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Original Research Article

Child Maltreatment and the Adolescent Patient With Severe Obesity: Implications for Clinical Care

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Abstract

Objective To characterize prevalence and correlates of child maltreatment (CM) in a clinical sample of adolescents with severe obesity. **Method** Multicenter baseline data from 139 adolescents undergoing weight loss surgery ($M_{age} = 16.9$; 79.9% female, 66.2% White; $M_{body\ mass\ index\ [BMI]} = 51.5\ kg/m^2$) and 83 nonsurgical comparisons ($M_{age} = 16.1$; 81.9% female, 54.2% White; $M_{BMI} = 46.9\ kg/m^2$) documented self-reported CM (Childhood Trauma Questionnaire) and associations with psychopathology, quality of life, self-esteem and body image, high-risk behaviors, and family dysfunction. **Results** CM prevalence (females: 29%; males: 12%) was similar to national adolescent base rates. Emotional abuse was most prevalent. One in 10 females reported sexual abuse. For females, CM rates were higher in comparisons, yet correlates were similar for both cohorts: greater psychopathology, substance use, and family dysfunction, and lower quality of life. **Conclusion** While a minority of adolescents with severe obesity reported a CM history, they carry greater psychosocial burden into the clinical setting.

Key words: abuse; adolescents; bariatric surgery; neglect; severe obesity.

Introduction

Both child maltreatment (CM) and pediatric severe obesity (i.e., body mass index [BMI] ≥ 120% of the BMI-for-age 95th percentile) are public health priorities owing to their immediate and long-term impact on health, well-being, and associated economic burden (Fang, Brown, Florence, & Mercy, 2012; Grieve, Fenwick, Yang, & Lean, 2013; Kelly et al., 2013; Widom, Czaja, Bentley, & Johnson, 2012). Prospective and cross-sectional examinations of community samples across the age span demonstrate that CM increases obesity risk (Noll, Zeller, Trickett, & Putnam, 2007; Shin & Miller, 2012; Veldwijk, Proper, Hoeven-Mulder, & Bemelmans, 2012), including greater odds of severe obesity in adulthood (Richardson, Dietz, & Gordon-Larsen,

2014). Severe obesity has emerged as the fastest growing subgroup of youth with obesity (Kelly et al., 2013), with recent estimates suggesting that 6% of adolescents in the United States are severely obese (Skinner & Skelton, 2014). Low efficacy of pediatric lifestyle modification or pharmacologic interventions for youth with severe obesity have resulted in weight loss surgery (WLS) emerging as the most effective treatment option (Daniels & Kelly, 2014), with a growing empirical base. In this current climate, it is vitally important to understand the psychosocial challenges facing this adolescent patient population to inform the development of age-salient care models.

Remarkably, as many as two-thirds of adults with severe obesity and undergoing WLS retrospectively report a history of CM, including sexual and/or physical abuse, emotional and physical neglect, and/or emotional abuse, and present with greater psychological impairment at program entry than those with no self-reported CM history (Grilo et al., 2005; Wildes, Kalarchian, Marcus, Levine, & Courcoulas, 2008). Accordingly, CM may be high in prevalence within the adolescent WLS patient population and amplify psychosocial risks. However, no studies to date have described the prevalence and associated psychosocial risks of CM in adolescents with severe obesity, nor those seeking weight loss intervention. However, research has detailed parallel correlates of each risk (adolescent severe obesity or sequelae of CM) including depression, body image disturbances, disordered eating, low self-esteem, family dysfunction, poor quality of life, and the engagement in high-risk behaviors (i.e., substance use, risky sexual behaviors, delinquency) (Ratcliff, Jenkins, Reiter-Purtill, Noll, & Zeller, 2011; Mills, Alati, Strathearn, & Najman, 2014; Mills et al., 2013; Noll, Trickett, & Putnam, 2003; Sysko, Zakarin, Devlin, Bush, & Walsh, 2011; Zeller et al., 2011). Understanding CM prevalence, severity, and associated correlates in adolescents with severe obesity presenting for care may point to potentially modifiable psychosocial targets for adjunctive interventions that not only improve psychosocial health, but may also optimize patient weight loss outcomes.

The present study documents the prevalence and correlates of CM using a large, multisite, clinically referred sample of adolescents with severe obesity, either before undergoing WLS or in a lifestyle modification intervention. Given that all participants were severely obese and treatment-seeking, no differences between groups were anticipated. Based on the aforementioned CM literature, adolescents with a history of CM were expected to have greater psychopathology and adjustment difficulties, lower quality of life, greater family dysfunction, and engage in more high-risk behaviors, relative to those without a history of CM. Severity of CM, including experiencing more than one type of maltreatment, was hypothesized to be associated with greater psychosocial risk. Finally, exploratory analyses examined what may be unique psychosocial risks based on the type of CM (e.g., sexual abuse, physical abuse) for this patient population.

