



Interpersonal Abuse and Long-term Outcomes Following Bariatric Surgery

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Abstract

Background History of abuse may impact weight loss (WL) following bariatric surgery. Some investigations have indicated slower WL rates among patients reporting abuse; however, among studies with multiple assessments, significant differences in WL are not evidenced at later measurement. Few investigations have extended follow-up beyond 18 months, limiting understanding of the impact of abuse on weight trajectory over time. Furthermore, existing research has insufficiently accounted for forms of interpersonal trauma beyond sexual abuse (i.e., emotional, physical) that may impact WL and other health outcomes. **Objectives** To determine whether post-surgical percent total WL (%TWL) and specific clinical outcomes are differentially impacted by history of interpersonal abuse.

Setting Large, comprehensive medical center.

Methods Retrospective data was collected from patients who underwent bariatric surgery at a single center ($N = 433$). Based on pre-surgical interview, patients were grouped according to reported history of interpersonal abuse (Y/N). Nonlinear repeated measures regression examined impact of abuse history on %TWL, and clinical sequelae.

Results Differences in %TWL at 6, 12, 18, 24, and 36 months post-surgically did not differ significantly. Further, %TWL did not differ across time, according to group. A significantly greater number of those with history of interpersonal abuse had a clinical diagnosis of depression as compared with those not reporting interpersonal abuse (38% vs. 22% respectively), $p < .001$.

Conclusions Interpersonal abuse history does not negatively impact %TWL post-surgically but is associated with diagnosis of depression, indicating depressive symptoms may be a viable clinical intervention target for surgery patients with interpersonal trauma history.

Keywords Bariatric surgery · Interpersonal violence · Obesity · Body weight loss · Depression

Weight loss surgery is an effective treatment for severe obesity [1] but certain psychosocial factors significantly impact

surgical outcomes, specifically weight loss (WL) [2]. One such factor may be a history of exposure to interpersonal trauma in the form of violence or abuse. All forms of interpersonal abuse (i.e., physical, sexual, emotional) can result in negative psychological and behavioral sequelae including post-traumatic stress disorder (PTSD) symptoms, anxiety symptoms, self-injurious behavior, and recurrent suicidal ideation and suicide attempts [3]. Childhood physical abuse is associated with low self-esteem, anger, depressive symptoms, and substance abuse [4] and in adulthood, intimate partner violence has shown strong associations with depressive symptoms, anxiety symptoms, PTSD, suicidal ideation, self-harm behavior, and suicide attempts [5].

Survivors of childhood sexual abuse (CSA) exhibit elevated incidence of PTSD, and are at increased risk for substance abuse and dependency, suicide attempts, and anxiety and depressive symptoms, as compared to non-abused children [6]. In adulthood, sexual assault is associated with a wide range of

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negative psychological outcomes including PTSD symptoms [7], depressive symptoms [8], dissociative symptoms [9], and substance use [10].

Emotional abuse can also have detrimental psychological effects. Individuals with greater severity of childhood emotional abuse show elevated depressive symptoms in the face of stressors while controlling for a history of physical abuse and CSA [11]. Adults with a history of emotional abuse are significantly more likely to have a diagnosis of major depression [12] and some evidence suggests that emotional abuse is a stronger predictor of symptoms or diagnoses of depression than childhood physical or sexual abuse [13].

Another potential negative health outcome of interpersonal trauma is weight gain. Associations between reported history of abuse and obesity have consistently been established [14], and some work has indicated that history of sexual abuse may differentially impact WL following bariatric surgery [15].

Some studies investigating post-bariatric weight outcomes in abused vs. non-abused individuals have indicated a slower rate of WL among patients reporting sexual abuse [16–18]. However, among studies with multiple assessment time points, significant differences in weight loss appear to either be minimal over time [19, 20], or to resolve at later measurement [16, 21]. Another study found that CSA predicted higher incidence of depression, but did not find differences in average BMI at 34 months post-surgery [22]. Some studies of post-surgical patients found higher rates of depression in those with history of sexual [19] or emotional [23] abuse.

While a majority of investigations have focused on the impact of history of sexual trauma on post-surgical outcomes, some studies have included other types of trauma exposure. One study of military veterans found that a diagnosis of PTSD did not negatively impact WL at 1 year [24]. Another examination found that a history of CSA, adult sexual trauma, and physical abuse did not independently correlate with differences in EWL at 2 years [25]. Further, Wedin et al. [26] found that physical abuse predicts 84% increased odds of unsuccessful weight loss ($\leq 50\%$ WL) at 2 years. Another study that included CSA with other types of maltreatment found no differences in WL at 1 year, but a significant association between history of emotional abuse and depression [23].

