

Factors Associated with Suicide Ideation in Severely Obese Bariatric Surgery-Seeking Individuals

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There are high rates of suicide ideation and/or behavior in severely obese individuals. The potential contributors to suicide ideation in a sample of 334 severely obese bariatric surgery candidates was explored. Lack of college education, a history of suicide ideation and/or behavior, psychological distress, hopelessness, loneliness, history of physical and/or sexual abuse, and lifetime major depression were associated with current suicide ideation. Some of the correlates of suicide ideation in severely obese bariatric surgery-seeking samples are similar to those found in the general community and this knowledge may serve to improve the psychological assessment and care for this group.

Severe or Class III obesity (body mass index [BMI] ≥ 40 ; World Health Organization [WHO], 1995) is the fastest growing group of overweight in the United States. Severe obesity is associated with a twofold increase in mortality (Sturm, 2007) and can be treated

with bariatric surgery. However, Omalu et al. (2007) found an excess of deaths by suicide in postbariatric surgery individuals as compared with matching community controls, and rates were particularly elevated in women. Similar findings were reported by

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Adams et al. (2007). In a small study by Rosen and Aniskiewicz (1983), severely obese women seeking bariatric surgery (compared with those who did not) reported a higher rate of suicide attempts. In another study, of 121 severely obese bariatric surgery candidates, 9.1% reported a lifetime history of suicide attempts (Sansone, Wiederman, Schumacher, & Routsong-Weichers, 2008). This was greater than reported in studies involving the community (2.4%, Baca-Garcia et al., 2008; 4.8%, Mather, Cox, Enns, & Sareen, 2009) and in heart transplant patients (1.95%, Owen, Bonds, & Wellisch, 2006).

Epidemiological studies report positive associations between BMI and suicide ideation (defined as thoughts of harming or killing oneself; Mather et al., 2009) and suicide attempts (Dong, Li, Li, & Price, 2006), especially among women (Carpenter, Hasin, Allison, & Faith, 2000). However, other studies have found a negative association with completed suicide (Kaplan, McFarland, & Huguet, 2007; Mukamal, Wee, & Miller, 2009). These inconsistent findings may be due to different factors being associated with suicide ideation and suicide attempts compared with completed suicide (Van Orden et al., 2010) and highlight the need for further research in this area.

With this study we add to previous postbariatric surgery suicide studies (Adams et al., 2007; Omalu et al., 2007), presurgery studies examining suicide attempts (Sansone, Schumacher, Wiederman, & Routsong-Weichers, 2008; Sansone, Wiederman, et al., 2008), and community studies examining suicide ideation and/or behavior in individuals with a range of BMIs (Mather et al., 2009). We examined suicide ideation in bariatric surgery-seeking, severely obese individuals and this study is the first to our knowledge to explore the individual factors associated with suicide ideation in this sample. The factors examined in this study were selected from the suicide literature (Van Orden et al., 2010) and from those that have been associated with severely obese individuals (Chen, Fettich, Harold, & Mitchell, 2010; Jones-Corneille, Wadden, & Sarwer, 2007). A his-

tory of suicidal behavior (deliberate behavior causing physical damage with intent to die, including suicide attempts) (Borges, Angst, Nock, Ruscio, & Kessler, 2008) is associated with suicide ideation in community samples and bariatric samples (Omalu et al., 2007; Sansone, Schumacher, et al., 2008; Sansone, Wiederman, et al., 2008). Similarly, current psychological distress (Beghi & Rosenbaum, 2010) and major depression are associated with suicide ideation (Brown, Beck, Steer, & Grisham, 2000) and high rates of major depression are seen in individuals undergoing bariatric surgery (e.g., 42%, Kalarchian et al., 2007). Cognitive factors examined include hopelessness and loneliness, which are associated with suicide ideation and/or behavior (Beck, Brown, Berchick, Stewart, & Steer, 1990; Van Orden et al., 2010) and are elevated in obese people (Lauder, Mummery, Jones, & Caperchione, 2006; Murphy et al., 2009). As chronic physical conditions such as obesity have been found to elevate the chance for suicide, even in the absence of psychopathology (Scott et al., 2010), we examined this as a predictor of suicide ideation. Finally, given that up to two-thirds of bariatric surgery-seeking candidates report childhood physical and/or sexual abuse (Grilo, White, Masheb, Rothschild, & Burke-Martindale, 2006), and that this is associated with suicide ideation and/or behavior (Brodsky & Stanley, 2008), this factor was also examined.

