

This item is the archived peer-reviewed author-version of:

The body dysmorphic disorder questionnaire-aesthetic surgery : are we screening the troublesome patients?

Reference:

Declau Frank, Pingnet Laura, Smolders Yannick, Fransen Erik, Verkest Valerie.- The body dysmorphic disorder questionnaire-aesthetic surgery : are we screening the troublesome patients?

Facial plastic surgery - ISSN 1098-8793 - New york, Thieme medical publ inc, (2024)10 p.

Full text (Publisher's DOI): <https://doi.org/10.1055/A-2241-9934>

To cite this reference: <https://hdl.handle.net/10067/2047890151162165141>

Facial Plastic Surgery

The Body Dysmorphic Disorder Questionnaire - Aesthetic Surgery: are we screening the troublesome patients?

Frank Declau, Laura Pingnet, Yannick Smolders, Erik Fransen, Valérie Verkest.

Affiliations below.

DOI: 10.1055/a-2241-9934

Please cite this article as: Declau F, Pingnet L, Smolders Y et al. The Body Dysmorphic Disorder Questionnaire - Aesthetic Surgery: are we screening the troublesome patients?. Facial Plastic Surgery 2024. doi: 10.1055/a-2241-9934

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

Trial registration: NCT03925389, ClinicalTrials.gov (<http://www.clinicaltrials.gov/>), Prospective

Abstract:

This study aims to clarify the current concept of performing rhinoplasty in patients with possible body dysmorphic disorder (BDD). The primary outcome was to investigate the validity and evolution over time of the Body Dysmorphic Disorder Questionnaire - Aesthetic Surgery (BDDQ-AS) before and after surgery.

Methods

Together with the BDDQ-AS, also the NOSE scale, FACE-Q nose and nostrils, and Utrecht questionnaire were used for convergent validation. In this prospective study, 187 patients completed these PROMs at 4 time points: at the preoperative consultation and postoperatively at 3, 6 and 12 months.

Results

The preoperative BDDQ-AS positivity rate was as high as 55.1%. Postoperatively, there was a highly significant decrease in the odds of scoring positive on the BDDQ-AS. At the preoperative consultation, positively screened patients were less satisfied with the aesthetics of their noses with worse scores on UQ, FACE-Q nose and VAS. The preoperative differences in outcome measure ratings disappeared postoperatively, except for the FACE-Q nostrils, which surprisingly showed better values in BDDQ-AS positive patients. Age and previous nasal trauma were statistically significant covariates associated with positive BDDQ-AS screening.

Conclusion

Due to the overwhelming decrease in positive BDDQ-AS outcome after surgery, a positive screening result on the BDDQ-AS should not be interpreted as a formal contra-indication for surgery. Collaboration with psychologists or psychiatrists remains crucial to diagnose BDD conclusively.

Corresponding Author:

Prof. Frank Declau, University of Antwerp Faculty of Medicine and Health Sciences, Department of ENT, Head & Neck Surgery, Antwerp, Belgium, frank.declau@telenet.be

Affiliations:

Frank Declau, University of Antwerp Faculty of Medicine and Health Sciences, Department of ENT, Head & Neck Surgery, Antwerp, Belgium

Frank Declau, GZA Ziekenhuizen Campus Sint-Vincentius, Department of ENT, Head & Neck Surgery, Antwerp, Belgium

Laura Pingnet, University of Antwerp Faculty of Medicine and Health Sciences, Department of ENT, Head & Neck Surgery, Antwerp,

Belgium

[...]

Valérie Verkest, University of Antwerp Faculty of Medicine and Health Sciences, Department of ENT, Head & Neck Surgery, Antwerp, Belgium



This article is protected by copyright. All rights reserved.

Downloaded by: FRANK DECLAU. Copyrighted material.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Abstract

This study aims to clarify the current concept of performing rhinoplasty in patients with possible body dysmorphic disorder (BDD). The primary outcome was to investigate the validity and evolution over time of the Body Dysmorphic Disorder Questionnaire - Aesthetic Surgery (BDDQ-AS) before and after surgery.

Together with the BDDQ-AS, also the NOSE scale, FACE-Q nose and nostrils, and Utrecht questionnaire were used for convergent validation. In this prospective study, 187 patients completed these PROMs at 4 time points: at the preoperative consultation and postoperatively at 3, 6 and 12 months.