Methods

Study Design Overview

The present data were part of larger study (TeenView) designed to investigate psychosocial health trajectories of adolescents with severe obesity undergoing WLS. TeenView is an ancillary to the Teen Longitudinal Assessment of Bariatric Surgery consortium study (Teen-LABS; NCT00474318), a prospective observational cohort study executed across five academic tertiary care centers in the United States to document the safety and efficacy of WLS in 242 adolescent patients (enrollment 2007–2011) (Inge et al., 2007; Michalsky et al., 2014). TeenView recruited two cohorts (enrollment 2008–2011): (1) Teen-LABS participants ("WLS"), and (2) demographically similar comparison adolescents with severe obesity in nonsurgical lifestyle modification programs across the five sites. TeenView was not designed as a comparative intervention trial (i.e., WLS vs. lifestyle modification), but to elucidate unique psychosocial benefits and risks associated with adolescent WLS relative to a more "natural course" for adolescent severe obesity. The institutional review board at each institution approved study protocols.

Participants

Baseline/preoperative data from 222 TeenView adolescents and a primary caregiver were used. Eligibility criteria required that the adolescent (1) had a BMI $\geq 40\,kg/m^2$, (2) was 13–18 years of age, (3) was not receiving full-time special education services owing to the high reading demand, (4) had a caregiver willing to participate, and (5) was able to speak/read English. Of the 159 potential WLS participants, 14 declined and 4 (consented) were unable to participate before surgery, leaving 141 participating adolescents (88.7%). For sibling pairs ($n = 2$), the older sibling was excluded. In addition, one caregiver consented but did not complete forms before surgery, resulting in a final WLS cohort of 139 adolescents and 138 caregivers, who completed baseline data collection within 30 days before surgery.

Comparison adolescents were recruited from TeenView research registries that identified study-eligible youth within lifestyle modification programs whose families were willing to be contacted for study enrollment should their adolescent become a demographic match (i.e., gender, race, ±6 months in age) to a WLS participant at any study site. During enrollment, 86 potential comparisons emerged as demographic matches and were approached for participation, of whom three declined, resulting in a final sample of 83 adolescents and caregivers (96.5%).

Procedures

Heights and weights were measured using a standardized protocol by trained research staff. Participants independently completed measures administered via paper-and-pencil and laptop computer. Participants' responses were confidential, although the informed consent/assent form specified that investigators would address significant distress or current risk of serious harm to self (e.g., suicidal ideation) or others. Further, participants were told that any harm suggestive of potential child abuse would be assessed and, as dictated by state law, could lead to a formal report to a child protective services agency (CPS). Participants were compensated for their time.

Measures

Child Maltreatment

CM was assessed by the 28-item screening measure for maltreatment histories, the Child Trauma Questionnaire-Short Form (CTQ-SF; Bernstein et al., 2003). Respondents are asked about "experiences they had growing up" and answer using a 5-point Likert scale ranging from "never true" to "very often true." The CTQ has five scales: emotional abuse (e.g., "People in my family said hurtful or insulting things to me"), physical abuse (e.g., "People in my family hit me so hard it left me with bruises or marks"), sexual abuse (e.g., "Someone tried to touch me in a sexual way, or make me touch them"), emotional neglect (e.g., "I felt [un]loved"), and physical neglect (e.g., "I had to wear dirty clothes"). Higher scores are indicative of greater severity of abuse/neglect, with established ranges of raw scores for none/minimal, mild, moderate, and severe abuse/neglect. The minimum raw score of the moderate range has been used in clinical research to categorize moderate to severe CM while minimizing false-positive identification (emotional

abuse ≥ 13, physical abuse ≥ 10, sexual abuse ≥ 8, emotional neglect ≥ 15, physical neglect ≥ 10). The CTQ-SF has demonstrated invariance of its factor structure across both clinical and nonreferred groups, as well as criterion-based validity in a clinical sample of adolescents for whom independent corroborative evidence was obtained (Bernstein et al., 2003; Spinhoven et al., 2014). Internal consistencies for each scale in the heterogeneous CTQ-SF validation sample ranged from 0.83 to 0.95, with the current sample ranging from 0.70 to 0.93. Recognizing adolescents may have experienced more than one type of maltreatment, the current authors created two summary scores. A continuous value representing the number of CM domains for which a participant's score was at or above the moderate cut point (range = 0–5) was computed as an indicator of maltreatment "load" (CM-Load). The CM-Load variable was also dichotomized to represent a participant's history of any CM (0 = *nonmaltreated*, 1 = *maltreated*).

