

# Prevalence of Body Dysmorphic Disorder Symptoms and Body Weight Concerns in Patients Seeking Abdominoplasty

Aesthetic Surgery Journal  
2016, Vol 36(3) 324–332  
© 2016 The American Society for  
Aesthetic Plastic Surgery, Inc.  
Reprints and permission:  
journals.permissions@oup.com  
DOI: 10.1093/asj/sjv213  
www.aestheticsurgeryjournal.com

**OXFORD**  
UNIVERSITY PRESS

Maria José Azevedo de Brito, PhD; Fábio Xerfan Nahas, MD, PhD;  
Táki Athanássios Cordás, MD, PhD; Maria Gabriela Gama, PhD;  
Eduardo Rodrigues Sucupira, MD, MS; Tatiana Dalpasquale Ramos, BS;  
Gabriel de Almeida Arruda Felix, MD;  
and Lydia Masako Ferreira, MD, PhD

## Abstract

**Background:** Body dysmorphic disorder (BDD) is one of the most common psychiatric conditions found in patients seeking cosmetic surgery, and body contouring surgery is most frequently sought by patients with BDD.

**Objectives:** To estimate the prevalence and severity of BDD symptoms in patients seeking abdominoplasty.

**Methods:** Ninety patients of both sexes were preoperatively divided into two groups: patients with BDD symptoms ( $n = 51$ ) and those without BDD symptoms ( $n = 39$ ) based both on the Body Dysmorphic Disorder Examination (BDDE) and clinical assessment. Patients in the BDD group were classified as having mild to moderate or severe symptoms, according to the BDDE. Body weight and shape concerns were assessed using the Body Shape Questionnaire (BSQ).

**Results:** The prevalence of BDD symptoms was 57%. There were significant associations between BDD symptoms and degree of body dissatisfaction, level of preoccupation with physical appearance, and avoidance behaviors. Mild to moderate and severe symptoms of BDD were present in 41% and 59% of patients, respectively, in the BDD group. It was found that the more severe the symptoms of BDD, the higher the level of concern with body weight and shape ( $P < .001$ ). Patients having distorted self-perception of body shape, or distorted comparative perception of body image were respectively 3.67 or 5.93 times more likely to show more severe symptoms of BDD than those with a more accurate perception.

**Conclusions:** Candidates for abdominoplasty had a high prevalence of BDD symptoms, and body weight and shape concerns were associated with increased symptom severity.

## Level of Evidence: 3



Accepted for publication May 28, 2015.

Dr De Brito is an Affiliate Professor, College of Health Science, Universidade do Vale do Sapucaí, Minas Gerais; and A Postdoctoral Researcher, Division of Plastic Surgery, Department of Surgery, Universidade Federal de São Paulo (UNIFESP), São Paulo, Brazil. Dr Nahas is an Affiliate Professor and Dr Ferreira is a Full Professor, Division of Plastic Surgery, Department of Surgery, UNIFESP, São Paulo, Brazil. Dr Cordás is a Joint Professor, Department of Psychiatry, Universidade de São Paulo (USP), São Paulo, Brazil. Dr Gama is an Associate Professor, Institute of Social Sciences, Universidade do Minho, Guimarães, Portugal. Dr Sucupira is a plastic surgeon in private

practice in Rio de Janeiro, Brazil. Ms Ramos is a Graduate Student in the Graduate Program in Translational Surgery, UNIFESP, São Paulo, Brazil. Dr Felix is a Medical Resident, Paulista School of Medicine, UNIFESP, São Paulo, Brazil.

### Corresponding Author:

Dr Maria José Azevedo de Brito, Division of Plastic Surgery, UNIFESP, Rua Napoleão de Barros, 715, 40 andar, Vila Clementino, CEP: 04024-002 São Paulo, SP, Brazil.  
E-mail: mjbrito@infinitetrans.com

Body dysmorphic disorder (BDD) is one of the most common psychiatric conditions found in patients seeking cosmetic surgery,<sup>1-7</sup> and body contouring surgery is most frequently sought by patients with BDD<sup>7-9</sup> and those with eating disorders.<sup>9,10</sup> Sarwer and Crerand,<sup>9</sup> and Grossbart and Sarwer<sup>11</sup> found that eating disorders and BDD were prevalent in plastic surgery patients and may be considered contraindications to surgery.