The aim of this study was to explore the factors associated with current suicide ideation in severely obese bariatric surgery-seeking individuals. We hypothesized that suicide ideation would be associated with older age given previous findings (Conwell, 2001), while minority status (Kessler, Borges, & Walters, 1999), marital status, and higher education status (Nock et al., 2008) would be protective. We hypothesized that greater BMI (discussed earlier) and female gender (Carpenter et al., 2000) would be positively associated with suicide ideation. Finally, we hypothesized that a history of suicide ideation and/or behavior, current psychological distress, lifetime major depression, hopelessness-

ness, loneliness, poorer physical functioning, and a history of sexual and/or physical abuse would also be associated with greater current suicide ideation in this sample.

METHOD

Participants

We utilized data from 334 severely obese individuals who consecutively enrolled in screening for bariatric surgery at the Center of Surgical Treatment of Obesity from September 2008 to January 2010. The University of Chicago institutional review board approved the protocol and all participants provided written informed consent prior to enrollment in the study.

Instruments

The Beck Depression Inventory (BDI-II; Beck, Brown, & Steer, 1996) is a psychometrically validated 21-item scale assessing depressed mood over the last 2 weeks, with answers rated on a 4-point Likert scale. Assessment of current suicide ideation used the question asking about suicidal thoughts/wishes in the last 2 weeks with responses ranging from 0 (*I do not have any thoughts of killing myself*) to 3 (*I would kill myself if I had the chance*).

A demographics questionnaire assessed age, gender, minority status, marital status, education status, weight, and height. Self-reported weight and height were validated by clinician assessment, the latter of which was used in instances of discrepancy.

The Suicidal Behaviors Questionnaire (SBQ; Addis & Linehan, 1989) assesses current and lifetime suicide ideation and behavior. We utilized the 7-point Likert scale question asking, "Have you thought about or attempted to kill yourself in your lifetime?" as a measure of lifetime suicide ideation and/or behavior. On this question, higher scores reflected greater severity with responses ranging from 0 (No) to 6 (*I attempted to kill myself, and I think I really hoped to die*).

The Brief Symptom Inventory (BSI; Derogatis, 1993) is a well-established 53-item self-report questionnaire assessing current psychological status and distress that yields a Global Severity Index (GSI), with higher scores indicating greater distress. The GSI was used because of its sensitivity to various levels of symptomatology across all nine symptom dimensions.

A clinical interview was conducted by doctoral trainees and attending clinicians assessing history of physical and/or sexual abuse and lifetime major depressive disorder using questions from the *Structured Clinical Interview for DSM-IV* (First, Spitzer, Gibbon, & Williams, 1995).

The Beck Hopelessness Scale (BHS; Beck, 1998) is a 20-item true-false self-report measure. Higher scores indicate greater hopelessness. The measure has high internal consistency (KR-20 coefficient = .93) and acceptable validity (r_s , ranging from .60 to .74).

The University of California Loneliness Scale (UCLA Loneliness Scale-3; Russell, 1996) is a 21-item self-report measure assessing the degree to which subjects feel lonely. Participants rate how often they identify with each item on a 4-point Likert scale from 1 (*Never*) to 4 (*Always*) to generate a global loneliness score. It has strong consistency (Cronbach's alpha ranging from .89 to .94) and reliability ($r = .73$ over a 1-year period).

The Impact of Weight on Quality of Life-Lite (IWQOL-Lite; Kolotkin, Crosby, Koslowski, & Williams, 2001) assesses obesity-specific quality of life including physical functioning, with higher scores indicating greater impairment. This measure is well-validated and reliable (Kolotkin et al., 2001). This study used the Physical Functioning subscale, which has high internal consistency ($\alpha = .94$; Kolotkin et al., 2001).