Psychopathology

Adolescent psychopathology in the past 6 months was assessed using the psychometrically sound broad-band scales (Internalizing, Externalizing, and Total Problems) of the Youth Self-Report (YSR) and parallel caregiver report on the Child Behavior Checklist (CBCL) (Achenbach, Dumenci, & Rescorla, 2003; Achenbach & Rescorla, 2001). Interpretive guidelines based on national age norms indicate a standardized *t*-score ranging from 60 to 63 is considered "at risk," and ≥63 in the clinical range. Depressive symptoms during the past 2 weeks were based on the total raw score on the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). The BDI has well-established psychometric properties for respondents aged ≥14 with good internal consistency (α = .91) for the total raw score in the present sample. Clinical interpretive guidelines suggest the following cut points: 0–13 minimal, 14–19 mild, 20–29 moderate, and 30+ severe. Adolescent self-report of current use of medication for psychiatric or emotional problems (i.e., antidepressants, major or minor tranquilizers, mood stabilizers, stimulants) were combined across drug classes and dichotomized (0 = *no medications*, 1 = *any use*) as an additional indicator of psychopathology risk.

Quality of Life

Overall weight-related quality of life was assessed using the total scores of the Impact of Weight on Quality of Life-Kids (IWQOL-Kids; Kolotkin et al., 2006) and Sizing Them Up (STU; Modi & Zeller, 2008). The IWQOL-Kids is a self-report instrument for youth (11–19 years), whereas the STU provides the caregivers' perspective of youth (aged 5–18 years) weight-related quality of life. Both the IWQOL-Kids and STU have demonstrated excellent psychometric properties, including discrimination among weight status groups (Kolotkin et al., 2006; Modi & Zeller, 2008, 2011). Internal consistencies in the current sample were strong (IWQOL-Kids α = .91, STU α = .93).

Self-Esteem and Body Image

Adolescent self-esteem and body image were described with three self-report indices. The global self-worth scale of the Self-Perception Profile for Adolescents (SPPA; Harter, 2012) serves as a general assessment of how happy adolescents are with themselves or their lives and has strong psychometric properties. The total score from the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) was also used as a measure of dissatisfaction and concern with body shape, with higher scores reflecting greater dissatisfaction. This measure has demonstrated concurrent and discriminant validity and good reliability. The body-esteem subscale from the IWQOL-Kids (Kolotkin et al., 2006) was also used as an indicator of weight-related body esteem concerns. Internal consistencies for scale scores in the current sample were adequate (SPPA, α = .80; BSQ, α = .97; Body-esteem, α = .97).

High Risk Behaviors

The Sexual Attitudes and Activities Questionnaire (SAAQ; Noll et al., 2003) provided adolescent self-report of lifetime number of voluntary sexual intercourse partners on a scale from 0 (*none*) to 5 (*>10 partners*), which was dichotomized (*none* = 0, *else* = 1) to indicate sexual debut. The SAAQ's Risky Sexual Behaviors scale was also used (e.g., oral sex, unprotected sex, sex while drunk or high) with an internal consistency of 0.89 for the current sample. Adolescents self-reported current cigarette smoking (0 = *no*, 1 = *yes*) and alcohol use within the past 12 months (dichotomized as *never* = 0, *any* = 1).

Family Functioning

The General Functioning scale of the Family Assessment Device (FAD; Epstein, Baldwin, & Bishop, 1983) assessed family dysfunction from the perspective of the caregiver and adolescent, with higher scores representing greater dysfunction. This scale has demonstrated good validity and reliability, with good internal consistency for adolescents (α = .89) and caregivers (α = .85) in the present study.

Other Measures

Caregivers completed a demographic questionnaire to assess basic family characteristics, including caregiver gender, age, and level of education, as well as family composition. Height and weight measures were used to calculate BMI (kg/m^2).

Analyses

Missing data ranged from 0.01 to 3.6% for all variables and were handled via maximum likelihood estimation in Mplus (Version 7.11). The nesting of participants within the five sites was controlled for in hypothesized analyses via specialized variable and analysis commands in Mplus (i.e., "Cluster = site" and "Type = Complex") to avoid possible Type 1 errors. Preliminary analyses compared cohorts (WLS vs. comparison) and groups (maltreated vs. nonmaltreated) on demographic factors and BMI. If significant differences were found, those factors were controlled in subsequent analyses. Means and standard deviations as well as prevalence of CM were calculated. Multivariate analysis of covariance was used to test for mean differences between cohorts for each CM domain. Linear or logistic regression models (when the response variable was continuous or binary, respectively) with cohort, CM group, and their interaction as independent variables, tested for differences across the psychopathology, quality of life, self-esteem and body image, high risk behaviors, and family dysfunction response measures. Finally, correlations were computed to examine the associations of continuous CM domain scores as well as CM-Load with all potential self-reported psychosocial variables. The false discovery rate procedure (Benjamini, 2010) was used to control family-wise Type 1 error within outcome domains (1) psychopathology, quality of life, self-esteem and body image; (2) high-risk behaviors; and (3). family dysfunction).

