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Predictors of Preoperative Program Non-Completion in Adolescents Referred for Bariatric Surgery

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Abstract

Background—Factors contributing to adolescents' non-completion of bariatric surgery, defined as self-withdrawal during the preoperative phase of care, independent of program or insurance denial, are largely unknown. Recent adolescent and adult bariatric surgery literature indicate that psychological factors and treatment withdrawal play a role; however, for adolescents, additional age-salient (family/caregiver) variables might also influence progression to surgery.

Objectives—The present study examined demographic, psychological, and family/caregiver variables as predictors of whether adolescents completed surgery (“completers”) or withdrew from treatment (“non-completers”).

Setting—Adolescents were from a bariatric surgery program within a pediatric tertiary care hospital.

Methods—A retrospective chart review was conducted of consecutive patients who completed bariatric surgery psychological intake evaluations from September 2009 to April 2013. Data

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The current study received Institutional Review Board approval.

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

Informed Consent Formal consent is not required for data collection as part of routine clinical practice.

Statement of Human and Animal Rights This study received institutional review board approval. All procedures performed were in accordance with institutional and national ethical standards of studies involving human participants.

involving completer ($n = 61$) versus non-completer ($n = 65$) status were analyzed using two-tailed independent t tests, Chi-squared tests, and logistic regressions.

Results—Forty-three percent of adolescents completed surgery, similar to adult bariatric samples. Significantly more males were non-completers ($p < .05$), and there was a trend towards non-completion for older adolescents ($p = 0.06$). No other demographic, psychological, or caregiver/family variables were significant predictors of non-completion.

Conclusions—These findings indicate that demographic variables, rather than psychological or family factors, were associated with the progression to or withdrawal from surgery. Further assessment is needed to determine specific reasons for completing or withdrawing from treatment, particularly for males and older adolescents, to improve clinical care and reduce attrition.

Keywords

Adolescent bariatric surgery; Predictors of surgery non-completion; Caregiver weight loss surgery; Attrition

Bariatric surgery is emerging as a safe, effective intervention for adolescents with class II (i.e., body mass index [BMI] of 35–39.9) and class III (BMI ≥ 40) severe obesity [1]. Yet, of the 8.7% of today's youth in this weight range [2], the majority never seek surgical treatment. Of those referred, many fail to progress to surgery, with reasons for non-completion including insurance denial [3] and patient indecision about whether to undergo the procedure [4].

Within the adult bariatric surgery literature, program attrition (dropping out of bariatric care prior to undergoing surgery) has been examined within the context of demographic, logistical (i.e., insurance denial [5]), psychosocial/behavioral [6, 7], dieting [8], and weight/shape domains [8]. Researchers have sought to identify reasons for patient attrition beyond exclusion by the bariatric program or by patients' insurance, and psychological variables have emerged as consistent predictors [6, 7, 9] of patient self-withdrawal amidst findings that otherwise yield non-significant associations or show low to moderate relationships with attrition [10]. For example, Merrell and colleagues [7] found that receiving current outpatient behavioral health treatment, taking psychotropic medication(s), and/or meeting diagnostic criteria for past or current substance abuse/dependence were associated with surgery non-completion in adult bariatric surgery candidates.

Consistent with the adult literature, psychological factors have been shown to predict attrition from first-line adolescent behavioral weight management programs [10, 11], and also more recently, from adolescent bariatric surgery [12]. For example, Cohen and colleagues [12] showed that adolescent non-completers of laparoscopic adjustable gastric banding (LAGB) reported more clinically significant symptoms of psychopathology compared to surgery completers on a measure of internalizing and externalizing behaviors. However, this study was limited to one measure of psychopathology and did not assess additional clinical information obtained from the pre-surgical psychological evaluation or include specific aspects of family/caregiver functioning.

Given greater treatment burden in bariatric surgery relative to behavioral weight management, prediction of surgery non-completion in adolescent patients will likely be complex. The intricacies of this critical, socio-developmental period, including age-salient, developmentally appropriate domains (i.e., family stressors, maternal psychopathology, caregiver history of bariatric surgery), are perhaps just as relevant as patient-level psychopathology [13–17]. Skelton and Beech [18] acknowledged the importance of family/caregiver factors in understanding contributors to adolescent obesity program attrition, suggesting caregiver-related factors (i.e., family stressors and functioning) [19] be routinely examined [14, 16]. For example, recent literature demonstrates that aspects of family dysfunction and maternal distress are clinically significant in this population [17] and that adolescents being evaluated for surgery should be considered within a family context.