The preoperative BDDQ-AS positivity rate was as high as 55.1%.

Postoperatively, there was a highly significant decrease in the odds of scoring positive on the BDDQ-AS. At the preoperative consultation, positively screened patients were less satisfied with the aesthetics of their noses with worse scores on UQ, FACE-Q nose and VAS. The preoperative differences in outcome measure ratings disappeared postoperatively, except for the FACE-Q nostrils, which surprisingly showed better values in BDDQ-AS positive patients. Age and previous nasal trauma were statistically significant covariates associated with positive BDDQ-AS screening.

Due to the overwhelming decrease in positive BDDQ-AS outcome after surgery, a positive screening result on the BDDQ-AS should not be interpreted as a formal contra-indication for surgery. Collaboration with psychologists or psychiatrists remains crucial to diagnose BDD conclusively.

Introduction and aim

Body dysmorphic disorder (BDD) is a psychiatric disorder with intrusive thoughts about one or more perceived flaws in physical appearance and time-consuming, compulsive behaviour.¹ BDD is classified under obsessive–compulsive disorders in the DSM-5.² BDD patients are mostly preoccupied with 5 to 7 different body parts, with the nose being one of the three most frequently reported body parts of excessive concern.³ BDD symptoms reduce quality of life and can cause significant appearance-related disruption of everyday living.^{4,5}

The prevalence in the general population is estimated at 0.7 – 7 %.⁶ However, the prevalence is known to be higher in a clinical setting and especially in rhinoplasty candidates.^{4,7-14} According to a meta-analysis from Nabavizadeh et al., the pooled prevalence for BDD was 32.7 % in rhinoplasty candidates.⁶ Al Awadh et al. found a preoperative prevalence of BDD ranging from 22 to 52% in publications between 2016 and 2021.¹⁰ The wide range in prevalence rate in various studies is most likely due to differences in population but also in the interpretation and application of the diagnostic criteria for BDD.¹⁵ Gender ratio is reported as equal, although some studies have found a slight preponderance in women.¹⁶⁻¹⁸

BDD is a condition that represents a point of intersection between the surgical area and psychiatry.⁷ BDD is chronic but responds favourably to medical treatment.^{19, 20,21} The standard treatment for BDD involves the combination of antidepressants and cognitive behavioural therapy.²² Although still controversial, there is growing consensus that individuals suffering from BDD have no benefit

from dermatologic and surgical treatments, even though they are found to be used in about 50% or more of BDD patients.^{23,24} Not recognizing these high-risk patients may lead to unnecessary procedures with ethical and medicolegal consequences.²⁵

The gold standard BDD diagnostic tool is SCID-V, a structured clinical interview based on the diagnostic criteria for BDD as described in the DSM-5 (Table 1). This interview with 24 questions is time consuming and therefore impractical in a clinical aesthetic setting. It also requires a trained clinician or mental health professional able to recognize diverse mental health disorders.¹ It is used in a psychiatric environment and is not yet validated in a cosmetic surgery setting.²⁶ Consequently, various screening tools were developed with the purpose to screen patients more efficiently in daily practice for aesthetic practitioners without training or experience in mental health disorders. In a recent meta-analysis (2023) by Pereira et al. on assessment tools for BDD, 16 self-administered questionnaires were identified.²⁶ According to these authors, only five were considered as validated screening instruments in an aesthetic setting, namely BDD Questionnaire (BDDQ), BDDQ Dermatology Version (BDDQ-DV), Dysmorphic Concern Questionnaire (DCQ), Body Dysmorphic Disorder Questionnaire-Aesthetic Surgery (BDDQ-AS), and Cosmetic Procedure Screening Questionnaire (COPS). In the opinion of these authors, the validation process for both BDDQ-AS and COPS had inconsistencies, while there was a lack of consensus for the DCQ score cut-off value.²⁶

The Body Dysmorphic Disorder Questionnaire-Aesthetic Surgery (BDDQ-AS) can be used to identify patients with BDD, with a sensitivity of 100% and specificity of