Results

Sample Characteristics

The majority of adolescents were White females, and living in a dual caregiver home (Table I). Most participating caregivers were female

Table I. Demographic Characteristics and BMI Values for Adolescents and Caregivers

Variables	Total ($N = 222$) Mean ± SD %	WLS ($n = 139$) Mean ± SD %	Non-surgical ($n = 83$) Mean ± SD %	p[a]
Adolescent				
Body mass index	49.77 ± 7.89	51.52 ± 8.32	46.85 ± 6.12	<.001
Age	16.59 ± 1.44	16.86 ± 1.39	16.11 ± 1.40	<.001
% Female	80.6	79.9	81.9	.71
Race/ethnicity				
% White	61.7	66.2	54.2	.08[b]
% Black	26.1	18.0	39.8	
% More than one race	5.4	8.6	–	
% Hispanic	6.8	7.2	6.0	
Caregiver[c]				
Body mass index	38.05 ± 9.63	37.84 ± 9.35	38.35 ± 10.08	.71
Age	44.27 ± 7.50	44.47 ± 6.41	43.93 ± 9.05	.63
% Female	93.6	93.4	94.0	.86
Education				.18
% ≤High school Graduation	42.5	39.0	48.2	
% 1+ years after secondary	57.5	61.0	51.8	
Family				
% Single caregiver home	33.3	31.6	36.1	.49

Note. [a]p-values are based on two-tailed independent t tests when examining mean values and on chi-square tests when examining percentages.

[b]Based on comparison of White participants versus participants of all other race/ethnicities.

[c]Demographic information was available for 136 WLS caregivers, with the exception of caregiver BMI, which was available for 123 caregivers. Demographic information and BMI were available for all 83 nonsurgical caregivers.

and had at least a high school education. WLS participants were significantly older and had a higher mean BMI relative to comparisons. Race/ethnicity was not significantly different between groups (1 = *White, Non-Hispanic*, 0 = *all other race/ethnicities*).

Prevalence of Maltreatment in Adolescent Males With Severe Obesity

For males, CTQ scale scores fell within the none/minimal range based on instrument guidelines (emotional abuse: $M = 6.95 \pm 2.85$; physical abuse: $M = 6.21 \pm 1.93$; sexual abuse: $M = 5.00 \pm 0.00$; emotional neglect: $M = 8.00 \pm 3.34$; physical neglect: $M = 6.10 \pm 1.79$). Five males (12.2%) self-reported any history of CM, with no male exceeding the cut point for sexual abuse. Owing to low prevalence/sample size, no further analyses were undertaken for males.

Prevalence of Maltreatment in Adolescent Females With Severe Obesity

Female CTQ mean scale scores for the combined sample and by cohort fell within the none/minimal to low range based on instrument guidelines (Table II). Controlling for adolescent age and BMI, comparison females reported significantly higher mean scores of emotional abuse, physical abuse, emotional neglect, and physical neglect than females undergoing WLS, although both groups fell within the none/minimal to low range.

Prevalence rates of CM are provided in Table II. Of 177 females, 52 (29.4%) were classified as having any history of CM.[1] Logistic regression analyses compared females undergoing WLS and comparison females for each scale, with adolescent age and BMI used as covariates. Significantly more comparison females exceeded cutoffs for emotional abuse and physical abuse than WLS females. Findings for a history of any CM and for physical neglect were not retained as significant after correcting for multiple comparisons.

[1] Two females in the bariatric group could not be classified owing to missing data.

Psychosocial Correlates of Maltreatment for Females With Severe Obesity

Psychosocial correlates of any history of CM were examined for females classified as having any history of CM ($n = 52$) relative to those who did not ($n = 125$). Linear or logistic regression analyses with CM group, cohort, and their interaction as independent variables were performed separately for each outcome. In keeping with the aims of the current study, only those main effects for CM group and interactions between CM group and cohort (WLS and comparison) that were retained as significant after correcting for multiple comparisons are discussed. As CM group membership did not significantly differ on any adolescent or caregiver demographic, no covariates were included.