The present study extends findings in adolescent bariatric surgery by examining a number of psychological variables and caregiver factors that were extracted from the pre-surgical psychological evaluation and were hypothesized to play a role in surgery non-completion among patients undergoing a more invasive procedure (i.e., Roux-en-Y gastric bypass [RYGB] or sleeve gastrectomy [SG] vs. LAGB). To address these gaps, demographic (age, gender, race), psychological, or caregiver/family variables that predicted preoperative program non-completion (i.e., patient self-withdrawal independent of program or insurance denial) were examined. Based on the aforementioned adult bariatric surgery literature and recent adolescent study, it was hypothesized that the presence of psychological factors, including a current psychiatric diagnosis and/or treatment (i.e., psychotropic medication use and/or outpatient behavioral health therapy), current substance use, past inpatient psychiatric hospitalization, and requiring or recommending behavioral health treatment at the initial pre-surgical psychological evaluation in order to proceed to surgery would predict surgery non-completion. Additional variables were also explored, including caregiver/family factors, not previously examined in the bariatric literature but arguably important and unique to an adolescent (versus an adult), to determine the influence on surgery non-completion. These included the following: number of family stressors, presence of a maternal psychiatric history, any involvement with Child Protective Services (CPS), and whether or not a caregiver(s) completed bariatric surgery.

Methods

Program Overview

The present study was executed within an adolescent bariatric surgery program in a free-standing, tertiary care children's hospital. Participants and their caregivers attended a pre-surgical evaluation that included assessment by the medical director, nurse practitioner, registered dietician, surgeon, and a licensed clinical psychologist. Patients without contraindications to surgery were required to complete a preoperative preparatory program consisting of 3–6 clinical appointments with the dietician, nurse practitioner, and team social worker. Upon completion of program requirements and receiving final clinical team and insurance approval, patients underwent either RYGB or SG.

Participants

A retrospective review of clinical charts was conducted on 145 consecutive patients presenting for an initial surgical evaluation between September 2009 and April 2013. Of the 145 charts reviewed, 3 were sibling pairs; to avoid redundant results, the sibling who completed the evaluation first was included. For patients having more than one initial evaluation ($n = 5$; family delayed and insurance required a second evaluation), only the first evaluation was included. Given the aims of the present study, charts were further screened to identify patients who proceeded to surgery (“completers”) or withdrew (“non-completers”) from the program within 2 years of initiating treatment. Two years was chosen to allow sufficient time for participants to complete pre-treatment requirements (i.e., specialty medical appointments, initiation of psychiatric treatment) and to obtain insurance approval. Withdrawing from treatment was operationalized as having two or more appointment no-shows or cancellations with no attempts to contact the program or reporting they were no longer interested in bariatric surgery. Those patients who had either been denied by the program ($n = 9$) for medical/psychiatric reasons or by insurance ($n = 7$) were excluded from further review, leaving a final sample of 126 patients and their caregivers (61 proceeding to surgery and 65 withdrawing). The current study received Institutional Review Board approval.

Procedure

Data were abstracted from the electronic medical record (EMR) and cross-referenced with an internal program tracking database to ensure 100% accuracy. Demographics (age, sex, race), BMI, and insurance status (i.e., medical assistance or commercial/private insurance) were captured and used at the time of the initial surgical evaluation date. Most data were taken from the pre-surgical, semi-structured psychological evaluation that was conducted by a licensed, doctoral-level psychologist, who, if the patient met diagnostic criteria, assigned a psychiatric diagnosis to the patient at the time of the evaluation. A data dictionary was created a priori and agreed upon by two psychologists conducting the evaluations who were investigators on this study to define psychological and caregiver/family functioning variables, most of which were dichotomized (i.e., 0 = no; 1 = yes). Disagreements in coding were resolved by consulting with the primary evaluator until consensus was reached.

All psychological variables were coded as present/yes (1) or absent/no (0) and included the following: having a current Diagnostic and Statistical Manual of Mental Disorders [20] (DSM-IV) diagnosis (i.e., assigned at the initial psychological evaluation), currently taking psychotropic medication(s), current participation in outpatient behavioral health treatment (i.e., therapy), prior inpatient psychiatric hospitalization(s), and self-reported current alcohol/substance/tobacco use. Two study-specific variables, “psychiatric treatment required” or “psychiatric treatment recommended,” were based on whether initiation of behavioral health treatment (i.e., medication and/or therapy) was required or recommended at the initial psychological evaluation for a patient to proceed to surgery. This information was gleaned from the psychologist’s recommendations in that evaluation and also dichotomized (yes or no). Caregiver and family functioning characteristics (also extracted from the pre-surgical psychological evaluation, in which the primary caregiver was present) included the following: number of family stressors (defined as a whole number, ranging

from 0 to 10, self-generated by caregiver), presence/absence of maternal psychiatric history, any involvement (yes or no) with CPS (defined as whether a report was made without consideration of claim substantiation), and caregiver(s) bariatric surgery completed (yes or no). Maternal psychiatric history was selected as most caretakers interviewed were mothers, and reports of paternal psychiatric history were inconsistent or unknown.

