

Prevalence of Body Dysmorphic Disorder and Impact on Subjective Outcome amongst Singaporean Rhinoplasty Patients

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Abstract

Importance: To improve understanding of body dysmorphic disorder in Asian rhinoplasty patients

Objective: To determine the prevalence of body dysmorphic disorder (BDD) in Asian patients who received cosmetic rhinoplasty and determine its impact on subjective outcomes after surgery.

Design: A survey study of patients who received cosmetic rhinoplasty between January 2009 and December 2012 was undertaken. Telephone interview using validated instruments (Body Dysmorphic Disorder Questionnaire and Rhinoplasty Outcome Evaluation) were performed to determine the prevalence of BDD and the subjects' pre-/post-operative subjective scoring of their noses.

Setting: Tertiary care hospital

Participants: All adult patients who received rhinoplasty for mainly cosmetic indications were included into our study population.

Main Outcome Measures: Those who screened positive on the Body Dysmorphic Disorder Questionnaire were considered to have BDD. The Rhinoplasty Outcome Evaluation quantified the individual's perception of his/her nose before and after the operation.

Results: Fifty-two patients who received cosmetic rhinoplasty were approached and forty-seven (90%) agreed to and completed the interview. The mean age of participants was 31.1 years. Twenty-seven (57%) of the participants were male and 20 were female. Of the 47 patients who participated in the study, seven (15%) were identified to have possible BDD. Six out of 7 of them were male. The BDD-group (mean age=26.0) was significantly younger ($p=0.003$) than the non-BDD group (mean age=32.0). Although the revision rate was clinically higher for the BDD group (29%) than the non-BDD group (12.5%), this was not statistically significant ($p=0.276$). Both groups reported overall improvement in ROE scores but patients with BDD had significantly lower pre- and post-operative ROE scores compared to non-BDD patients ($p<0.05$).

Conclusion and Relevance: Our results show that BDD is quite prevalent amongst patients who have received cosmetic rhinoplasty. BDD patients are likely to have poorer subjective outcomes after surgery although they may experience some improvement in satisfaction when compared to before surgery.

Level of Evidence: 3

Introduction

Body dysmorphic disorder (BDD) is defined as an excessive preoccupation with a slight or imagined defect in one's physical appearance. The DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) criteria also states that the preoccupation must cause clinically significant distress or impairment in social, occupational or other areas of functioning to fulfill the diagnostic criteria of BDD [1]. Patients with BDD are usually too ashamed to seek psychiatric treatment and are motivated in the pursuit of cosmetic surgery. Hence, it is not surprising that the prevalence of BDD

reported in the cosmetic setting has been consistently higher than that in the general population which is estimated at approximately 1 to 2% [2]. Rhinoplasty is one of the most popular operations in the field of cosmetic surgery in Asia. Several Caucasian studies have found that cosmetic rhinoplasty was the most common surgery sought by individuals with BDD, with a prevalence of between 20 to 33 percent of patients seeking rhinoplasty having the disorder [3,4]. To our knowledge, there has not been any published literature on the prevalence of BDD among rhinoplasty patients in an Asian population.

The diagnosis of BDD is considered to be a contraindication to surgery by most surgeons. Studies from psychiatric literature reveal that the majority of BDD patients experienced no improvement or even worsening of BDD symptoms after surgery [5]. Although some studies have attempted to investigate the impact of BDD on level of satisfaction after nose surgery [5-7], most of them did not use proper validated instruments specific for rhinoplasty to measure outcome.

Therefore, the two main aims of this study are to determine the prevalence of BDD in patients who received cosmetic rhinoplasty in an Asian population and to determine the impact of BDD on subjective outcome after surgery using the validated Rhinoplasty Outcome Evaluation (ROE) instrument.

Patients and Methods

This survey study was conducted at the Facial Plastic Division of a tertiary otolaryngology referral centre in Singapore. Ethics approval was obtained from Singapore National Healthcare Group Domain Specific Review Board (NHG DRSB).

All patients aged 21 years and above who received rhinoplasty by the senior author (SL) for mainly cosmetic indications from January 2009 to December 2012 were invited to participate. Those who received surgery for mainly traumatic indications were excluded. Patient demographics (age, sex, race and number of revision rhinoplasty) were obtained from clinical notes. Patient information sheets were mailed to participants informing them about this telephone-based interview study. To maximize response rate, we scheduled the interview to be conducted at a time convenient for the subjects. Participants who agreed to take part in this study were interviewed 6 months after their primary surgery.