Main effects for CM group are reported in Table III. Relative to females with no CM, females with a history of CM self-reported significantly higher depressive symptoms (BDI-II; $B = 6.34$, $p < .001$), internalizing symptoms (YSR; $B = 7.18$, $p < .001$), externalizing symptoms (YSR; $B = 5.20$, $p < .001$), total behavior problems (YSR; $B = 18.83$, $p < .001$), and current psychiatric medication use ($B = 0.96$, $p < .001$) as well as lower global self-worth scores (SPPA; $B = -0.52$, $p = .01$). Similarly, caregiver report of adolescent psychopathology and adjustment indicated that females with a history of CM had greater internalizing symptoms (CBCL; $B = 5.94$, $p = .01$) and total behavior problems (CBCL; $B = 11.67$, $p < .001$) as well as lower total weight-related quality of life (STU; $B = -8.13$, $p = .002$). For high-risk behaviors, females with CM reported significantly higher odds of having used alcohol in the past 12 months (odds ratio [OR] = 2.03, $p = .01$) and currently smoking cigarettes (OR = 4.10, $p = .01$). Finally, both females with CM (FAD; $B = 0.43$, $p = .02$) and caregivers of females with CM (FAD; $B = 0.20$, $p = .01$) reported greater family dysfunction.

Table II. Mean Scores and Prevalence Estimates of Child Maltreatment (CM) Based on the Childhood Trauma Questionnaire (CTQ) for Female Adolescents With Severe Obesity

Variables	Total ($N = 178$)[a] Mean ± SD (%)[b]	WLS ($n = 110$)[a] Mean ± SD (%)[b]	Non-surgical ($n = 68$)[a] Mean ± SD (%)[b]	p[c]	d[d]
Emotional abuse	8.53 ± 4.31 (17.4)	7.81 ± 3.60 (10.9)	9.69 ± 5.07 (27.9)	.002 .004	0.46
Physical abuse	6.71 ± 3.32 (11.8)	6.24 ± 2.76 (7.3)	7.49 ± 3.97 (19.1)	.018 .004	0.38
Sexual abuse[a]	5.92 ± 3.27 (9.6)	5.91 ± 3.46 (8.3)	5.94 ± 2.98 (11.8)	.40 .18	0.009
Emotional neglect	8.75 ± 4.18 (8.4)	7.85 ± 3.49 (6.4)	10.19 ± 4.78 (11.8)	<.001 .18	0.58
Physical neglect	6.43 ± 2.65 (12.4)	6.01 ± 2.00 (7.3)	7.12 ± 3.35 (20.6)	.006 .045	0.43
Any CM	(29.4)	(22.0)	(41.2)	.03	

Note. [a]Of 179 female adolescents, 178 completed the CTQ. For the Sexual Abuse Scale, information was available for 109 WLS and 67 nonsurgical participants owing to missing items.

[b]Prevalence rates refer to the number of female adolescents who exceeded moderate cutoffs as provided by the CTQ manual. For one WLS adolescent, no items were completed for the Sexual Abuse scale, and thus, no classification was made for Sexual Abuse or Any CM.

[c]For mean levels, p-values were based on analyses of multivariate covariance. For prevalence estimates, p-values were based on logistic regressions. Adolescent age and BMI were used as covariates in both sets of analyses.

[d]Effect sizes are reported as Cohen's d, and are defined at small = 0.20, medium = 0.50, and large = 0.80.

Only one significant interaction between CM group and cohort was identified, specifically for currently smoking cigarettes ($p < .001$). Post hoc examination of this interaction indicated that only one female in the WLS group reported current smoking and that this adolescent also reported a history of CM. Of the 10 comparison females who reported currently smoking, 7 also reported a history of CM. However, Fisher's Exact test indicated that the association between CM group and cigarette use was not significant ($p = .08$).

Maltreatment Severity for Females With Severe Obesity

Table IV presents exploratory correlations of continuous CTQ scores for each CM domain with all potential adolescent self-reported psychosocial correlates. In general, higher severity of emotional abuse, emotional neglect, and physical abuse were significantly associated with greater psychopathology and family dysfunction, as well as lower weight-related quality of life. Greater severity of emotional abuse and emotional neglect were also associated with lower global self-esteem and weight-related body-esteem, as well as greater body dissatisfaction. Physical abuse and sexual abuse were associated with significantly greater high-risk sexual behaviors. Correlations were also explored between CM-Load and potential psychosocial correlates. CM-Load was a continuous indicator of the number of CM domains for which a participant's score was at or above the moderate cut point, with 20 (38.5%) females exceeding for only 1 domain, 19 (36.5%) for 2 domains, 7 (13.5%) for 3 domains, 3 (5.8%) for 4 domains, and 3 (5.8%) for all 5 domains. CM-Load was associated with adolescent self-report of lower weight-related quality of life, as well as greater psychopathology, high-risk sexual behaviors, recent cigarette smoking, alcohol use within the past year, and family dysfunction.