Recent studies have suggested a change in the expression of body dissatisfaction<sup>7,12,13</sup> and, therefore, concerns about weight and body contour, and disordered eating behaviors can make the diagnosis of BDD difficult.<sup>13,14</sup> This aspect has been identified and highlighted by the American Psychiatric Association (APA) in the diagnostic criteria for BDD described in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5).<sup>15</sup>

According to the DSM-5, BDD is characterized by a preoccupation with one or more perceived defects or flaws in physical appearance that are not observable or appear slight to others, and repetitive behaviors (eg, mirror checking, excessive grooming, skin picking, and reassurance seeking) or mental acts (eg, comparing his or her appearance with that of others) in response to concerns about physical appearance. BDD causes clinically significant distress or impairment in important areas of functioning, and its symptoms are not better explained by normal concerns with physical appearance or by concerns with body fat or weight in individuals meeting diagnostic criteria for eating disorders. BDD symptoms may be associated with muscle dysmorphia and patients with BDD may show different degrees of insight regarding BDD beliefs.<sup>15</sup>

Abdominoplasty is frequently performed to improve body contour after pregnancy or major weight loss.<sup>16,17</sup> This surgery treats the aesthetic units of the abdomen, namely, the epigastrium, lower abdomen, flanks, and mons pubis.<sup>17-19</sup>

Physiological changes, such as aging and pregnancy, or alterations in body contour caused mainly by increases in body mass index (BMI) may lead to functional and psychological changes expressed as high levels of embarrassment in social and personal relationships.<sup>16,17,20</sup> However, an excessive preoccupation with appearance can conceal psychopathological traits that are not always easy to recognize and may result in iatrogenic and medico-legal problems if neglected.<sup>21-25</sup> Therefore, it is very important to carefully assess candidates for cosmetic procedures to identify those with this condition.<sup>5,26</sup>

For patients with a slight perceived defect who seek cosmetic surgery, degrees of behavior impairment and emotional distress seem to be more accurate indicators of BDD.<sup>6,26,27</sup> Avoidance behaviors and social withdrawal have been appointed as contributors to BDD severity<sup>6,7</sup> and chronicity.<sup>28-30</sup> Therefore, the classification of BDD severity in the present study was based on this concept.

The purpose of the study was to evaluate the prevalence and severity of BDD symptoms in patients seeking abdominoplasty.

## METHODS

This study was approved by the Research Ethics Committee of the Universidade Federal de São Paulo (UNIFESP), Brazil, and performed in accordance with the ethical standards of the 1964 Declaration of Helsinki and its subsequent amendments. Written informed consent was obtained from all patients prior to their inclusion in the study. Patient anonymity was assured. The study was conducted between February 2009 and August 2010.

Patients of both sexes, who expressed a desire to undergo abdominoplasty, were recruited at the outpatient facility of the Abdominal Plastic Surgery Unit of the São Paulo Hospital, UNIFESP.

Patients unable to understand the interview questions and those with severe physical deformities as a result of obesity, bariatric surgery, tumors and other conditions, psychotic disorders, previous history of BDD, or who had undergone psychiatric or psychological treatment were excluded from the study.

Ninety patients who met participation criteria and agreed to participate were included in the study. The participants were divided into two groups: patients with BDD symptoms (BDD group;  $n = 51$ ) and those without BDD symptoms (non-BDD group;  $n = 39$ ), according to the Brazilian version of the Body Dysmorphic Disorder Examination (BDDE)<sup>31</sup> and clinical assessment of BDD.<sup>15</sup> All patients were clinically assessed by the same psychologist (first author) with expertise in BDD and screening of plastic surgery candidates, who administered the BDDE. Body weight and shape concerns were assessed using the Body Shape Questionnaire (BSQ).<sup>32</sup> Sociodemographic (eg, name, sex, age, and ethnicity) and clinical characteristics (eg, history of previous cosmetic procedures, psychological/psychiatric treatment, and abuse) of the study participants were obtained through a clinical interview. All participants were evaluated by the authors, including two psychologists, one psychiatrist, and three plastic surgeons. The questionnaires were administered preoperatively.

The 34-item BDDE is a specific questionnaire that measures symptoms of severely negative body image.<sup>33</sup> The items are grouped into 6 domains assessing preoccupation and negative self-evaluation of appearance, self-consciousness and embarrassment, excessive importance given to appearance in self-evaluation, avoidance of activities (eg, avoidance of public and social situations or physical contact with other persons), body camouflaging (eg, use of camouflage strategies involving style of clothing, the wearing of accessories, use of makeup, and changes in body posture in an attempt to hide the perceived defect),

and body checking (eg, self-inspection, reassurance seeking, and comparing self to others).<sup>26</sup> The items are rated on a 0 to 6 scale, with 0 indicating the absence of negative body image symptoms in the previous 4 weeks. Scores of 1 to 6 represent the frequency (number of days) or intensity (mild to severe) of symptoms. The BDDE total score ranges from 0 to 168; a cutoff score of  $\geq 66$  indicates a higher degree of dissatisfaction with appearance and is usually associated with diagnosis of BDD.<sup>33</sup>

Besides measuring body image dissatisfaction, the BDDE includes specific items for the diagnosis of BDD and patients are required to have a score of 4 or greater on these items to meet diagnostic criteria.<sup>31,34</sup> Patients without BDD symptoms were defined as those who had a score of 3 or less on the specific items and those who did not meet criteria for BDD according to the DSM-5 during the clinical interview.