Statistical Analyses

All analyses were conducted using SPSS Statistics, version 21.0 [21] and Mplus (Version 7.11) [22]. Missing data (2.4–15.9%) were handled with maximum likelihood estimation. Descriptive statistics, including frequencies, means, and standard deviations (SDs), were calculated for all psychological and caregiver/family variables for the total sample ($N = 126$). Independent t tests or Chi-square tests were used to test group (completers vs. non-completers) differences on demographic variables. Logistic regression models using gender as a covariate were completed to examine psychological and caregiver/family factors as predictors of group membership (completers = 0 vs. non-completers = 1). Given the exploratory nature of these analyses and sample size considerations, separate logistic regression models were completed for each predictor.

Results

Descriptive Statistics

The total sample ($N = 126$) of adolescents was primarily female and White. The average age was 16 years, and the mean BMI approached 50, indicating class III obesity (Table 1). Most had commercial or private insurance ($n = 85$; 68%), and the average time from the initial psychological evaluation to surgery was 8.8 months ($SD = 0.54$). Race and BMI were not significantly different between completers and non-completers, but age approached significance indicating a trend for non-completers to be older relative to completers ($p = 0.06$). However, groups were significantly different in terms of gender ($p = 0.003$; Table 1), with females ($n = 48$) more likely to complete surgery than males.

Psychological and Family/Caregiver Characteristics at Intake Evaluation

Frequencies of psychological and caregiver/family variables for the total sample and for completers and non-completers are detailed in Table 2. Fifty-eight percent ($n = 73$) of all patients met DSM-IV diagnostic criteria for a psychiatric diagnosis at the pre-surgical psychological evaluation. Thirty-five percent ($n = 44$) were currently taking a prescribed psychotropic medication(s), over a fourth ($n = 33$) were in outpatient behavioral health treatment/therapy, and 10% ($n = 11$) were previously hospitalized for a mental health reason. Twenty-seven percent ($n = 34$) were required to initiate psychiatric treatment in order to proceed to surgery. For caregivers, over half reported a maternal psychiatric history. Fifteen percent ($n = 19$) of care-givers (completers and non-completers combined) had also undergone bariatric surgery.

Relationships with Surgery Non-completion

Results from a series of logistic regression models predicting whether adolescents withdrew from treatment are presented in Table 3. No significant predictors were identified after controlling for gender (p value range = 0.17 to 0.99).

Discussion

The current study examined factors associated with adolescents proceeding to bariatric surgery versus withdrawing from the preoperative phase of care. The surgery completion rate (43%), with more females completing surgery, is consistent with reports for adults [5, 7] and a recent study in adolescents [12], but the overall results underscore that preoperative challenges extend beyond access to care and are distinct from the adult and extant adolescent literature.

In this study, adolescent completers and non-completers were not statistically different on any of the assessed psychological factors. Specifically, this study found no differences between groups on current psychotropic medication use, utilization of outpatient therapy, current substance use, or previous inpatient hospitalization for a psychiatric condition, all of which significantly predicted failure to complete bariatric surgery in adults [7]. Thus, the primary hypothesis that a presence of key psychological factors would predict surgery non-completion was not supported. Further, in this study, having the clinical team require or recommend an adolescent to initiate psychological treatment (i.e., therapy and/or psychotropic medication) in order to proceed to surgery did not significantly predict premature withdrawal from treatment or surgery completion. While the adult literature has suggested that requiring psychiatric treatment or delaying progression to surgery for psychiatric reasons might explain failure to complete surgery [7], our findings did not support this in an adolescent sample.

These findings are, in some ways, discrepant from those of Cohen et al. [12], but at the same time, provide different information. For example, Cohen and colleagues [12] defined non-completion differently than the current study; as part of their definition, the authors included patients who did not meet adherence requirements. This included a group of adolescents who failed to meet program requirements and thus were not approved for surgery versus the present study where adolescents who did not meet program requirements were not eligible for the study at the outset. This may explain higher levels of psychopathology in Cohen et al.'s sample.