Discussion

Twenty-nine percent of females and 12% of males with severe obesity undergoing WLS or nonsurgical treatment self-reported a history of CM. Emotional abuse was the most prevalent, although approximately 1 in 10 females reported a history of moderate/severe sexual or physical abuse. These rates are similar to self-reported rates of CM in adolescent community samples in the United States (Finkelhor, Turner, Shattuck, & Hamby, 2013), as well as in Canada when using the CTQ (Crooks, Scott, Ellis, & Wolfe, 2011), suggesting no greater CM history risk than would be expected in the broader adolescent population. Sample size and low prevalence of CM in males precluded examination of CM correlates and severity. However, females with a CM history appear to be a significant minority who carry greater psychosocial burden into a clinical weight management setting.

Females with a history of CM had significantly greater internalizing (e.g., depressive and anxiety) and externalizing symptomatology (e.g., oppositional or defiant behaviors), as well as a greater likelihood of current use of psychiatric medications compared with those without a CM history. However, although neither group had mean levels of internalizing or externalizing symptoms (YSR, CBCL) in a clinical range, both groups reported psychiatric medication use rates (maltreated 28%; nonmaltreated 20%) that were higher than national base rates (7%) (Olfson, He, & Merikangas, 2013). Females with a history of CM were also more likely to be current smokers and report alcohol use, and were characterized by lower self-esteem and weight-related quality of life, as well as greater family dysfunction. Finally, a greater number of maltreatment types (CM-Load) was associated with a range of psychosocial impairments, with unique associations when considering severity within each CM domain.

These data have clear clinical implications, highlighting modifiable intervention and prevention targets (e.g., psychopathology, alcohol use, risky sexual behaviors, low self-esteem) for an at-risk adolescent subgroup to improve patient outcomes. While CM is known to increase obesity risk, no empirical base indicates that a CM history serves as a barrier to an adolescent successfully engaging in supervised weight loss treatment. The adult obesity treatment literature is equivocal regarding this issue (Steinig, Wagner, Shang, Dolemeyer, & Kersting, 2012). More likely, CM may play an *indirect* role in WLS outcomes given its associated psychosocial sequelae. For example, depression has been shown to mediate the links between CM and later obesity (Danese & Tan, 2014). Severe obesity, depression (Zeller et al., 2004) as well as family dysfunction (Williams et al., 2010) have each been shown to increase the likelihood of pediatric lifestyle modification dropout. For adults, greater psychiatric impairment has been linked to program dropout before WLS (Merrell, Ashton, Windover, & Heinberg, 2012), as well as poorer weight loss outcomes in surgical and nonsurgical interventions (Legenbauer, 2009; Wood & Ogden, 2012).

Providers in surgical and nonsurgical pediatric weight management programs are already primed to assess and monitor the clinical needs of patients with severe obesity, and thus uniquely positioned to assess a patient's maltreatment history and risk. Providers may find the American Academy of Pediatrics trauma guide a helpful resource (see www.aap.org/traumaguide). At a minimum, providers should be knowledgeable of adjunctive referral resources to assist adolescents and their families presenting with dysfunction and/or distress. Evidence-based treatments have also emerged to promote

Table III. Psychosocial Correlates of Maltreated and Nonmaltreated Female Adolescents With Severe Obesity