90%.²⁷ This self-administered screening tool was validated in a rhinoplasty population by Lekakis et al. in 2016. It is a brief 7-item screening tool for BDD symptoms based on the criteria of BDD in the DSM-IV. The questionnaire comprises three “yes/no” questions and four questions with a 5-point Likert scale. As the outcome of the questionnaire is binary (positive or negative for BDD), it is not a severity-measure tool. To assess its concurrent validity, BDDQ-AS was compared to BDD-YBOCS severity measure tool, whereas the convergent validity was assessed by comparing the BDDQ-AS to the Sheehan Disability Scale and Derriford Appearance Scale-59.²⁷ Spataro et al. also conducted a prospective study to evaluate the convergent validity of BDDQ-AS and SCHNOS for identifying BDD preoperatively.²⁸ However, according to Pereira et al., the validation process of BDDQ-AS still has some inconsistencies as it was not performed against a validated diagnostic tool for BDD.²⁶

The purpose of the present study is to clarify the current concept of performing rhinoplasty in patients with possible body dysmorphic disorder, as measured with the BDDQ-AS. The primary goal is to explore sample characteristics associated with positive BDDQ-AS screening. The secondary goal is to investigate the predictive value of the BDDQ-AS on rhinoplasty outcome as measured by patient reported outcome measures (PROM). The associations between the BDDQ-AS and validated rhinoplasty PROMs add to the convergent validity of the BDDQ-AS. The third goal of this study is to examine the evolution of BDDQ-AS outcome after surgery.

Methods

This article is protected by copyright. All rights reserved.

The study is part of a prospective observational longitudinal outcome cohort study in a single private hospital center. Participants had to be rhinoplasty candidates who master the Dutch language. Other inclusion criteria included age over 18 and a new patient status. Those eligible and willing to take part signed an informed consent form. These patients were invited to complete the Utrecht questionnaire, NOSE scale, FACE-Q rhinoplasty module and the BDDQ-AS pre- and postoperatively as part of standard clinical care. It was made clear to the patients that the results of the preoperative questionnaires, including the BDDQ-AS, would be used for scientific purposes only and would not take part in the decision making to perform surgery. The participants provided data at four time points: at the preoperative consultation and 3, 6 and 12 months postoperatively.

Rhinoplasty PROMs

The NOSE scale was developed by Stewart et al. in 2004 as the first validated questionnaire for assessing subjective nasal obstruction.²⁹ The questionnaire contains 5 items evaluating the quality of life related to nasal obstruction. The questions are responded to as 0) not a problem, 1) very mild problem, 2) moderate problem, 3) fairly bad problem, 4) severe problem. The sum of the answers is multiplied, providing a score ranging from 0 (no nasal obstruction) to 100 (severe nasal obstruction).

The FACE-Q was developed by Klassen et al in 2010 measuring patient satisfaction in facial plastic and reconstructive surgery.³⁰ Two items of the FACE-Q instrument are used for the evaluation of rhinoplasty and constitute the FACE-

Q Rhinoplasty module: "Satisfaction of the nose" contains ten questions, and "Satisfaction of the nostrils" contains five questions that are scaled on a four-point Likert scale. Items in both scales are responded to as (1) very dissatisfied, (2) somewhat dissatisfied, (3) somewhat satisfied, and (4) very satisfied. The raw ordinal score is converted into equivalent linear interval data from 0 to 100, generated by a Rasch transformation, with higher scores indicating better outcomes.

The Utrecht questionnaire (UQ) was developed by Lohuis et al.³¹ in 2013 and focuses on the subjective perception of nasal appearance in aesthetic rhinoplasty. The UQ captures the answers to five questions and a visual analogue scale. The questions are responded to as 1) not at all, 2) a little, 3) moderate, 4) much or often, and 5) very much or often. The sum of the answers provides a score ranging between 0 and 25 with higher scores indicating worse outcomes. Two questions were designed as trick questions to help the surgeon screen for signs of body dysmorphic disorder. The visual analogue scale assessing self-satisfaction with nasal appearance ranges from 0 (very ugly) to 10 (very nice).