Patients with BDD symptoms were classified as having mild to moderate or severe symptoms,<sup>6,7,26</sup> based on their level of subjective distress and avoidance behavior.<sup>26</sup>

The classification of the physical deformity perceived by the patient was performed independently and in person by two experienced plastic surgeons, who are not authors of this paper, and two observers, who were not plastic surgeons. The intention was to classify the degree of severity of the defect from both the point of view of plastic surgeons and that of lay persons (non-plastic surgeons). Plastic surgeons are specialists able to observe even small aesthetic defects or variations from the ideal standard of beauty valued by a given culture. Consensus between non-plastic surgeons was achieved through a review of the photographs of patients. There was no disagreement between the classifications of both plastic surgeons.

The BSQ assesses concerns of body weight and shape in the past 4 weeks. Items are rated on a 6-point Likert-type scale ranging from “never” to “always” and grouped into 4 domains, including self-perception of body shape, comparative perception of body image, attitude concerning body image alterations, and severe alterations in body perception.<sup>32</sup>

## Statistical Analysis

Comparisons between groups were made using *t* test, the Mann-Whitney test, chi-square test, and Fisher’s exact test. The *t*-test for independent samples was used to compare the means between groups, and analysis of variance (ANOVA) was applied to compare data from more than two variables. The Brown-Forsythe test was used when variances were heterogeneous.

The Cramer’s *V* coefficient was calculated to measure the strength of associations between categorical variables. The Kolmogorov-Smirnov test and Shapiro-Wilk *W*-test were used to test for normality. Levene’s test was performed to test homoscedasticity of variances. Dunnett’s

multiple comparison test was applied to identify differences in mean values if significant differences were detected by ANOVA.

Ordered logistic regression was used to analyze the relationship between the four BSQ domains and BDD symptoms. The level of significance was set at a *P*-value of  $\leq .05$ , and BSQ domains showing statistical significance were included into the final logistic regression model. The Mantel-Haenszel method was used to test for trends between BDD symptoms and the BSQ total score.

The Statistical Package for the Social Sciences (SPSS) 20.0 (SPSS Inc., Chicago, IL) and Stata 12 (StatCorp, College Station, TX) were used for data analysis. All statistical tests were performed at a significance level of 5% ( $P < .05$ ). Data are expressed as mean  $\pm$  SD.

## RESULTS

Most patients were women (women,  $n = 84$ , 93.3%; men,  $n = 6$ , 7%), had a mean age of  $38 \pm 11$  years (range, 20-66 years), a mean BMI of  $26 \pm 4$  kg/m<sup>2</sup> (range, 18.3-41.3 kg/m<sup>2</sup>), and secondary or higher education ( $n = 72$ , 80%). No significant differences in sociodemographic characteristics were found between groups (Table 1).

There were significant differences in mean BDDE total score and number of patients scoring  $> 66$  between groups, showing a significant association between BDD symptoms and body dissatisfaction (Table 2).

Mild to moderate (without avoidance behavior) and severe (with avoidance behavior) symptoms of BDD were present in 41% and 59% of patients, respectively, in the BDD group.

Significant differences in patient perception of the defect severity ( $P = .024$ ) and perception of self-reference ( $P < .001$ ) were found between groups, revealing an association between level of preoccupation with physical appearance and BDD symptoms (Table 2).

There were also significant associations of BDD symptoms with some avoidance behaviors, including avoidance of mirrors ( $P = .005$ ), social situations ( $P = .008$ ) and physical contact ( $P < .001$ ), and inhibition of sexuality ( $P < .001$ ) (Table 2).

The majority of participants (90%) expressed the desire to undergo not only abdominoplasty, but also other cosmetic surgeries.

All patients with BDD symptoms ( $n = 51$ ) reported extreme dissatisfaction with their abdominal region and desired to undergo additional cosmetic surgery in other parts of the body. The most common complaints were body weight and deformities of the nose, breast, and face.

Complaints of dissatisfaction with different parts of the body were not normally distributed in both the BDD group (*S-W* = 0.835;  $P < .001$ ) and non-BDD group (*S-W* = 0.880;  $P < .001$ ). Patients with BDD symptoms showed dissatisfaction

**Table 1.** Sociodemographic Characteristics of Patients According Group Distribution

Characteristics	Groups			P Value
	Non-BDD Group (n = 39)	BDD Group (n = 51)	Test Statistics	
Age (years)	39 ± 11	37 ± 10	<i>t</i> = 0.76	.451
BMI (kg/m <sup>2</sup> )	26 ± 5	25 ± 4	<i>t</i> = 0.61	.545
Education Level	N (%)	N (%)		
Incomplete primary education	2 (5)	1 (2)	$\chi^2 = 1.297$	.523
Complete primary education	5 (13)	10 (20)		
Secondary education	17 (43)	24 (47)		
Some higher education	10 (26)	11 (21)		
College degree	5 (13)	5 (10)		

SD, standard deviation; BMI, body mass index.

with a significantly ( $Z = -2.337$ ,  $P = .019$ ) greater mean number of parts of the body ( $2.36 \pm 1.19$ ) compared with those without BDD symptoms ( $2.36 \pm 1.01$ ).