Procedure

Subjects completed questionnaires online prior to a presurgery multidisciplinary interview. Licensed clinicians contacted individuals who reported suicide ideation.

Data Analysis

Our preliminary analysis compared suicide ideation and nonsuicide ideation groups on demographic variables and potential factors associated with suicide ideation using independent *t* tests and chi-square tests. The suicide ideation group was defined by a score of 1 or over on the suicide ideation question of the BDI-II. As this was an exploratory analysis, we then examined the independent contribution of each potential predictor of suicide ideation. We conducted separate linear regressions for each potential independent variable of interest: age, BMI, minority status, marital status, education status, gender, physical functioning, current and lifetime suicide ideation, psychological distress, loneliness, hopelessness, history of sexual and/or physical abuse, and lifetime major depression. In each of these linear regressions, the continuous score of the question on suicide ideation (BDI-II) was utilized as the dependent variable (*p* values are for two-sided and $p < .05$).

RESULTS

The average age of the sample was 43.8 ($SD = 11.4$) years, with the majority being women (76.0%), Caucasian (50.3%), married (53.9%) with some college education (82.9%). The mean BMI of the sample was 49.22 ($SD = 9.89$). Of the total sample, 8.4% reported having a plan for killing themselves in their lifetime and 6.3% reported suicide ideation in the last 2 weeks (see Table 1 for results of the preliminary analysis comparing suicidal and nonsuicidal groups).

The results of each separate linear regression with suicide ideation as the dependent variable and each independent variable entered separately are detailed in Table 2. A history of suicide ideation and/or behavior, current psychological distress, loneliness, hopelessness, a history of sexual and/or physical abuse, and lifetime major depression was significantly associated with greater suicide ideation in this sample. A his-

tory of suicide ideation and/or behavior predicted the greatest amount of variability in suicide ideation scores (7.4%), followed by current psychological distress (7.1%). Some college was significantly protective and there was a trend for minority status to be also protective.

DISCUSSION

In this sample, 6.29% reported suicide ideation in the last 2 weeks, which may be greater than in obese community-drawn samples (e.g., 4.99% in the last year, Mather et al., 2009) although the timeframes are different. Additionally, 8.4% reported planning suicide in a lifetime, similar to rates in bariatric surgery candidates (Sansone, Schumacher, et al., 2008; Sansone, Wiederman, et al., 2008) but greater than other surgery and community samples.

Some college protected severely obese bariatric surgery-seeking individuals from suicide ideation, which is consistent with previous findings (Nock et al., 2008). Similarly, there was a trend for minority status to be protective (Kessler et al., 1999). Unlike previous findings, (Nock et al., 2008), marital status did not have a significantly protective effect from suicide ideation, which may have been due to relationship quality, a factor that was not assessed here. Age, BMI, gender, and weight-related physical functioning were not significantly associated with suicide ideation in this sample. Lifetime history of suicide ideation and/or behavior and current psychological distress were significantly associated with suicide ideation; these factors accounted for the most variance in suicide ideation scores. Loneliness, hopelessness, history of sexual and/or physical abuse, and lifetime major depression were associated with suicide ideation, although each of these variables independently did not account for a large proportion of the variance in suicide ideation scores.

Overall, the factors found to be associated with suicide ideation are similar to those seen in community samples. Lifetime history

TABLE 1
Means, Standard Deviations, and Ranges or Rates for Demographic and Independent Variables, Comparing Suicidal and Nonsuicidal Groups