Statistical analysis

Data were analyzed with Statistical Package for the Social Sciences (SPSS) 28.0 for Windows (SPSS Inc., Chicago, IL, USA) and R Statistical Software (v 4.2.2; R Core Team 2022). Continuous variables were described as means and standard deviations and categorical variables as percentages. P-values less than .05 were considered significant. A simple logistic regression was performed to

examine whether a covariate had a significant predictive value on the preoperative BDDQ-AS. As covariates, age, gender, previous nasal trauma or surgery, ethnicity, smoking, and respiratory allergy were included. A logistic mixed model was applied to model the changes in the BDDQ-AS outcome over time and to analyze how each covariate predicted the BDDQ-AS outcome at different time points. To check for informative missingness, associations between missing data at each time point and the covariates were investigated using Fisher's exact test for categorical covariates and Mann-Whitney test for the continuous covariate age. Correlation coefficients (Spearman's rho) were calculated between BDDQ-AS and the PROMs employed. A mixed logistic model further investigated the correlation between rhinoplasty outcome (PROMS) and BDDQ-AS status.

Results

Sample characteristics and association with pre-operative BDDQ-AS outcome

From June 2020 to February 2022, 205 patients presenting for rhinoplasty were sequentially enrolled from the ENT outpatient department of GZA St. Vincentius Hospital in Antwerp, Belgium. 187 (91.2%) patients completed all the questionnaires (BDDQ-AS, FACE-Q, UQ and NOSE) preoperatively. The mean age was 30.3 years, with a range from 18 to 64 years old, and a higher percentage of females (70.4%) compared to males (29.6%). Twenty-two per cent of the included population were smokers. Twenty-seven per cent had a history of previous nasal surgery (either septoplasty and/or previous rhinoplasty) and 45.8% had experienced nasal trauma before the surgery. The group who screened positive on the BDDQ-AS had a significantly greater percentage of females and less frequently a history of nasal trauma. In addition, their age was significantly younger. Age, gender, and history of nasal trauma affected the odds of screening positive on the pre-operative BDDQ-AS, as shown in Table 2.

Predictive value of the BDDQ-AS on rhinoplasty outcome

The results of the pre- and postoperative patient-reported outcome measures, classified according to the preoperative BDDQ-AS outcome are shown in Table 3. The patients who screened positive preoperatively on the BDDQ-AS showed significantly worse scores for UQ, VAS and FACE-Q nose than those who screened negative. After surgery, regardless of their pre-operative BDDQ-AS status, VAS, FACE-Q nose and nostrils scores were significantly higher and NOSE and UQ scores were significantly lower for all study participants. These outcome measure differences rated preoperatively between both groups

disappeared postoperatively. The NOSE scores were neither pre- nor postoperatively significantly different in both groups. Interestingly, FACE-Q nostrils became postoperatively significant with higher scores in the BDDQ-AS positive group.

Correlations between BDDQ-AS and the rhinoplasty PROMs could be interpreted as very weak to moderate. UQ showed the strongest correlations at all time points, both before and after surgery. At the preoperative time point, Spearman's rank correlation was $r_s(183) = .513$, which was statistically significant ($p = <.001$). (Table 4)

Due to incomplete PROM data for certain individuals, which lacked observations at one or more time points, we investigated if there were signs of informative missingness. We tested the association between missing PROM values at any time point and the covariates, and between missing values at a given time point and the value of the outcome at the preceding time points. No significant associations were found indicating that the data were missing at random. A mixed logistic model was fitted with the PROMs as dependent variables, patient ID as random effect and pre-operative BDD outcome, time, and their interaction as fixed effects. This latter term tests whether the change in rhinoplasty outcome over time differs according to the BDDQ-AS outcome and is considered as robust for values missing at random.³² The evolution of rhinoplasty outcomes over time (with 95% confidence interval) according to the preoperative BDDQ-AS outcome is shown in Figure 1.