Patients in both groups reported that dissatisfaction with their body image began before the age of 40 years, especially during adolescence and early adulthood ( $P = .460$ ;  $\chi^2 = 1.555$ ). A higher proportion (49%) of patients in the BDD group experienced the onset of BDD symptoms during adolescence.

Patients in the BDD (69%) and non-BDD (33%) groups reported some experience of being teased and bullied, with a significant difference between groups ( $P = .001$ ;  $\chi^2 = 11.061$ ).

No significant association was found between history of substance abuse (alcohol and other drugs) and BDD symptoms ( $P = .061$ ). However, a higher proportion (20%) of patients with BDD reported substance abuse compared with that (5%) of patients without BDD.

### Dissatisfaction With Body Image Associated With Body Weight and Shape

There were significant differences in the distribution of BSQ total scores across the levels of body image concern measured by the BDDE, and in mean BSQ domain scores between groups (Table 3). BSQ total scores for patients without body image concerns were significantly lower than those of patients with mild to moderate concerns, which in turn were significantly lower than the scores of patients with severe body image concerns (Table 3).

A significant association was found between presence of BDD symptoms and both the BSQ total and domain scores, with the comparative perception of body image ( $V = 0.570$ ;  $P < .001$ ) and self-perception of body shape ( $V = 0.520$ ;  $P < .001$ ) domains showing the strongest association. The

higher the level of concern with body weight and shape, the more severe were the BDD symptoms ( $P < .001$ ; Mantel-Haenszel test).

Logistic regression showed that patients having distorted self-perception of body shape or distorted comparative perception of body image were respectively 3.67 (odds ratio (OR) = 3.670;  $P = .011$ ; 95% IC, 1.35-9.94) or 5.93 (OR = 5.932;  $P = .001$ ; 95% IC, 2.15-16.39) times more likely to show more severe symptoms of BDD than those with a more accurate perception when the effects of the other variables were controlled (Tables 4 and 5).

Only patients in the BDD group ( $n = 51$ ; 57%) had concerns about body weight and shape, with 17%, 21%, and 19% of them having mild, moderate, and severe levels of concern, respectively.

It also was found that 53%, 42%, and 20% of all participants reported high levels of concern on the self-perception of body shape, comparative perception of body image, and attitude concerning body image domains of the BSQ, respectively.

Overall, significant associations were found between dissatisfaction with body image and BSQ total scores ( $P < .001$ ), self-perception of body shape ( $P < .001$ ;  $\chi^2 = 16.61$ ), and comparative perception of body image ( $P < .006$ ;  $\chi^2 = 7.46$ ) scores. There was no association between attitude concerning body image ( $P = .114$ ) and severe alterations in body perception ( $P = .063$ ).

## DISCUSSION

The high prevalence of BDD symptoms (57%) in the study population shows the importance of the abdomen in the assessment of body image and its impact on mental health.<sup>16</sup> The prevalence rate was different and greater than those of previous studies on cosmetic surgery.<sup>1,4,35,36</sup> This may be

Table 2. Comparison of Clinical Characteristics of Patients Between Groups

Variable	Non-BDD Group (n = 39)	BDD Group (n = 51)	Test Statistics	P Value
Dissatisfaction with appearance				
BDDE total score (mean ± SD)	83 ± 33	120 ± 26	t = 5.87	<.001*
	N (%)	N (%)		
BDDE scores >66	26 (67)	50 (98)	$\chi^2 = 16.559$	<.001*
Level of preoccupation (obsessive characteristics) <sup>a</sup>				
Defect severity <sup>a</sup>				
Real	5 (13)	—		
Exaggerated	30 (77)	42 (82)	$\chi^2 = 7.456$	.024*
Non-observable	4 (10)	9 (18)		
Perception of self-reference	14 (36)	48 (94)	$\chi^2 = 34.952$	<.001*
Types of behaviors (compulsive characteristics) <sup>a</sup>				
Checking				
Comparing self to others	28 (72)	43 (84)	$\chi^2 = 2.080$	.149
Reassurance seeking	18 (46)	24 (47)	$\chi^2 = 0.007$	.932
Mirror checking	35 (90)	49 (96)	$\chi^2 = 1.425$	.233
Body inspection	39 (100)	50 (98)	Fisher's test	.999
Avoidance and Inhibition				
Mirror avoidance	12 (31)	31 (61)	$\chi^2 = 7.980$	.005*
Camouflage strategies	32 (82)	47 (92)	$\chi^2 = 2.104$	.147
Avoidance of public situations	13 (33)	27 (53)	$\chi^2 = 3.441$	.064
Avoidance of social situations	12 (31)	30 (59)	$\chi^2 = 6.989$	.008*
Avoidance of physical activities	21 (54)	27 (53)	$\chi^2 = 0.007$	.932
Avoidance of physical contact	15 (38)	46 (90)	$\chi^2 = 27.084$	<.001*
Inhibition of sexuality	28 (72)	51 (100)	$\chi^2 = 16.388$	<.001*

