ED symptoms, ED tend to be underdiagnosed by clinicians, resulting in the failure of many patients to receive the necessary treatment (Campbell & Peebles, 2014). Consistent with literature that shows a link between ED and numerous subsequent health problems (Campbell & Peebles, 2014; Herpertz-Dahlmann, 2015), the present report found that an increased number of BN symptoms reported in adolescence was associated with an increased number of recent BN-related health problems in adulthood, such as gastrointestinal problems. These findings underscore the potential of ED symptoms, irrespective of the presence of an ED diagnosis, to prognosticate subsequent health problems. ED symptoms, therefore, should be considered as a part of a comprehensive health assessment and treatment plan.

Given that primary health providers often serve as gatekeepers to ED treatments, these clinicians should be vigilant about symptoms of ED and enact health education or treatment referrals as soon as symptoms emerge. The early detection of and

intervention for ED symptoms may benefit efforts to prevent the progression of ED and the debilitating and costly related health problems that may ensue.

3. Treatment services provided to survivors of childhood sexual abuse should include monitoring and interventions for eating disorder symptoms.

Standard treatments for youth who have a history of childhood maltreatment focus mainly on reducing trauma symptoms and acute internalizing and externalizing behavior problems (Silverman et al., 2008), but rarely address physical maladies. The present report's finding that BN symptoms explained some of the association between CSA and BN-related health problems may point to new areas of intervention, such as healthy lifestyle and ED prevention enhancements that can be embedded in standard trauma treatment programs in order to help to prevent these physical maladies and promote long-term health and well-being for CSA survivors. In child welfare, advocacy, and clinical settings, clinicians and caseworkers should carefully monitor sexually abused youth for symptoms of ED, particularly of BN, and provide prompt referrals for ED and evidence-based trauma treatments such as TF-CBT.

2.3.2 Implications for Policy

1. More financial resources should be made available to child sexual abuse survivors in aid of accessing necessary treatment.

Unfortunately, previous research has found that 31–35% of child sexual abuse survivors do not access treatment (Haskett, Nowlan, Hutcheson, & Whitworth, 1991). In one study, only about half of the children referred for mental health treatment during a Child Advocacy Center assessment for abuse had initiated treatment (McPherson, Scribano, & Stevens, 2012). The cost and availability of coordinated treatments play an important role in whether abuse survivors access treatment. Thus, resources, both financial and access to treatment, should be made more available to facilitate abuse survivors' attainment of the necessary treatments. Policy efforts such as the Child Abuse Prevention and Treatment Act (CAPTA; Administration for Children and Families, 2010), the Victims of Crime Act (VOCA; Office for Victims of Crime & Office of Justice Programs, 2001), and the National Child Traumatic Stress Network (NCTSN; Pynoos et al., 2008) should ensure the availability of such resources. If trauma treatments are made more available to abuse survivors, incidences of BN symptoms and related health problems might be greatly reduced, given that nearly 60,000 children are victims of sexual abuse each year in the United States (U.S. Department of Health, & Human Services, Administration for Children and Families, Administration on Children Youth and Families, & Children's Bureau, 2017).

2.3.3 *Implications for Research*

1. **More research is needed to better understand the link between childhood sexual abuse, eating disorders, and related health problems.**

The strengths of the present report lie in its prospective design, stringent inclusion criteria of substantiated CSA, matched comparison group, and diagnostic assessment of ED symptoms, all of which constitute significant methodological improvements over past studies on this topic (Brewerton, 2007; Carter et al., 2006; Caslini et al., 2015; Fuemmeler et al., 2009; Johnson et al., 2002; Sancì et al., 2008; Steiger & Zanko, 1990). Results provide evidence to support the link between CSA and the symptomatology and related health problems of BN, but not of AN, suggesting that making distinctions between the two types of ED is important in the investigation of the long-term health consequences of CSA.