Questionnaire

We screened for BDD using the Body Dysmorphic Questionnaire (BDDQ) and measured the surgical outcome using the Rhinoplasty Outcome Evaluation (ROE). Body Dysmorphic Disorder Questionnaire (BDDQ) was originally developed by Phillips [8]. This validated [7,9] screening tool was designed to screen for patients who are likely to have BDD based on the definition of BDD in DSM-IV [1]. It has also been used to determine the prevalence of BDD in cosmetic rhinoplasty by two earlier studies [7,9]. Consistent with the DSM-IV definition, an individual positive for BDD must indicate a preoccupation with a perceived appearance flaw and report moderate distress and/or impairment in functioning [8]. Participants were specifically told to respond to the questions on the BDDQ retrospectively based on the symptoms they were experiencing before the operation.

Rhinoplasty Outcome Evaluation (ROE) is a validated instrument used to assess patients' satisfaction towards the appearance and function of their nose, the impact on their social life as well as their desire for change [10]. Each question is scored on a Likert scale from 0 to 4, with 0 and 4 corresponding to the worst and best scores respectively. The sum of the scores from the six questions, divided by 24 and multiplied by 100 derives the final score. Higher scores reflect better subjective outcomes. During the same interview, participants were asked for their current ROE scores (6 months post-rhinoplasty) and their retrospective pre-operative baseline ROE scores.

Statistical Analysis

All analyses were performed using Statistical Package for Social Science (SPSS) Version 21. Fisher's exact test and chi-squared test was performed to examine demographic differences (sex, ethnicity, number of revision rhinoplasty) between groups. Nonparametric comparisons (Mann-Whitney U tests) of pre- and post-operative ROE scores were performed comparing the BDD and non-BDD group. The same analysis was used to compare the improvement in ROE scores after operation in both groups of patients. To determine if the improvement of ROE scores was significant, Wilcoxon signed-rank test was used. Values of $p < 0.05$ were considered significant.

Results

Prevalence of body dysmorphic disorder

Of the 52 patients who received rhinoplasty for cosmetic indications between January 2009 and December 2012 that were identified and approached, forty-seven (90%) participated in the study. The demographics of our patients are summarized in Table 1.

Demographic Characteristics	All	BDD group	Non-BDD group	Level of Significance
No. of patients, n=	47	7	40	-
Mean Age, years	31.1	26	32	0.003
Sex, n=				
Male	27(57.4%)	6(85.7%)	21(52.5%)	0.11
Female	20(42.6%)	1(14.3%)	19(47.5%)	
Ethnicity, n=				
Chinese	32 (38.0%)	5(71.5%)	27(67.5%)	
Malay	6(12.8%)	0	6(15%)	0.5
Indian	9(19.1%)	2(28.5%)	7(17.5%)	
Revision rhinoplasty, n=	7(14.9%)	2(28.5%)	5(12.5%)	0.28

Table 1: Demographic Characteristics of Cosmetic Rhinoplasty Patients

The mean age of all the patients in this studied group was 31.1 years with a range of 21 to 67 years. Twenty-seven (57%) of the subjects were male and the remaining 20 (43%) were female. Our results reveal that seven patients (15%) had BDD based on the BDDQ. Mann-Whitney U and Fisher's exact test was conducted to compare the demographic characteristics of BDD and non-BDD patients (Table 1). The BDD group was significantly younger than the group without ($p=0.003$). Patients were followed-up after their primary surgery for a mean duration of 18 months (range 6-32 months). During this period, a total of 7 (14.9%) patients subsequently received revision rhinoplasty by the senior author (BDD group $n=2$, non-BDD group $n=5$). There were no statistically significant differences in terms of sex, ethnicity and subsequent revision rhinoplasty rates between the two groups.

Comparison of ROE scores

Table 2 provides an overview on the impact of the investigated demographic factors on the pre, postoperative and improvement in ROE scores of all the patients that underwent rhinoplasty. The median age of the study population was 30 years and this was arbitrarily used as the cut-off for sub-group analysis of age. We found that the younger group was associated with significantly less improvement in ROE scores ($p=0.026$) but had no statistically significant difference in terms of preoperative and postoperative ROE scores compared to older patients. There were no other significant differences when we compared the pre-operative, post-operative and improvement in ROE scores of amongst subgroups ranged by sex or ethnicity.