Inadequate sample sizes and lack of follow-up beyond 18 months has limited understanding of the impact interpersonal abuse has on post-surgical outcomes, and specifically, the impact of interpersonal trauma outside of sexual violence. The current study aimed to determine whether history of interpersonal abuse negatively impacts WL over extended follow-up (i.e., 36 months). Secondary study outcomes examined pre-surgical depression and related clinical outcomes (e.g., psychiatric medication usage) relative to group status (those with reported abuse history vs.

without). Extending evidence from prior work [20], it was hypothesized that individuals reporting history of interpersonal abuse would demonstrate significantly less %TWL at specific follow-up time points, in addition to a slower rate of %TWL. Also based on prior research [23], it was hypothesized that individuals reporting abuse history would demonstrate elevated prevalence of depression.

Methods

Participants

The bariatric surgery patient database with $> 75\%$ follow-up at 4-year post-surgery was queried for primary bariatric surgeries occurring during 2015 and 2016 at a single medical center and 459 consented patients were identified [27]. For these 459, there were 442 (96%) that had any information recorded for the “History of violence or trauma” section of the clinical note. These 442 were reviewed by two experts (i.e., doctoral candidate Clinical Psychology interns in Adult Behavioral Medicine) who independently recorded whether the recorded information indicated any abuse (Y/N), any physical abuse (Y/N), any emotional abuse (Y/N), and any sexual abuse (Y/N). The responses by each expert were compared and all discrepancies were discussed and resolved by the two experts. Of these 442, there were another 9 that included language such as “Did not assess”. These 9 were excluded, resulting in 433 for further analysis. For those included in final analyses, diagnosis of depression was extracted from patient chart data. Institutional review board permission was acquired to examine the clinical records of these 433 patients who underwent Roux-en-Y gastric bypass ($n = 300$), laparoscopic sleeve gastrectomy ($n = 92$), or biliopancreatic diversion/duodenal switch ($n = 41$) surgeries.

Procedure

At the time of the initial preoperative multidisciplinary evaluation, all patients underwent a psychological evaluation as part of their assessment. By way of a semi-structured interview, patients were asked if they had ever experienced sexual, physical, or emotional abuse.

Analytic Plan

Outcomes were compared between the group reporting any abuse ($n = 143$) versus the group reporting no abuse ($n = 282$); for eight of the 433 total patients, abuse status had been assessed but could not be categorized based on chart review. Baseline differences between groups were compared using Chi-square tests, Fisher’s exact tests,

and two-sample *t* tests. The primary outcome of WL was compared between groups using two definitions of WL including mean BMI and percent total weight loss (%TWL). Differences in weight loss were evaluated by comparing weight loss at selected time points after surgery (using two-sample *t* tests) and by testing for an overall difference using a nonlinear repeated measures model (including all weight measurements up to 48 months after surgery). Secondary outcomes including BMI, time until maximum weight loss, use of depression medications, percent with emergency department visits, percent with inpatient psychiatry encounter, and percent of visits that were “no-show” were compared using Chi-square tests, Fisher’s exact tests, and two-sample *t* tests.

Results

Rates of reported abuse within the full sample are displayed in Table 1. At baseline, significant differences in descriptive characteristics were evidenced relative to sex, and presence of depression diagnosis (Table 2). There were no significant differences between groups in BMI change or %TWL during the 3 years after surgery (Table 3). In analyses of secondary outcomes, months until maximum weight loss (i.e., nadir) was known for $n = 85$ in the “any abuse” group and $n = 163$ in the “no abuse” group; between-group differences were not significant (Table 4). In addition, across time, rates of relative %TWL were comparable across groups ($p = .59$, Fig. 1). Further, there were no statistical differences evidenced between interpersonal abuse subtypes (i.e., sexual, physical, emotional) in %TWL over time. Between-group differences were not evidenced for the percentage of those on depression medications at baseline but no longer on them 1-year post-operatively. Similarly, no group differences were found for those not on depression medications at baseline but on them 1-year post-operatively. Results did reveal significant differences in the number of inpatient psychiatry visits, with more visits within the group reporting any abuse, $p < .01$. While small, this sample size may include false negatives in the denominators (i.e., patients who used other health systems for their inpatient psychiatry care).