Evolution of BDDQ-AS outcome

As the BDDQ-AS questionnaires were filled out at baseline (pre-operatively) and post-operatively at 3, 6, and 12 months, Figure 2 shows the number of patients who were positively and negatively screened for BDDQ-AS at subsequent time points. The odds ratios (odds that BDDQ-AS screening is positive) using the preoperative time point as reference level (along with the upper and lower limit around the odds ratio) are significantly lower at the follow-up time points compared to the preoperative time point (Table 5). The raincloud plot in Figure 3 visualises the evolution of BDDQ-AS in patients. At 3 months postop, about 2% of the BDDQ-AS negative patients became positive, while from the BDDQ-AS positive patients, about 13 % remained positive. However, at 12 months postop, the conversion of BDDQ-AS negative into positive patients dropped to 1%. Inversely, about 4% of the initial BDDQ-AS positive patients remained positive. As previously described, age, gender, and previous nasal trauma were statistically significant covariates at the preoperative baseline. However, mixed logistic regression demonstrated that only age and previous nasal trauma were statistically significant in time (Table 6).

Discussion

Characteristics associated with positive BDDQ-AS screen.

This research contributes to the increasing body of literature that characterizes the prevalence and potential risk factors of a positive BDDQ-AS screen. In our population of rhinoplasty patients, the preoperative BDDQ-AS positivity rate was as high as 55.1%. Age, gender, and previous nasal trauma

were statistically significant covariates at the preoperative baseline indicating that a younger age, female gender, and an absent history of nasal trauma are associated with an increased likelihood of a positive BDDQ-AS screen. However, mixed logistic regression demonstrated that only age and previous nasal trauma were statistically significant in time. Despite the female preponderance in the preoperative BDDQ-AS group, gender was not significantly associated with a positive BDD screening postoperatively. Research has indicated that BDD occurs in both males and females but the clinical features of BDD may differ.¹ For BDD symptoms of the nose, no difference in gender was found. In line with our population, Wei et al. also found a female predominance of a positive BDDQ-AS screen preoperatively in certain age groups.

Younger age as a predictor for a positive BDDQ-AS screen in rhinoplasty patients is consistent with the study of Wei et al. and in agreement with previous studies reporting a link between younger age and positive BDD screens in facial plastic surgery patients.^{17, 33, 34} There are likely multiple factors that contribute to this link. The development of psychiatric conditions, such as BDD, can be influenced by low self-esteem.^{35,36} Self-esteem usually increases with age.³⁶ Bjornsson et al. examined the age of BDD's onset, and found that individuals who developed BDD early in life had more severe BDD symptoms and a higher risk for other psychiatric conditions including borderline personality disorder, anxiety disorders, suicidal attempts, and psychiatric hospitalization.³⁷ Wei et al. also found a positive interaction between younger age and psychiatric history on the risk of positive BDDQ-AS screening.¹⁶ Additionally, a decline in body image among adolescents and young adults may be a result of increased social media

influence and screen time.³⁸ The increasing trend of “Zoom” mirror gazing may highlight dissatisfaction with perceived flaws in appearance.³⁹

When it comes to nasal trauma, we suggest that patients with posttraumatic anomalies have a more realistic mindset compared to patients with predominantly aesthetic wishes. In the preoperative population studied by Wei et al., those who had aesthetic/cosmetic motivations, and those seeking revision rhinoplasty had higher rates of positive BDD screening.¹⁶ The latter was not confirmed in our cohort.

Predictive value of the BDDQ-AS on rhinoplasty outcome

Preoperatively, UQ, FACE-Q nose and VAS score were significantly worse in BDDQ-AS positive patients. These findings agree with what was expected and contributes to the convergent validity of the BDDQ-AS. However, postoperatively, BDDQ-AS positive patients did not differ significantly anymore from BDDQ-AS negative patients concerning the outcome of UQ, FACE-Q nose and VAS score. The NOSE scale measuring the functional outcome, was neither pre- nor postoperative significantly different. Surprisingly, in our population the FACE-Q nostrils demonstrated significantly higher scores postoperatively in the BDDQ-AS positive group.

This contrasts with the findings of Lekakis et al., where BDDQ-AS positive patients scored postoperatively significantly worse on the VAS and ROE. The initial assumption that the surgical outcome would be worse in BDDQ-AS positive patients must be questioned based on our results. Although we acknowledge the

inherent risk of bias, the inclusion criteria were not of such a nature that only patients with mild to moderate BDD would have been admitted for rhinoplasty. Assuming that only mild to moderate patients with BDD would have been operated in the present cohort and that this would be the explanation for the lack in outcome difference, it is expected that there would be no difference in the pre-operative phase either. In our cohort BDDQ-AS positive patients were less satisfied with their nose pre-operatively but had comparable surgical outcomes as negatively screened patients. Another explanation could be that the BDDQ-AS measures another construct which can be influenced with surgery.