Also, due to Cohen et al.'s definition [12], there may be group differences (between completers and non-completers) on psychopathology, because as the authors noted, non-adherence and psychopathology can be correlated. Further, since Cohen and colleagues [12] used mean scores on a measure of psychopathology to compare the groups rather than a psychiatric diagnosis, the scores for non-completers might indicate significantly greater symptomatology even if clinical levels were not reached. To this end, the authors noted that the scores were not in the clinically significant range for either group.

In the present study, other age-salient, caregiver/family variables thought to play a role in progression to surgery did not significantly predict whether an adolescent completed surgery or withdrew from treatment. Factors previously found to predict attrition from adolescent behavioral weight management programs such as family stressors and maternal distress were not significant predictors in this study. A recent study found that family dysfunction was unrelated to weight loss outcomes in adolescents post-surgery [17] and suggested that, despite exhibiting clinically significant family dysfunction, some adolescents still completed surgery, which may explain the current findings. It is also possible that families reporting higher rates of communication problems and emotional conflict prior to surgery may opt out of the procedure due to added strain on the family. However, these variables were not examined previously or in the current study but warrant further investigation. Rather, what emerged as a significant predictor were demographic differences between groups, which have important implications for the field of adolescent bariatrics.

Most notably, significantly fewer males progressed to surgery. Thus, further attention must be given to male patients who are at greater risk for attrition within the preoperative phase compared to female patients. Early identification of obstacles to proceeding to surgery is critical. These might include expectations of surgery or fear of complications, which are currently unknown. Consistent with our findings, the adult literature has found that fewer males seek bariatric treatment [23] or complete it [7] despite high rates of obesity. There is also evidence that males and females perceive surgical risks differently and have distinct weight loss expectations [24], but this does not explain why more males are opting out of treatment once initiated. Previous research has shown that males utilize less medical care even when medically relevant factors are controlled (i.e., seriousness of the problem, medical diagnosis) [25]. Thus, it appears that gender differences in social (i.e., requests for follow-up appointments, beliefs about social roles) and psychological factors (i.e., level of distress, perception of symptoms, help/support-seeking behaviors) may influence utilization and continuity of care [25, 26]. It is important to ascertain specific reasons for surgery non-completion among adolescent males, which might involve conducting focus groups to gather information that could be used to tailor pre-surgical interventions. Alternatively, offering male patients the opportunity to receive peer education and support from another male patient(s) completing bariatric surgery may also serve to decrease obstacles and improve expectations and retention.

The trend toward older adolescents not progressing to surgery suggests that initiating behavioral changes required for surgery may be more challenging at different ages and developmental periods. Current findings suggest that different interventions may be required to retain older adolescents [16]. Older adolescents may have increased difficulty with adherence than their younger peers due to a number of factors, including increasing autonomy, peer influences, and family dynamics [27]. Thus, family-based theories might provide insight into other potential predictors needed to examine adolescent completion and attrition from surgical weight management programs to eventually inform treatments.

The present paper also adds to an emerging literature highlighting the occurrence of bariatric surgery in multiple generations within a household [17, 28, 29]. The risks and benefits of caregiver bariatric surgery on adolescent patient bariatric surgery outcomes are unknown,

although this is an anticipated area of investigation within the Teen-LABS consortium and associated ancillaries [30]. While the present findings do not indicate that caregiver(s) history of bariatric surgery contributes to adolescents reaching or withdrawing from surgery, there is some evidence to suggest that it can contribute to less engagement in postoperative program opportunities [31] and should be a continued area of study.

Strengths of the present study included the use of clinic data from a fairly large sample of male and female adolescent patients pursuing bariatric surgery. To date, this is one of few studies that have attempted to explain attrition from adolescent bariatric surgery and that also used data from the initial pre-surgical evaluation on not only psychiatric variables but also family/caregiver variables. However, this study also includes several limitations.

First, the current study is a retrospective chart review and is limited to information collected at the intake visit and extracted from the medical chart. For this reason, other variables that may be pertinent to studying surgery non-completion (and attrition) in adolescents were not routinely collected. These include, but are not limited to, parent or caregiver ratings of their adolescent's health [32], parent or caregiver self-reported functioning (beyond simply psychiatric history) [18], and clinic specific factors such as environment and program content [33], all of which have been associated, in some studies, with attrition/program non-completion [18]. Logistical factors such as clinic location, transportation, and parent/caregiver financial barriers might also influence adolescents' progression to surgery.

Second, this study did not include standardized measures and used primarily dichotomized variables, which may limit statistical power by restricting variance and which precludes the examination of the effects of severity (e.g., psychopathology) on surgery non-completion. As noted by Sogg et al. [34], there is evidence that "severity of psychiatric symptoms, rather than their mere presence, plays a more influential role in determining surgical outcome" (p. 735, SOARD). Future studies should obtain standardized measures to assess different domains of functioning, in addition to clinical interview data, to better characterize the factors leading to surgery non-completion, and in particular, to understand the role of presence and severity of psychopathology in adolescent non-adherence.