Table 1 Reported interpersonal abuse

	Abuse % (<i>n</i>)	No abuse % (<i>n</i>)	Unknown (<i>n</i>)
Any abuse	34% (143)	66% (282)	8
Physical abuse	21% (86)	79% (328)	19
Emotional abuse	19% (77)	81% (331)	25
Sexual abuse	10% (42)	90% (367)	24

Total sample $N = 433$

Table 2 Comparison of baseline characteristics between groups

Variable	Any abuse $n = 143$	No abuse $n = 282$	<i>p</i>
Sex			
Female % (<i>n</i>)	90% (129)	75% (212)	$< .001^1$
Male % (<i>n</i>)	10% (14)	25% (70)	
Race			
White % (<i>n</i>)	88% (126)	92% (259)	.51 ²
Black % (<i>n</i>)	5% (7)	4% (12)	
Hispanic % (<i>n</i>)	6% (8)	3% (9)	
Other/unknown % (<i>n</i>)	1% (2)	1% (1)	
Age: years, mean (SD)	44.6 (10.2)	43.7 (11.9)	.43 ³
BMI: kg/m ² , mean (SD)	49.7 (10.4)	49.7 (9.3)	.96 ³
Waist: cm, mean (SD)	52.7 (7.0)	53.9 (7.2)	.09 ³
Surgery type			
RYGB % (<i>n</i>)	72% (103)	68% (192)	.69 ¹
LSG % (<i>n</i>)	20% (28)	22% (61)	
BPD/DS % (<i>n</i>)	8% (12)	10% (29)	
Depression: % (<i>n</i>)	38% (55)	22% (61)	$< .001^1$

Total sample $N = 433$; table excludes 8 patients with unknown value for “any abuse”; BMI body mass index, RYGB Roux-en-Y gastric bypass, LSG laparoscopic sleeve gastrectomy, BPD/DS biliopancreatic diversion/duodenal switch

¹ Chi-square test

² Fisher’s exact test

³ Two-sample *t* test

Discussion

The current study evaluated post-surgical differences in %TWL among bariatric patients reporting a history of interpersonal abuse, as compared with those with no abuse history. Contrary to some prior evidence demonstrating differences in weight loss rate among those with a history of sexual abuse [16–18], in all measurement time points over 36 months in the present study, no significant between-group differences emerged in %TWL, months until maximum weight loss, the rate of %TWL, or the rate of BMI change across time. Previous studies have indicated that survivors of interpersonal abuse, especially CSA, may struggle with weight loss as it may increase perceptions of being susceptible to future incidents of abuse [14, 28, 29]. However, the findings of the present study indicate that a history of interpersonal abuse does not hinder weight outcomes of post-bariatric surgery patients, consistent with some previous research [22, 23, 25]. Perhaps these individuals are particularly motivated for surgery and its associated benefits, despite the perceived risk of future traumatization. The context of bariatric surgery may be important as these individuals are likely to be cognizant of the likelihood of long-term weight loss, and therefore may be more primed for the outcome than if they had lost the weight through non-surgical means [21].

Table 3 Comparison of BMI and percent body weight loss (%TWL)

	<i>n</i>	Any abuse <i>n</i> = 143 Mean (SD)	<i>n</i>	No abuse <i>n</i> = 282 Mean (SD)	<i>p</i>
BMI					
6 months	130	35.5 (8.3)	249	36.2 (6.7)	.38
12 months	128	32.2 (7.4)	246	33.1 (6.2)	.26
24 months	97	32.1 (8.1)	154	31.8 (6.0)	.79
36 months	40	32.4 (9.9)	59	31.8 (5.3)	.73
%TWL					
6 months	130	28.2% (6.6)	249	27.4% (6.0)	.22
12 months	128	34.0% (8.4)	246	33.2% (8.6)	.41
24 months	97	34.1% (11.0)	154	35.1% (11.1)	.50
36 months	40	32.9% (12.9)	59	33.4% (11.9)	.84

Further analyses evaluated relations between history of abuse and other clinical outcomes (e.g., psychiatric medication use). At baseline, survivors of interpersonal abuse reported greater rates of depression diagnosis; however, no differences emerged between groups in associated clinical outcomes at all measurement time points up to 24-month follow-up. Those with an abuse history had an increased number of inpatient psychiatric visits but with the small number of patients represented in this calculation ($n = 5$), this finding should be interpreted with caution, and suggests a need for follow-up in a larger sample. It appears as if the desired outcomes from bariatric surgery (%TWL) are not affected over a relatively short follow-up, relative to history of interpersonal abuse.

A strength of this study is its large sample size up to 24 months after surgery, with evaluation over time points beyond 18 months. The current study is also unique in including

a broader definition of interpersonal abuse, beyond sexual violence; notably, no differences were evidenced between interpersonal abuse subtypes in the impact on %TWL over time. Given the well-documented negative psychological outcomes associated with physical, emotional, and sexual abuse, this study allows for more comprehensive comment on the potential clinical impact of interpersonal abuse on bariatric post-surgical outcomes.