The literature also shows conflicting results on rhinoplasty outcome in patients with possible BDD. There is a broad consensus that BDD should be a contraindication for aesthetic rhinoplasty, as a favorable outcome is unlikely. A prospective study in 2013, which determined the influence of preoperative BDD symptoms on patients' postoperative satisfaction and quality of life with the modified Yale-Brown Obsessive Compulsive Scale, concluded that patients with more severe BDD symptoms are significantly less satisfied after surgery in comparison with patients with low to moderate scores.⁴⁰ Some studies also found a negative influence of BDD on the patients' self-assessment regarding their nasal function.⁷ Contrarily, Rabaoli et al., reported considerable improvement after rhinoplasty irrespective of the presence or intensity of BDD symptoms even in severe cases, as measured with the Body Dysmorphic Disorder Examination (BDDE). In another study on female rhinoplasty patients with mild to moderate BDD, Felix et al. discovered with the aid of the same BDDE, a remission rate of 81% and a postoperative satisfaction of 90% after 1 year.⁴¹ These contradictory findings may be attributed to the use of different

screening or diagnostic tools and potential issues with the content validity of some of these tools.

Evolution of BDDQ-AS outcome after surgery

An interesting finding in our study is that the proportion of patients scoring positive on the BDDQ-AS decreased significantly after rhinoplasty. The initial hypothesis that the BDDQ-AS outcome remains unchanged regardless of surgical intervention, must therefore be rejected. The hypothesis that BDD can be partially cured with surgical intervention seems highly unlikely as it goes against the current beliefs of this disorder. Based on the positive correlation between BDDQ-AS and UQ, we assume screening tools might measure psychosocial well-being and self-esteem rather than BDD itself. UQ is indeed a validated and standardized questionnaire with emphasis on the psychosocial aspects of rhinoplasty.³¹ In a more general population of cosmetic patients, Von Soest et al.⁴² showed an improvement in self-esteem after surgery whereas the level of psychological problems did not change postoperatively. Moss and Harris evaluated the long-term effects of cosmetic surgery and concluded that surgical intervention can improve depression, self-esteem, and anxiety.⁴³ In addition, Sarwer et al. have shown that depression and anxiety improved following aesthetic surgery.⁴⁴

In conclusion, younger age, female gender, and absence of nasal trauma are patient characteristics associated with positive BDDQ-AS screen. BDDQ-AS

positive patients were less satisfied with their nose pre-operatively but had comparable surgical outcomes after rhinoplasty as negatively screened patients. In our population, BDDQ-AS outcome could be influenced by surgery and, there was a highly significant decrease in the odds of scoring positive on the BDDQ-AS after surgery.

This study adds to the existing literature on risk factors for a positive BDDQ-AS screen and the effect of the BDDQ-AS on rhinoplasty outcome. To the best of our knowledge this is the first study investigating the evolution over time of a BDD screening tool after surgery. Our study has certain limitations. The study was conducted in a single center for rhinoplasty, and the results may not be transferable to other settings. The clinical ENT setting made it impossible to use the gold standard BDD diagnostic tool, SCID-V, to assess concurrent validity. Further research on the evolution of other validated BDD screening tools after surgery would be useful to better understand the validity and interpretability of these screening tools.

Based on our findings, we suggest that a positive screening result on the BDDQ-AS should not be interpreted as a formal contra-indication for rhinoplasty. As described by Lekakis et al., the BDDQ-AS cannot diagnose BDD; it can only suggest possible BDD. At present, collaboration with psychologists or psychiatrists seems imperative to diagnose BDD conclusively. We hope this study provides further insight into the psychological complexity of rhinoplasty patients.