<sup>a</sup>Data obtained using the Body Dysmorphic Disorder Examination (BDDE). <sup>b</sup>According to the psychologist's assessment based on the BDDE. \*Statistical significance ( $P < .05$ ).

attributed to sociocultural factors, which may affect the onset and progression of this condition. The results also indicated that the social importance of physical appearance, which can be corrected with plastic surgery, can make diagnosis of BDD difficult.

In this study, patients with BDD symptoms reported dissatisfaction with a significantly greater number of parts of the body compared with patients without BDD symptoms, indicating an overall dissatisfaction with body image. This also indicates that an overlap of clinical symptoms of BDD and body dissatisfaction with body areas (size of the stomach, hips, and thighs) may occur, representing a challenge for the differential diagnosis of BDD and eating disorders.<sup>13</sup>

Fontenelle et al<sup>37</sup> suggested that systematic investigations should be performed to determine the impact of sociocultural factors on body image concerns in Brazil, such as the estimate of prevalence of BDD symptoms obtained in this study. Veale<sup>38</sup> highlighted that, in a culture that values appearance, increased levels of preoccupation with body image based on an ideal body model may stimulate individuals to seek cosmetic procedures. Cansever et al<sup>39</sup> observed that the prevalence of BDD may be affected by differences in physical appearance among different cultures, suggesting that complaints of dissatisfaction with different parts of the body in patients with BDD may be specific, but also show diversity, as found in the present study.

**Table 3.** Distribution of BDDE Total Scores According to Levels of Body Image Concern and BSQ Domain Scores in Both Groups

Scores	Mean	SD	Median	N
<b>BDDE total</b>	104.9	32.8	110.0	90
<b>BSQ total</b>				
Absent	81.4 <sup>a</sup>	30.4	80.0	39
Mild	106.4 <sup>b</sup>	19.2	103.0	15
Moderate	121.5 <sup>b</sup>	18.2	117.0	19
Severe	138.9 <sup>c</sup>	13.1	144.0	17
$F_{3,80} = 37.74; P < .001$				
<b>BSQ domains</b>				
<b>Self-perception of body shape</b>				
Non-BDD group	83.8	30.5	81.0	43
BDD group	124.2	20.7	127.0	47
$t = -7.28; P < .001$				
<b>Comparative perception of body image</b>				
Non-BDD group	88.9	31.1	88.5	52
BDD group	126.8	20.0	131.5	38
$t = -7.02; P < .001$				
<b>Attitude concerning body image</b>				
Non-BDD group	98.8	32.4	100.5	74
BDD group	132.9	15.8	134.0	16
$t = -6.26; P < .001$				
<b>Severe alterations in body perception</b>				
Non-BDD group	98.2	32.3	100.5	72
BDD group	131.7	17.8	134.0	18
$t = -5.90; P < .001$				

<sup>a,b,c</sup>different letters indicate significant differences between mean values ( $P < .05$ ).

A significant association was found between severity of BDD symptoms and level of preoccupation ( $P = .009$ ;  $\chi^2 = 9.425$ ), which was excessive for all patients in the BDD group. A negative self-perception of body image may have increased the perception of self-reference in these patients. Mood disturbances and excessive preoccupation with appearance may not always be associated with changed behavior.<sup>13,26</sup> Thus, distress is not always clearly expressed in the behavior of patients with BDD.<sup>26</sup> The observation of this phenomenon allowed us to assess the degree of global functioning impairment and to classify patients in the BDD group as having mild to moderate (41%) or severe (59%) BDD symptoms.

Concerns with body weight and shape were associated with severity of BDD symptoms, which is in agreement with the findings of other investigators.<sup>40</sup> No eating disorder symptoms were found among the participants, as measured by the attitude concerning body image domain (assessing appearance-related behaviors, which may help detect extreme cases of eating disorders) and severe alterations in the body perception domain (assessing negative feelings toward body-image disturbance, such as anorexia nervosa) of the BSQ. Both domains were not associated with severity of BDD symptoms.

Despite dissatisfaction with their body weight and shape, only 18% of patients reported performing regular physical

**Table 4.** Complete Logistic Regression Model Measuring the Relationship Between BDD Symptoms and the Four BSQ Domains

BSQ domains	OR	SE	Z	P >  Z	95% CI
Self-perception of body shape	3.153	1.665	2.17	.030*	[1.120-8.875]
Comparative perception of body image	4.123	2.289	2.55	.011*	[1.389-12.241]
Attitude concerning body image alterations	3.377	3.144	1.31	.191	[.545-20.938]
Severe alterations in body perception	1.082	.875	0.10	.923	[.221-5.284]

OR, odds ratio; SE, standard error; CI, confidence interval. \*Statistical significance ( $P \leq .05$ ).