Third, this study did not include a direct assessment of patients' specific reasons for withdrawing from care. Future studies should be conducted with patients and caregivers to inquire about their reasons for drop-out (i.e., financial, psychosocial, logistical), which may have important clinical implications.

Fourth, the current study's sample was primarily White and female, reflecting national trends for adolescents and adults who seek bariatric surgery [30, 35]. However, findings may not be generalizable to other samples, particularly males and minority youth seeking bariatric surgery. Given the differences in surgery completion by gender in the current study as well as by race/ethnicity in Cohen et al. [12], future studies are needed with larger samples of males and minority groups to explore whether reasons for drop-out differ for these sub-samples.

In sum, prospective multi-center studies are needed, which thoughtfully consider multiple patient, family, and caregiver influences in addition to patient satisfaction with critical

elements of the treatment program. This will be achieved by combining clinical interview data with developmentally appropriate standardized assessments to better elucidate the phenomenon, so that program retention efforts can be improved.

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Adolescent demographic factors obtained at bariatric surgery program intake for adolescents who completed surgery versus those who withdrew

Table 1

	Completers (n = 61) M (SD) %	Non-completers (n = 65) M (SD) %	p value^a
Body mass index	49.86 (8.98)	49.55 (8.60)	0.84
Age	16.01 (1.75)	16.70 (2.31)	0.06
Gender: % female	78.7%	53.8%	0.003
Race: % White	73.8%	72.3%	0.85

^a p values are based on two-tailed independent t tests when examining mean values and on Chi-square tests when examining percentages

Table 2
Adolescent and caregiver psychosocial factors at bariatric surgery program intake for the total sample of adolescents and by completion status (completed surgery versus withdrew)

	Total N = 126		Completers n = 61		Non-completers n = 65	
Adolescent	% (N)	% (n)	% (n)	% (n)		
Psychiatric diagnosis	57.9 (73)	57.4 (35)	58.5 (38)			
Psychotropic medication use	34.9 (44)	36.1 (22)	33.8 (22)			
Outpatient behavioral health treatment	26.2 (33)	29.5 (18)	23.1 (15)			
Inpatient psychiatric hospitalization ^a	10.4(11)	9.6 (5)	11.1 (6)			
Psychiatric treatment required	27.0 (34)	23.0 (14)	30.8 (20)			
Psychiatric treatment recommended	60.3 (76)	54.1 (33)	66.2 (43)			
Substance use ^b	12.8(16)	8.3 (5)	16.9 (11)			
Caregiver/family functioning						
Family Stressors ^c	M = 2.41 (1.40)	M = 2.41 (1.40)	2.41 (1.42)			
Maternal psychiatric history ^d	52.8 (56)	49.0 (25)	56.4 (31)			
Child protective services Involvement ^e	22.5 (27)	19.0 (11)	25.8 (16)			
Caregiver weight loss surgery	15.1 (19)	21.3 (13)	9.2 (6)			

^aMissing data for n = 20

^bAdolescent report of use of tobacco, alcohol, or other illicit substance in past year. Missing data for n = 1

^cMean and standard deviation reported. Missing data for n = 14

^dMissing data for n = 20

^eMissing data for n = 6

Table 3

Associations of adolescent and caregiver psychosocial factors at bariatric surgery intake with adolescent surgery completion status

	<i>B</i> estimate	Standard error	OR	<i>p</i> value ^a
Adolescent				
Psychiatric diagnosis	-0.03	0.38	0.97	0.93
Psychotropic medication use	-0.28	0.41	0.76	0.50
Outpatient behavioral health treatment	-0.51	0.45	0.60	0.26
Inpatient psychiatric hospitalization	0.09	0.86	1.10	0.92
Psychiatric treatment required	0.46	0.45	1.58	0.31
Psychiatric treatment recommended	0.54	0.40	1.72	0.17
Substance use	0.83	0.70	2.30	0.23
Caregiver/family functioning				
Family stressors	0.001	0.14	1.00	0.99
Maternal psychiatric history	0.34	0.43	1.41	0.43
CPS involvement	0.29	0.47	1.34	0.53
Caregiver WLS	-1.11	0.83	0.33	0.18

^a *p* values were based on separate logistic regressions for each predictor variable with adolescent gender as a covariate. In all regressions, the dependent variable was completion status with 0 = completer (*n* = 61) and 1 = non-completer (*n* = 65). Missing data were handled via maximum likelihood estimation