Variables	Maltreated ($n = 52$) Mean ± SD (%)	Non-maltreated ($n = 125$) Mean ± SD (%)	p[a]	Effect size[b]
Adolescent measures				
Psychopathology, quality of life, self-esteem, and body image				
Depressive symptoms (BDI)	14.61 ± 10.81	8.76 ± 7.86	<.001	0.66
Internalizing symptoms (YSR)[c]	58.43 ± 11.90	52.17 ± 9.31	<.001	0.75
Externalizing symptoms (YSR)[c]	56.51 ± 9.31	50.34 ± 8.21	<.001	0.74
Total problems (YSR)[c]	59.08 ± 9.87	52.73 ± 8.28	<.001	0.79
Current psychiatric medication	28.0%	20.0%	<.001	2.61
Total weight-related quality of life (IWQOL-Kids)	58.83 ± 20.02	64.29 ± 15.38	.05	0.32
Global self-worth (SPPA)	2.53 ± 0.84	2.85 ± 0.66	.01	0.45
Body shape concerns (BSQ)	108.94 ± 45.21	100.76 ± 35.84	.09	0.21
Weight-related body-esteem (IWQOL-Kids)	42.22 ± 31.41	44.67 ± 26.04	.26	0.09
High risk behaviors				
Sexual debut (SAAQ)	38.5%	21.8%	.24	1.75
Risky sex (SAAQ)	2.69 ± 4.53	1.03 ± 2.48	.16	0.52
Current cigarette use	15.7%	2.4%	.01	4.10
Alcohol use	27.5%	6.4%	.01	7.61
Family				
Family dysfunction (FAD)	2.32 ± 0.60	1.94 ± 0.52	.02	0.70
Caregiver measures				
Internalizing (CBCL)[c]	63.52 ± 11.26	60.35 ± 10.23	.01	0.45
Externalizing (CBCL)[c]	55.30 ± 8.57	53.17 ± 8.94	.73	0.20
Total problems (CBCL)[c]	61.84 ± 9.17	58.73 ± 9.01	<.001	0.40
Total weight-related quality of life (STU)	53.30 ± 20.53	59.89 ± 17.48	.002	0.36
Family dysfunction (FAD)	1.98 ± 0.48	1.81 ± 0.43	.01	0.38

Note. BDI = Beck Depression Inventory; BSQ = Body Shape Questionnaire; CBCL = Child Behavior Checklist; FAD = Family Assessment Device; IWQOL-Kids = Impact of Weight on Quality of Life-Kids; SAAQ = Sexual Attitudes and Activities Questionnaire; SPPA = Self-Perception Profile for Adolescents; STU = Sizing Them Up; YSR = Youth Self-Report.

[a]Linear or logistic regression analyses with maltreatment group, surgical status, and their interaction as independent variables were completed for each dependent variable (linear regressions for continuous variables represented as means and logistic regressions for binary variables represented as percentages). All reported p-values are based on the main effect of maltreatment group.

[b]For continuous dependent variables, effect sizes are reported as Cohen's d (small = 0.20, medium = 0.50, and large = 0.80); for dichotomous dependent variables, effect sizes are reported as odds ratios.

[c]For the YSR and CBCL, means and SDs are provided for t scores in the table to aid in interpretation, but all analyses including effect size estimates were completed using raw scores.

resilience in youth who have experienced CM (i.e., trauma-focused cognitive behavior therapy; Mannarino, Cohen, Deblinger, Runyon, & Steer, 2012). Pediatric psychologists can play a crucial role in facilitating appropriate referrals to adjunctive care.

The present study also included some unanticipated findings. Specifically, CM rates were consistently lower in adolescents undergoing WLS compared with those in lifestyle modification. These cohort differences may be a downstream effect of a complex and often lengthy process to achieve WLS candidacy. This includes decision-makers on multiple levels (i.e., referring physician, adolescent, family, clinical team, insurance provider; Inge et al., 2014). In addition, the adolescent must maintain a stable psychiatric status (i.e., symptoms well-managed by collaborating providers; Austin, Smith, & Ward, 2013). Thus, it is conceivable that maltreated youth presenting with poorly managed psychopathology and family dysfunction may be less likely to progress to achieving WLS candidacy. While beyond the scope of this study, this is an important empirical question to be addressed by future studies examining access to care and preoperative program attrition.

Alternately, it remains possible that WLS adolescents may have minimized their CM history. A post hoc examination of the CTQ Minimization/Denial scale, an indicator of possible underreporting of CM (score range 0–3; Bernstein et al., 2003), suggested that a significantly greater number of WLS participants (26%) than comparisons (13%; $p = .038$) had high minimization scores (i.e., score of 2 or 3). While all participants had been approved for surgery before study recruitment, adolescents may have minimized CM history severity to avoid mandated follow-up by research staff at such a critical time (i.e., within 30 days of WLS). Mandated reporting for minors may also be an important consideration when comparing the present adolescent findings to the higher CM rates reported in the adult WLS literature, as adult retrospective reporting bears few consequences (Grilo et al., 2005; Wildes et al., 2008). Moreover, adolescents in the present study remain in the age window to still experience CM, and thus, the present data may underestimate CM prevalence in adolescent WLS patients.