	Nonsuicidal (<i>n</i> = 313)	Suicidal ^a (<i>n</i> = 21)	Total (<i>N</i> = 334)	Range for <i>N</i> = 334	<i>t</i> / χ^2	<i>p</i>
Age <i>M</i> (<i>SD</i>)	43.92 (11.42)	42.14 (12.05)	43.81 (11.44)	19.00–73.00	.66	.518
Body mass index <i>M</i> (<i>SD</i>)	48.79 (8.98)	52.28 (9.77)	49.00 (9.06)	33.74–91.85	–1.60	.125
Minority (Black, Hispanic, Asian, Pacific Islander, Native American or other) <i>n</i> (%)	159 (50.8)	7 (33.3)	166 (49.7)	Not applicable	2.40	.121
Marital status married <i>n</i> (%)	172 (55.0)	8 (38.1)	180 (53.9)	Not applicable	2.25	.134
Education—some college and above <i>n</i> (%)	264 (84.3)	13 (61.9)	277 (82.9)	Not applicable	7.00	.008*
Gender— female <i>n</i> (%)	236 (75.4)	18 (85.7)	254 (76.0)	Not applicable	1.15	.284
History of suicide ideation and/behavior <i>n</i> yes (%) ^b	.65 (1.39)	2.43 (1.54)	.76 (1.46)	.00–6.00	–5.16	<.001***
Current psychological distress <i>M</i> (<i>SD</i>) ^c	0.48 (.45)	1.11 (.52)	0.52 (.48)	.00–2.40	–5.42	<.001***
Lifetime major depressive disorder <i>n</i> yes (%) ^d	109 (34.8)	12 (57.1)	121 (36.2)	Not applicable	4.24	.039*
Beck Hopelessness Scale total <i>M</i> (<i>SD</i>)	2.95 (2.27)	4.57 (3.04)	3.05 (2.36)	1.00–17.00	–2.40	.026*
UCLA loneliness total <i>M</i> (<i>SD</i>)	36.55 (9.35)	44.86 (10.82)	37.07 (9.65)	20.00–68.00	–3.43	.002**
Weight-related physical functioning <i>M</i> (<i>SD</i>) ^e	37.54 (9.97)	39.38 (8.02)	37.66 (9.85)	15.00–55.00	–0.83	.327
History of physical and/or sexual abuse <i>n</i> yes (%)	57 (18.2)	7 (33.3)	64 (19.2)	Not applicable	2.91	.088
Beck Depression Inventory total <i>M</i> (<i>SD</i>)	10.80 (7.43)	26.43 (9.38)	11.78 (9.45)	.00–43.00	–7.48	<.001***

M, Mean; *SD*, standard deviation.

^aA score of 1 or over on the BDI question asking about suicide ideation was used as a cutoff for the presence of any suicide ideation in this study.

^bSuicidal Behaviors Questionnaire asking “Have you thought about or attempted to kill yourself in your lifetime?”

^cBrief Symptom Inventory—Global Severity Index.

^dFrom the clinical interview utilizing questions from the Structured Clinical Interview for *DSM-IV* (First et al., 1995).

^eImpact of Weight on Quality of Life-Lite—Physical Functioning subscale.

t uses equal variances not assumed.

p* < .05; *p* < .01; ****p* < .001.

TABLE 2

Separate Linear Regressions for Each Independent Variable of Interest with Suicide Ideation as the Dependent Variable (N = 334)^a

Independent variable	R ²	B	b	p
Age	.0001	.0003	-.011	.844
Body mass index	.006	.003	.002	.165
Minority status ^b	.010	-.059	-.098	.074
Marital status ^b	.001	-.023	-.039	.482
Education—some college ^b	.017	-.104	-.130	.018*
Gender—female ^b	.002	.029	.041	.458
History of suicide ideation and/behavior ^c	.077	.057	.277	<.001***
Current psychological distress	.074	.170	.271	<.001***
Lifetime major depression ^b	.017	.082	.130	.017*
Beck Hopelessness Scale	.025	.020	.160	.003**
UCLA total—loneliness	.028	.005	.167	.002**
Weight-related physical functioning	.001	.001	.038	.494
History of sexual and/or physical abuse ^b	.019	.104	.136	.013*

B, beta coefficients (standardized regression equation); b, unstandardized coefficients; R², % of variance in suicide ideation explained by an independent variable.

^aUtilized the Beck Depression Inventory question asking about suicide ideation.

^bCoded 0 = no; 1 = yes.

^cSuicide Behaviors Questionnaire asking “Have you thought about or attempted to kill yourself in your lifetime?”