**Table 5.** Final Logistic Regression Model Measuring the Relationship Between BDD Symptoms and Two BSQ Domains

BSQ domains	OR	SE	Z	P >  Z	95% CI
Self-perception of body shape	3.670	1.866	2.56	.011*	[1.355-9.944]
Comparative perception of body image	5.932	3.076	3.43	.001*	[2.147-16.388]

OR, odds ratio; SE, standard error; CI, confidence interval. \*Statistical significance ( $P \leq .05$ ).

activities. Similarly, Javo and Sørli<sup>41</sup> found that women seeking abdominoplasty were the most dissatisfied with appearance, but at the same time considered their appearance as less important compared to those seeking different cosmetic procedures. This may predict weight gain after abdominoplasty in these patients.<sup>42,43</sup>

Patients with BDD symptoms had a changed relationship with their body, especially expressed as avoidance of physical contact with other people, as also reported by Constantian and Lin.<sup>2</sup> Changed and negative self-perception of body shape may have led these patients to an extreme dissatisfaction with their physical appearance. Self-perception of the body is an indicator of mental health and changes in this parameter may indicate severe BDD symptoms, as observed in this study.

The comparative perception of body image domain of the BSQ was used to assess levels of inhibition and embarrassment when exposing the body. Results showed the extent to which avoidance behaviors may interfere with the severity of BDD symptoms and a behavior pattern in patients seeking abdominoplasty similar to that identified in a previous study.<sup>16</sup> All patients with BDD symptoms experienced inhibition of sexuality, which is in agreement with other investigators.<sup>14</sup> Patients reported avoiding close contact with other persons due to shame and embarrassment about the perceived defects,<sup>2</sup> reducing possible affective relationships and social interactions, which increase the severity of symptoms.

In this study, complaints about the shape of the abdomen and breast were associated with body weight and shape, and with pregnancy in some cases; requests for rhinoplasty were associated with ethnicity, and for facial cosmetic procedures were associated with concerns about aging. Complaints about body weight suggested that BDD symptoms may also be associated with weight concerns.<sup>40</sup> We found that 28% of patients with BDD symptoms and

who were dissatisfied with their body weight had a normal weight (BMI range, 18.5-24.99 kg/m<sup>2</sup>), showing that their concern was not real. Recent studies have included clinically significant concerns with body weight as symptoms of BDD.<sup>12,40</sup> This result may also be related to the fact that most of the candidates for abdominoplasty are women.<sup>10</sup>

Previous studies have emphasized the role of adverse childhood experiences in the development of BDD.<sup>2,3,44</sup> In the BDD group, 69% of patients reported some experience of being teased and bullied. Dissatisfaction with physical appearance as a reaction to environmental interference, such as the phenomenon of teasing and bullying, has been observed by other authors.<sup>2,3,38,45,46</sup> It has been suggested that an insecure style of interpersonal attachment might result in body dissatisfaction<sup>40</sup> and therefore be also a motivation for cosmetic surgery,<sup>41</sup> as observed by the association of teasing and bullying experiences with BDD symptoms. The mean age ( $38 \pm 11$  years) of the participants at the time of the interview was not significantly associated with the onset of BDD symptoms, but this does not mean that the desire for aesthetic improvement has not been considered before.

Patients were classified as having or not having BDD symptoms using the BDDE as a screening tool. The Brazilian version of the BDDE in the interview format has been validated in a population sample of candidates for cosmetic surgery.<sup>31</sup> Although it requires time to be administered<sup>46</sup> and an experienced examiner,<sup>34</sup> the instrument allows accurate evaluation of patients with BDD, who usually complain of great difficulty in being understood and often hide their symptoms, unless directly questioned. The BDDE covers a broader spectrum of symptoms and aspects of body image, and has been used in several studies.<sup>40,46</sup> Some studies have observed that specific screening instruments are able to detect BDD symptoms and criticized the DSM-IV, Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), and

Mini International Neuropsychiatric Interview-Plus (MINI-Plus) because they fail to diagnose the disorder.<sup>14,47</sup>

Our study has limitations, including a small sample size, the fact that most patients were women, and that the Structured Clinical Interview for DSM (SCID) was not included. Further studies with a larger number of patients and involving multiple centers are necessary to evaluate and compare the prevalence of BDD symptoms in patients seeking abdominoplasty to allow the development of care and treatment strategies for this population.

## CONCLUSIONS

This was the first study exclusively assessing BDD symptoms in patients seeking abdominoplasty. A high prevalence of BDD symptoms was found among candidates for abdominoplasty, and body weight and shape concerns were significantly associated with severity of BDD symptoms. Systematic studies on the diagnosis of psychopathological symptoms in all specialties of plastic surgery are important and necessary. A careful screening of candidates for cosmetic surgery may contribute to patient satisfaction after surgery and improvement in their quality of life.