Several limitations should be noted. Given the nature of this study as secondary data analysis based upon pre-surgical assessment interviews, the current study did not assess specifically for the severity or frequency of abuse and therefore cannot comment on differences among individuals who may have experienced chronic interpersonal abuse. Since many patients had surgery within a few years of study initiation, the 24- and 36-month weight loss endpoints were not yet available for a sizable portion of the cohort (25% yet to reach

Table 4 Comparison of secondary outcomes between groups

Variable	Any abuse <i>n</i> = 143	No abuse <i>n</i> = 282	<i>p</i>
Months until nadir, mean (SD)	14.6 (5.7)	14.1 (5.3)	.47 ³
Depression medication at 1-year post-op			
Removed from meds: % (<i>n</i>)	19% (12 of 64)	21% (18 of 67)	.72 ³
Of those not on meds pre, on meds post, % (<i>n</i>)	13% (6 of 45)	10% (11 of 109)	.56 ³
Emergency department visit, % (<i>n</i>)	46% (44)	40% (112)	.20 ¹
Inpatient psychiatry visit, % (<i>n</i>)	3.5% (5)	0% (0)	< .01 ²
Percent of “no-show” office visits, mean (SD)	12.6% (20.8)	13.1% (20.6)	.81 ³

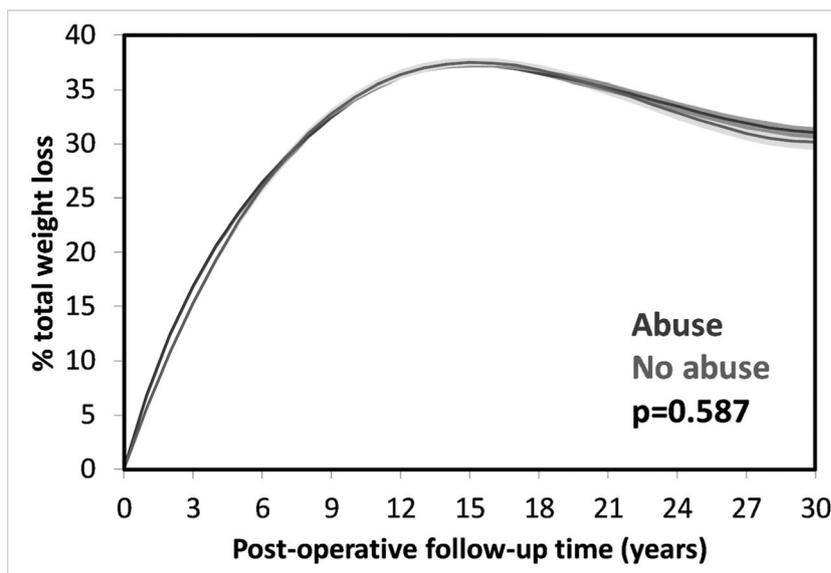
Removed from meds = percentage of those on depression medications at baseline but no longer on them at 1-year post-op (limited to those with completed 1-year post-op appointment with nutrition and weight management, $n = 64$ in “any abuse” group and $n = 67$ in the “no abuse” group). Of those not on meds pre, on meds post = those not on depression medications at baseline but on them at 1-year post-op (limited to those with completed 1-year post-op appointment with nutrition and weight management, $n = 45$ in “any abuse” group and $n = 109$ in the “no abuse” group)

¹ Chi-square test

² Fisher’s exact test

³ Two-sample *t* test

Fig. 1 Nonlinear repeated measures model for %TWL comparing between those with any abuse and those with no abuse. Note: Sample portrayed: $n = 3600$ weight measures from 282 patients without abuse and $n = 2171$ weight measures from 143 patients with any abuse. Shading around lines represents 95% confidence intervals



24 months post-surgery and 70% yet to reach 36 months post-surgery). This combined with modest loss to follow-up resulted in limited conclusions for the 24- and 36-month WL endpoints. The study sample was mostly female and White, precluding conclusions that might be drawn based on diversity in gender, race, and ethnicity on the variables of interest. Future study should aim to include a more diverse sample in an effort to examine idiographic differences, and further, to extend this work beyond 36 months.

Conclusions

The current study did not find evidence of significant differences in %TWL among survivors of interpersonal abuse following bariatric surgery. In a large sample, evaluated over 36 months, rates of %TWL did not demonstrate significant differences, suggesting that a history of interpersonal abuse is not necessarily a barrier for a positive post-surgical prognosis. Despite evidence of higher baseline rates of depression in those with reported abuse history, related clinical outcomes including psychotropic medication use, emergency department visits, and “no-show” rates to follow-up appointments were not indicated. These findings suggest though that depressive symptoms could be a clinically meaningful point of intervention to reduce distress in bariatric surgery patients with a history of interpersonal abuse. Future studies should strive to replicate the current findings with a more diverse sample, and with continued follow-up over time.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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