* $p < .05$; ** $p < .01$; *** $p < .001$.

of suicide ideation and behavior were most strongly associated with current suicide ideation, which is similar to previous findings (Brown et al., 2000), including a 10-year longitudinal study utilizing the National Comorbidity Survey showing that the strongest factor for suicide-related outcomes was baseline reports of these behaviors, particularly for suicide ideation (Borges et al., 2008). Psychological problems and lifetime major depression were associated with suicide ideation as in previous studies (Beghi & Rosenbaum, 2010; Borges et al., 2008; Omalu et al., 2007), although the former relationship was stronger. This suggests psychological problems other than depression may be associated with suicide ideation in this sample. Future studies should examine which forms of psychopathology and psychological distress are uniquely associated with suicide ideation and severe obesity.

Both cognitive factors examined—hopelessness and loneliness—were associated with suicide ideation and/or behavior in this sample, which fits with the general suicide

literature (Beck et al., 1990). Future studies could explore if hope for the future and suicide ideation are mediated by facing the serious consequences of severe obesity and a potentially dangerous operation. With regards to loneliness, further exploration of related concepts theorized to be specifically associated with suicide, such as a sense of thwarted belongingness, is warranted (Van Orden et al., 2010).

Childhood maltreatment was associated with current suicide ideation although this rate did not appear as high as in previous studies (Grilo et al., 2006). Maltreatment is associated with major depressive disorder and general psychological distress, both of which were examined in the present study and seem to have a stronger proximal contribution to suicide ideation that could obfuscate the effects of such distal factors.

Age, BMI, female gender, and weight-related physical functioning were not associated with suicide ideation. This may have resulted from the nature of the sample gathered. The bariatric surgery clinic mainly

enrolls women (almost 4/5 of the sample) in their 40s, which may have obscured specific relationships with suicide ideation. Additionally, bariatric surgery is recommended only for those with BMIs ≥ 40 or BMIs ≥ 35 with high risk comorbid medical conditions, which limits the weight range enrolled in the study and made a strong linear association with suicide ideation less likely. On average, our subjects also had poor physical functioning because of their severe obesity. Thus, there may have been a ceiling effect. In addition, there is the suggestion that medical illness may not be independently associated with suicide ideation and behavior above and beyond their associations with mental illness (Harris, Barraclough, & Winslow, 1994).

These findings contribute to the literature exploring the mechanisms of suicide ideation in this population; however, there are limitations to this study. The assessment of current and lifetime suicide ideation and/or behavior was limited, respectively, to one item on the BDI-II and one item on the SBQ, and distinctions could not be made between true suicide attempts and a past history of self-injury. Additionally, we could have improved our choice of versions of the SBQ, with the SBQ-Revised (Osman et al., 2001) being a psychometrically superior choice. Assessment of the presence and severity of other Axis I and II disorders known to be associated with suicide ideation such as eating disorders (Pompili, Girardi, Tatarelli, Ruberto, & Tatarelli, 2006; Preti, Rocchi, Sisti, Camboni, & Miotto, 2011) and borderline personality

disorder (Sansone, Schumacher, et al., 2008) could have improved this study. Furthermore, presurgical assessment in this sample is always limited by clients' concerns for potential consequences of disclosure that may lead to denial of the surgery, leading to the possible underestimation of psychological factors associated with suicide ideation. This study was also limited by only assessing individuals presurgery and not postsurgery. Preoperative suicide ideation or psychopathology may predict postsurgery suicide ideation and/or behavior and assessing this may provide useful clinical indicators of postsurgery suicide (Adams et al., 2007; Omalu et al., 2007).

Future research is needed to further understand the link between preoperative and postoperative suicide ideation and/or behavior. Future research should also examine suicide ideation and behavior in severely obese bariatric surgery-seeking individuals compared with matched severely obese nonsurgery-seeking individuals or to obese individuals seeking other surgeries (e.g., heart bypass surgery). Despite these limitations, the large size and diverse ethnic composition of the sample are strengths of this study. These results replicate factors associated with suicide ideation in the general population, suggesting that these are applicable to bariatric surgery-seeking individuals. The factors found in this study are informative for clinicians working with surgery candidates to identify those who are suicidal who may benefit from psychological services prior to surgery.

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