## Disclosures

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

## Funding

The authors received no financial support for the research, authorship, and publication of this article.

## REFERENCES

- Sarwer DB, Spitzer JC. Body image dysmorphic disorder in persons who undergo aesthetic medical treatments. *Aesthet Surg J*. 2012;32:999-1009.
- Constantian MB, Lin CP. Why some patients are unhappy: part 1. Relationship of preoperative nasal deformity to number of operations and a history of abuse or neglect. *Plast Reconstr Surg*. 2014;134:823-835.
- Constantian MB, Lin CP. Why some patients are unhappy: part 2. Relationship of nasal shape and trauma history to surgical success. *Plast Reconstr Surg*. 2014;134:836-851.
- Veale D, De Haro L, Lambrou C. Cosmetic rhinoplasty in body dysmorphic disorder. *Br J Plast Surg*. 2003;56:546-551.
- Hayashi K, Miyachi H, Nakakita N, et al. Importance of a psychiatric approach in cosmetic surgery. *Aesthet Surg J*. 2007;27:396-401.
- Felix GA, de Brito MJ, Nahas FX, et al. Patients with mild to moderate body dysmorphic disorder may benefit from rhinoplasty. *J Plast Reconstr Aesth Surg*. 2014;67:646-654.
- De Brito MJA, Nahas FX, Cordás TA, Tavares H, Ferreira LM. Body dysmorphic disorder in patients seeking abdominoplasty, rhinoplasty and rhytidectomy. *Plast Reconstr Surg*. 2015 (In Press).
- Glaser DA, Kaminer MS. Body dysmorphic disorder and the liposuction patient. *Dermatol Surg*. 2005;31:559-560.
- Sarwer DB, Crerand CE. Body image and cosmetic medical treatments. *Body Image*. 2004;1:99-111.
- Jávo IM, Pettersen G, Rosenvinge JH, Sørli T. Predicting interest in liposuction among women with eating problems: a population-based study. *Body Image*. 2012;9:131-136.
- Grossbart TA, Sarwer DB. Psychosocial issues and their relevance to the cosmetic surgery patient. *Semin Cutan Med Surg*. 2003;22:136-147.
- Fenwick AS, Sullivan KA. Potential link between body dysmorphic disorder symptoms and alexithymia in an eating-disordered treatment-seeking sample. *Psychiatry Res*. 2011;189:299-304.
- Phillips KA, Wilhelm S, Koran LM, Didie ER, Fallon BA, Feusner J, Stein DJ. Body dysmorphic disorder: some key issues for DSM-V. *Depress Anxiety*. 2010;27:573-591.
- Dyl J, Kittler J, Phillips KA, Hunt JI. Body dysmorphic disorder and other clinically significant body image concerns in adolescent psychiatric inpatients: prevalence and clinical characteristics. *Child Psychiatry Hum Dev*. 2006;36:369-382.
- American Psychiatric Association. Obsessive-compulsive and related disorders. In: *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*. 5th ed. Arlington, VA: American Psychiatric Association; 2013:215-224.
- de Brito MJ, Nahas FX, Barbosa MV, et al. Abdominoplasty and its effect on body image, self-esteem, and mental health. *Ann Plast Surg*. 2010;65:5-10.
- de Brito MJ, Nahas FX, Bussolaro RA, Shinmyo LM, Barbosa MV, Ferreira LM. Effects of abdominoplasty on female sexuality: a pilot study. *J Sex Med*. 2012;9:918-926.
- Nahas FX. A pragmatic way to treat abdominal deformities based on skin and subcutaneous excess. *Aesth Plast Surg*. 2001;25:365-371.
- Ferreira LM, Castilho HT, Hochberg J, et al. Triangular mattress suture in abdominal diastasis to prevent epigastric bulging. *Ann Plast Surg*. 2001;46:130-134.
- Sarwer DB, Wadden TA, Whitaker LA. An investigation of changes in body image following cosmetic surgery. *Plast Reconstr Surg*. 2002;109:363-369.
- da Silva DB, Nahas FX, Bussolaro RA, de Brito MJ, Ferreira LM. The increasing growth of plastic surgery lawsuits in Brazil. *Aesthetic Plast Surg*. 2010;34:541-542.
- Vila-Nova da Silva DB, Nahas FX, Ferreira LM. Factors influencing judicial decisions on medical disputes in plastic surgery. *Aesthet Surg J*. 2015;35:477-483.
- Paik AM, Mady LJ, Sood A, Eloy JA, Lee ES. A look inside the courtroom: an analysis of 292 cosmetic breast surgery medical malpractice cases. *Aesthet Surg J*. 2014;34:79-86.