Patient Characteristics					Number	Pre-op ROE	
Age			p-value	Post-op ROE	p-value	Improvement in ROE	p-value
<30	24	41.7	0.56		0.06		0.03
>30	23	39.3		70.4		28.9	
Sex							
Male	27	42.7		75.2		32.4	
Female	20	37.7	0.21		0.44		0.86
Ethnicity							
Chinese	32	40.1		74.5		34.4	
Non-Chinese	15	41.7	0.69		0.45		0.66
				73.9		32.2	

Table 2: Correlation between ROE Scores and Patient Characteristics

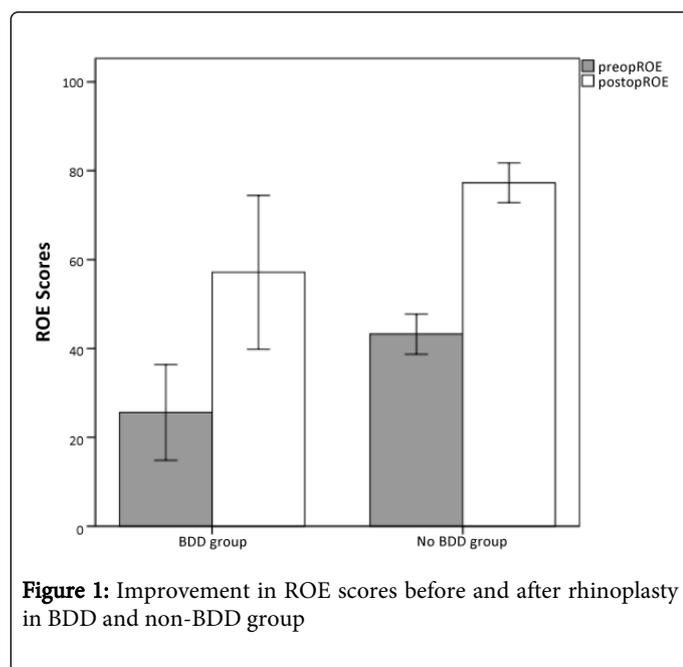


Figure 1: Improvement in ROE scores before and after rhinoplasty in BDD and non-BDD group

The mean preoperative score was 25.6 in the BDD group and 43.2 in the non-BDD group. The mean postoperative score was 57.1 in the BDD group and 77.3 in the non-BDD group. Both the BDD and non-BDD group reported a statistically significant overall improvement ($p<0.001$) in ROE scores after their operation (Figure 1).

In addition, there was no difference in the degree of improvement of ROE scores between the two groups ($p=0.386$). However, our results show that BDD patients had significantly lower preoperative ($p=0.002$) and postoperative ROE scores ($p=0.005$) compared to those without BDD (Table 3).

	BDD	Non-BDD	Mann-Whitney Test
Pre-op ROE	25.6	43.2	$p=0.002$
Post-op ROE	57.1	77.3	$p=0.005$
Improvement in ROE	31.5	34	$p=0.39$

Table 3: Comparison of ROE scores between BDD and non-BDD group

Discussion

BDD is characterized by an excessive preoccupation with a perceived or minor defect in appearance that results in significant distress or impairment in daily functioning. Due to the central role of the nose in the face, rhinoplasty is one of the most common surgical procedures requested amongst BDD patients [3,4]. In this study, we used the BDDQ to screen for BDD. This brief screening tool has been validated in both the psychiatric and dermatological setting [11]. It has previously been used to determine the prevalence of BDD in cosmetic rhinoplasty setting by Veale et al. [7]. To our knowledge, some studies have investigated the BDD rates in patients seeking rhinoplasty but there is no data on the proportion of BDD in patients who have already received cosmetic rhinoplasty [7,12,13]. This study reveals that 15% of patients who received cosmetic rhinoplasty in a tertiary hospital setting have possible BDD. As expected, this figure is lower than that reported by studies which looked at the prevalence of BDD in patients seeking rhinoplasty which ranges from 20 to 33 percent [7,12,13]. This suggests that surgeons generally refrain from operating on patients suspected to have BDD, however despite this the high percentage of BDD in patients who received rhinoplasty reflected in this study highlights the potential difficulty faced by surgeons in screening for or excluding these patients. This point is reiterated from a survey of 265 plastic surgeons in America; eighty-four percent indicated that they had operated on a patient whom they believed was appropriate for surgery only to realize that these patients had BDD [14]. Currently, the assessment of whether a patient has BDD is largely made through the short interaction time the surgeon has during clinic consultation, which is less than ideal. Although several self-report, screening tools have been developed to aid in the assessment of BDD, a significant limitation that is hard to circumvent would be patients understating their symptoms in order to obtain surgery. Hence, these screening instruments are often more appropriate for research purposes rather than for use in a clinical setting.