Despite the finding of a statistically significant indirect effect of CSA for BN-related health problems through BN symptoms, the indirect effect was relatively small and much of the effect of CSA remained unexplained. Since these health problems are complex and have multiple possible etiological underpinnings, BN symptoms may play only a small role in the development of these types of health problems. Also, because these health problems were assessed for occurrence over the “past two years,” their occurrence at other times during the lifetime could not be captured in the analytical models. It is unknown whether BN symptoms might explain a greater portion of the association between CSA and BN-related health problems at different life stages. Future research should investigate additional potential mechanisms underlying the CSA population’s increased risks for health problems across more time periods along the life course.

While the present report did not find a significant association between CSA and AN or BN diagnoses, the FGDS sample contained a higher rate of BN diagnoses than the national prevalence rate, at 3.73% compared to the national rate of 1.3% in girls (Swanson et al., 2011). The elevated rate may be due to the relatively high proportion in the present sample of African-American/Black and Hispanic/Latina individuals, for whom epidemiological reports indicate higher rates of BN compared to White/Caucasian individuals (Swanson et al., 2011). Thus, the FGDS sample may represent a relatively high-risk sample. Due to potential racial-ethnic differences in ED, racial-ethnic minority status was tested as a covariate in analytical models. Results did not change with the addition of this variable.

It is also possible that the true rates of ED are greater than previously identified. The DSM 5th edition (DSM-5) had been released in 2013 and relaxed the stringent criteria for AN and BN diagnoses, including eliminating the amenorrhea requirement and reducing the minimum frequency of binge/purge behaviors from twice to once weekly (American Psychiatric Association, 2013). Hence, the DSM-IV diagnoses used in the present study constitute a more conservative estimate of the presence of ED. For example, using the DSM-5 diagnostic criteria for AN would result in 11 participants (8 abused, 3 comparison) receiving the diagnosis. BN diagnosis rates under DSM-5 could not be ascertained due to the inability to obtain information

on whether binge/purge behaviors had occurred at least once weekly, but it is likely that the less stringent diagnostic criteria would result in higher rates of diagnoses. These individuals with ED symptoms who did not reach DSM-IV diagnostic threshold may have been underserved if ED treatments had been limited to only those with diagnoses.

As stated earlier, the ED-related health problems assessed in the present report have multiple etiologies, and definitive causal attributions of these health problems to ED symptoms cannot be made. Nonetheless, these health problems serve as useful proxies for the physical health problems that result from ED, and provide evidence to suggest that ED symptoms might contribute to, or affect other etiological processes involved in, subsequent health problems. Moreover, these health problems are commonly-assessed symptoms during medical visits. Monitoring these health problems as indicators of ED-related complications can help clinicians to identify adolescents who are at-risk for developing severe health conditions and to provide timely intervention.

Several limitations must be considered when interpreting these data. This sample included only intrafamilial CSA and these findings may not generalize to other sexual abuse experiences (e.g., extrafamilial perpetrators, non-contact). This sample included only females and these findings cannot be extrapolated to males. The strict inclusion criteria for CSA resulted in a sample size that may have limited power for detecting group differences in ED diagnoses. The DSM-IV likely underestimated the rates of ED diagnoses and future studies need to replicate findings using the less-stringent DSM-5 criteria. Given the low rate of treatment for AN- (four) and BN- (one) related symptoms, the potential impact of treatment on outcomes could not be examined in this sample. The health problems were assessed using self-report and were limited to those problems known to the participant. Information regarding the age at onset for the health problems was unavailable and it is unclear whether these problems existed prior to the onset of ED symptoms. Future studies using patient medical records could objectively confirm the presence and timing of participants' health problems.

Despite these limitations, the present report constitutes the first prospective evidence known to the authors for the relations among CSA, BN symptoms, and BN-related health problems. This report also demonstrated that BN symptoms may partially account for the association between CSA and increased BN-related health problems. The methodological strengths of this report allow for its substantial contribution to the literature and to policy and practice.

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