24. Paik AM, Mady LJ, Sood A, Lee ES. Beyond the operating room: a look at legal liability in body contouring procedures. *Aesthet Surg J*. 2014;34:106-113.
25. Sarwer DB. Awareness and identification of body dysmorphic disorder by aesthetic surgeons: results of a survey of American society for aesthetic plastic surgery members. *Aesthet Surg J*. 2002;22:531-535.
26. de Brito MJ, Nahas FX, Ortega NR, et al. Support system for decision making in the identification of risk for body dysmorphic disorder: a fuzzy model. *Int J Med Inform*. 2013;82:844-853.
27. Sarwer DB, Crerand CE. Body dysmorphic disorder and appearance enhancing medical treatments. *Body Image*. 2008;5:50-58.
28. Kelly MM, Walters C, Phillips KA. Social anxiety and its relationship to functional impairment in body dysmorphic disorder. *Behav Ther*. 2010;41:143-153.
29. Bjornsson AS, Didie ER, Phillips KA. Body dysmorphic disorder. *Dialogues Clin Neurosci*. 2012;12:221-232.
30. Marques L, LeBlanc N, Robinaugh D, Weingarden H, Keshaviah A, Wilhelm S. Correlates of quality of life and functional disability in individuals with body dysmorphic disorder. *Psychosomatics*. 2011;52:245-254.
31. Jorge RT, Sabino Neto M, Natour J, Veiga DF, Jones A, Ferreira LM. Brazilian version of the body dysmorphic disorder examination. *Sao Paulo Med J*. 2008;126:87-95.
32. Di Pietro MC, Silveira DX. Internal validity, dimensionality and performance of the Body Shape Questionnaire in a group of Brazilian college students. *Rev Bras Psiquiatr*. 2009;31:21-24.
33. Phillips KA. Body image and body dysmorphic disorder. In: Cash TF, Pruzinsky T, eds. *Body Image: A Handbook of Theory, Research, and Clinical Practice*. New York: The Guilford Press; 2004:312-321.
34. Rosen JC, Reiter J. Development of the body dysmorphic disorder examination. *Behav Res Ther*. 1996;34:755-766.
35. Picavet VA, Gabriëls L, Grietens J, Jorissen M, Prokopakis EPHellings PW. Preoperative symptoms of body dysmorphic disorder determine postoperative satisfaction and quality of life in aesthetic rhinoplasty. *Plast Reconstr Surg*. 2013;131:861-868.
36. Sarwer DB, Wadden TA, Pertschuk MJ, Whitaker LA. Body image dissatisfaction and body dysmorphic disorder in 100 cosmetic surgery patients. *Plast Reconstr Surg*. 1998;101:1644-1649.
37. Fontenelle LF, Telles LL, Nazar BP, et al. A sociodemographic, phenomenological, and long-term follow-up study of patients with body dysmorphic disorder in Brazil. *Int J Psychiatry Med*. 2006;36:243-259.
38. Veale D. Body dysmorphic disorder. *Postgrad Med J*. 2004;80:67-71.
39. Cansever A, Uzun O, Dönmez E, Ozsahin A. The prevalence and clinical features of body dysmorphic disorder in college students: a study in a Turkish sample. *Compr Psychiatry*. 2003;44:60-64.
40. Kittler JE, Menard W, Phillips KA. Weight concerns in individuals with body dysmorphic. *Eat Behav*. 2007;8:115-120.
41. Javo IM, Sørli T. Psychosocial characteristics of young Norwegian women interested in liposuction, breast augmentation, rhinoplasty, and abdominoplasty: a population-based study. *Plast Reconstr Surg*. 2010;125:1536-1543.
42. Nahas FX, Ferreira LM, Augusto SM, Ghelfond C. Long-term follow-up of correction of rectus diastasis. *Plast Reconstr Surg*. 2005;115:1736-1741.
43. Nahas FX, Ferreira LM, Ely PB, Ghelfond C. Rectus diastasis corrected with absorbable suture: a long-term evaluation. *Aesthetic Plast Surg*. 2011;35:43-48.
44. Veale D, Neziroglu F. *Body Dysmorphic Disorder. A Treatment Manual*. West Sussex: Wiley-Blackwell; 2010
45. Park LE, Calogero RM, Harwin MJ, DiRaddo AM. Predicting interest in cosmetic surgery: interactive effects of appearance-based rejection sensitivity and negative appearance comments. *Body Image*. 2009;6:186-193.
46. Kisely S, Morkell D, Allbrook B, Briggs P, Jovanovic J. Factors associated with dysmorphic concern and psychiatric morbidity in plastic surgery outpatients. *Aust N Z J Psychiatry*. 2002;36:121-126.
47. Dingemans AE, van Rood YR, de Groot I, van Furth EF. Body Dysmorphic disorder in patients with an eating disorder: prevalence and characteristics. *Int J Eat Disord*. 2012;45:562-569.