After performing sub-group analysis on the two groups, we found that the BDD group was significantly younger than the non-BDD group. However, there were no significant differences in terms of sex, ethnicity or the rates of revision rhinoplasty. The revision rhinoplasty rate for BDD patients (29.0%) was much higher in percentage

compared to the non-BDD group (12.5%) but this was not statistically insignificant. This is probably due to the small sample size of this study. Studies performed by Tignol and Veale also found that BDD patients seeking cosmetic surgery were younger than their non-BDD counterparts but subject groups did not differ in gender [7,15]. These results suggest that surgeons who perform cosmetic rhinoplasty should have a higher index of suspicion in young patients seeking cosmetic rhinoplasty with a minimal defect in appearance. More research is required to characterize the typical profile of a BDD patient seeking rhinoplasty.

Studies from psychiatric literature demonstrate that BDD patients usually have poor psychosocial outcomes following cosmetic surgeries; Philips studied the outcome of 58 BDD patients who had sought cosmetic surgery and revealed that the overwhelming majority (82.6%) experienced no improvement or even worsening of their BDD symptoms [16]. In this study, we investigated the impact of BDD on subjective outcomes after rhinoplasty. Our results reveal that patients with BDD have significantly lower preoperative and postoperative satisfaction of their noses as measured by the ROE instrument as compared to those without BDD. This is in accordance with the small number of studies that also investigated the role of BDD on outcome [5-7]. Picavet et al. also used the ROE instrument in their study and demonstrated that patients with moderate to severe body dysmorphic disorder symptoms scored their postoperative satisfaction significantly lower compared with patients with no or mild symptoms [6]. However, their study did not obtain the baseline preoperative ROE scores and therefore could not determine the improvement in nasal satisfaction of patients after surgery.

To our knowledge, there have not been any studies that specifically analyzed the improvement in perception of BDD patients towards their noses after surgery. In this study, we compared the pre- and postoperative ROE scores. Surprisingly, not only did the level of satisfaction after surgery improve in both the BDD and non-BDD group, there was also no difference in the magnitude of improvement between both groups. We postulate that the majority of possible BDD patients we identified and subsequently operated on may belong to the milder end of the wide BDD disease spectrum that was missed during the preoperative consultation process. These patients may have had a sub-clinical form of the disease that was not readily detected by their surgeon during preoperative evaluation. Our data suggests that although patients with BDD tend to have poorer subjective outcome after surgery, this is attributed to their lower preoperative baseline level of satisfaction, rather than surgery offering less perceived improvement. Hence there be a role of surgery for certain subgroup of BDD patients who may experience improved perception of their noses postoperatively. Further studies are required to evaluate this finding, taking into consideration that this improvement of ROE scores was observed in patients who were retrospectively diagnosed with BDD and were not detected preoperatively, where a bias in exclusion of the more severe BDD patients is likely to exist. Furthermore, the BDD patients in our study who underwent surgery had an imperfection albeit minimal that was perceivable by the author. These results should not be generalized to all BDD patients seeking rhinoplasty especially those with no perceivable defect to the surgeon. Quantifying the severity of the disease and following up on the progression of the BDD after the operation was out of the scope of this study. A potential avenue for future research is to investigate the relationship between the severity of BDD symptoms and the degree of improvement in subjective outcomes and BDD symptoms after rhinoplasty to determine what the threshold for surgery in BDD patients is.

Nevertheless, surgeons should continue to evaluate their patients carefully and decide if the patient is a good psychological candidate for cosmetic surgery before proceeding.

Some limitations of the present study need to be addressed. Because of the medico-legal implications of a prospective study which would involve knowingly allowing a patient diagnosed with BDD pre-operatively to undergo surgery, we chose to perform retrospective survey study to determine the prevalence of BDD in our study population. Due to limitations in our methodology, we are unable to formally diagnose patients with this disorder, as that would require a trained psychologist to conduct a formal clinical interview. However, we believe that our screening tool is effective at identifying patients highly likely to have suffered from BDD and most if not all of these patients who screened positive with the validated BDDQ are likely to have the disorder. As with all survey studies, non-participation biasness may potentially skew the results. A respectable response rate of ninety percent was achieved, thus ensuring that non-participation bias is kept to a minimum.

In conclusion, this study shows that the prevalence of BDD among Asia patients who underwent rhinoplasty is still high. Although these patients have poorer subjective outcome after surgery, they generally experienced an improvement in their perception of their noses. Although our data suggests that surgery benefited patients with a mild or sub-clinical form of the disease that was undetected during clinical consultation and only in retrospect, these findings need to be confirmed by further prospective large-scale studies looking into the effect of surgery on BDD symptoms and improvement of nasal perception in patients with mild BDD.

Conflict of interest statement: The authors declare no conflict of interest.

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