Strengths of the present study include the multisite and controlled design, standardized data collection, and a comprehensive and age-salient assessment battery. However, this study is not without limitations that can inform future work. Consistent with adult WLS trends (Belle et al., 2013), the Teen-LABS patient population is primarily female and White, which combined with the study's design to recruit a demographically similar comparison cohort, resulted in limited information regarding males and other race/ethnic groups (e.g., Hispanic, non-Hispanic Black, Native American) known be at heightened risk for severe obesity (Kelly et al., 2013), as well as to have experienced CM by the age of 18 years (Wildeman et al.,

Table IV. Correlations of Maltreatment Severity and Psychosocial Domains Based on Self-Report of Female Adolescents With Severe Obesity (N = 179)

Variables	Emotional abuse	Physical abuse	Sexual abuse	Emotional neglect	Physical neglect	CM-load
Psychopathology, quality of life, self-esteem and body image						
Depressive symptoms (BDI)	0.38**	0.22*	0.09	0.27**	0.14	0.25*
Internalizing symptoms (YSR)	0.48**	0.21*	0.10	0.31**	0.11	0.25*
Externalizing symptoms (YSR)	0.44**	0.26*	0.18	0.34**	0.30**	0.39**
Total problems (YSR)	0.48**	0.21*	0.15	0.32**	0.19	0.30**
Current psychiatric medication	0.01	−0.01	0.04	0.12	0.07	0.07
Total weight-related quality of life (IWQOL-Kids)	−0.30**	−0.08	−0.04	−0.19*	−0.06	−0.16**
Global self-worth (SPPA)	−0.36**	−0.11	−0.07	−0.29**	−0.01	−0.16
Body shape concerns (BSQ)	0.28**	0.05	−0.01	0.08	−0.03	0.02
Weight-related body esteem (IWQOL-Kids)	−0.21*	−0.02	0.01	−0.11	0.02	−0.03
High risk behaviors						
Sexual debut (SAAQ)	0.20*	0.29**	0.29**	0.16	0.20*	0.28**
Number of sex partners lifetime (SAAQ)	0.15	0.28**	0.35**	0.16	0.17	0.27**
Risky sex (SAAQ)	0.18	0.27**	0.39**	0.17	0.18	0.29**
Current cigarette Use	0.17	0.06	0.17	0.17	0.12	0.18
Annual alcohol use	0.26**	0.19	0.14	0.28**	0.24*	0.30**
Family						
Family dysfunction (FAD)	0.40**	0.20*	0.02	0.52**	0.21*	0.27**

Note. BDI = Beck Depression Inventory; BSQ = Body Shape Questionnaire; CM = Child Maltreatment; FAD = Family Assessment Device; IWQOL-Kids = Impact of Weight on Quality of Life-Kids; SAAQ = Sexual Attitudes and Activities Questionnaire; SPPA = Self-Perception Profile for Adolescents; YSR = Youth Self-Report.

To control for Type 1 error, the significance level was set at $p < .01$.

*$p < .01$.

**$p < .001$.

2014). Further, adolescents who demographically "matched" and participated in the nonoperative comparison group may have been different than those who did not match, or those who initially declined being listed as potential matches on the nonsurgical registry. Finally, these findings may not be representative of adolescents with severe obesity in nonclinical settings.

The presence of CM was based on adolescent self-report on the CTQ-SF, a widely used psychometrically sound screening tool. An alternate approach would be to examine CM substantiated by CPS criterion. This would be challenging in the current multisite context representing patients from eight states, with reporting laws based on varying definitions of abuse and neglect. We did not assess additional CM characteristics that are important to understanding psychosocial correlates, such as developmental timing or frequency of CM experiences (Jackson, Gabrielli, Fleming, Tunno, & Makanui, 2014). In addition, the present study focused exclusively on CM, arguably an exemplar of only one aspect of adverse child experiences (e.g., parental death, divorce, parental psychopathology, family violence, crime, poverty, victimization) that may co-occur and contribute to adolescent health outcomes (McLaughlin et al., 2012). Finally, the present data are cross-sectional and causality cannot be inferred.

Conclusions and Future Directions

Given maltreated youth are not homogeneous in their experiences or their outcomes (Jackson et al., 2014), we cannot assume a simple CM to WLS outcomes link, whether the outcomes be in the domain of physical or psychosocial health. These outcome pathways are likely more complex and best examined through prospective longitudinal studies where one must consider CM playing a mediating or moderating role. What role CM plays in adolescent WLS outcomes is unknown and part of important ongoing ancillary work currently being executed in collaboration with the Teen-LABS consortium. In addition, the present study shows that there is concern for maltreated adolescents with severe obesity who are not undergoing WLS, who are an understudied subpopulation, and for whom there is a bleak forecast of health and well-being in adulthood. The present authors are in no way advocating that youth with a history of CM be excluded from weight management care, nor should CM be perceived as a barrier to WLS candidacy. Rather, as for any pediatric patient in any clinical setting, CM history should be indicator for trauma-informed care.

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