References

1. Phillips KA. *Broken Mirror: Understanding and Treating Body Dysmorphic Disorder*. Oxford University Press; 2005.
2. Association AP, ed. *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*. 5th ed. American Psychiatric Association; 2013.
3. Phillips KA, Menard W, Fay C, Weisberg R. Demographic characteristics, phenomenology, comorbidity, and family history in 200 individuals with body dysmorphic disorder. *Psychosomatics*. Jul-Aug 2005;46(4):317-25. doi:10.1176/appi.psy.46.4.317
4. Picavet VA, Prokopakis EP, Gabriels L, Jorissen M, Hellings PW. High prevalence of body dysmorphic disorder symptoms in patients seeking rhinoplasty. *Plast Reconstr Surg*. Aug 2011;128(2):509-517. doi:10.1097/PRS.0b013e31821b631f
5. Phillips KA. Quality of life for patients with body dysmorphic disorder. *J Nerv Ment Dis*. Mar 2000;188(3):170-5. doi:10.1097/00005053-200003000-00007
6. Nabavizadeh SS, Naseri R, Sadeghi E, Afshari A, Dehdari Ebrahimi N, Sadeghi A. Prevalence of body dysmorphic disorder in rhinoplasty candidates: A systematic review and meta-analysis. *Health Sci Rep*. Aug 2023;6(8):e1495. doi:10.1002/hsr2.1495
7. de Souza TSC, Patrial M, Meneguetti AFC, de Souza MSC, Meneguetti ME, Rossato VF. Body Dysmorphic Disorder in Rhinoplasty Candidates: Prevalence and Functional Correlations. *Aesthetic Plast Surg*. Apr 2021;45(2):641-648. doi:10.1007/s00266-020-01930-9
8. Fang A, Matheny NL, Wilhelm S. Body dysmorphic disorder. *Psychiatr Clin North Am*. Sep 2014;37(3):287-300. doi:10.1016/j.psc.2014.05.003
9. Bjornsson AS, Didie ER, Phillips KA. Body dysmorphic disorder. *Dialogues Clin Neurosci*. 2010;12(2):221-32. doi:10.31887/DCNS.2010.12.2/abjornsson

10. AlAwadh I, Bogari A, Azhar T, et al. Prevalence of Body Dysmorphic Disorder Among Rhinoplasty Candidates: A Systematic Review. *Ear Nose Throat J*. Nov 18 2021;1455613211056543. doi:10.1177/01455613211056543
11. Ramos TD, de Brito MJA, Suzuki VY, Sabino Neto M, Ferreira LM. High Prevalence of Body Dysmorphic Disorder and Moderate to Severe Appearance-Related Obsessive-Compulsive Symptoms Among Rhinoplasty Candidates. *Aesthetic Plast Surg*. Aug 2019;43(4):1000-1005. doi:10.1007/s00266-018-1300-1
12. Alavi M, Kalafi Y, Dehbozorgi GR, Javadpour A. Body dysmorphic disorder and other psychiatric morbidity in aesthetic rhinoplasty candidates. *J Plast Reconstr Aesthet Surg*. Jun 2011;64(6):738-41. doi:10.1016/j.bjps.2010.09.019
13. de Brito MJA, Nahas FX, Cordas TA, Tavares H, Ferreira LM. Body Dysmorphic Disorder in Patients Seeking Abdominoplasty, Rhinoplasty, and Rhytidectomy. *Plast Reconstr Surg*. Feb 2016;137(2):462-471. doi:10.1097/01.prs.0000475753.33215.8f
14. Vindigni V, Pavan C, Semenzin M, et al. The importance of recognizing body dysmorphic disorder in cosmetic surgery patients: do our patients need a preoperative psychiatric evaluation? *European Journal of Plastic Surgery*. 2002/12/01 2002;25(6):305-308. doi:10.1007/s00238-002-0408-2
15. Phillips KA. The Presentation of Body Dysmorphic Disorder in Medical Settings. *Prim psychiatry*. Jul 2006;13(7):51-59.
16. Wei EX, Kimura KS, Abdelhamid AS, et al. Prevalence and Characteristics Associated with Positive Body Dysmorphic Disorder Screening Among Patients Presenting for Cosmetic Facial Plastic Surgery. *Facial Plast Surg Aesthet Med*. Nov 7 2023;doi:10.1089/fpsam.2023.0212

17. Higgins S, Wysong A. Cosmetic Surgery and Body Dysmorphic Disorder - An Update. *Int J Womens Dermatol*. Mar 2018;4(1):43-48. doi:10.1016/j.ijwd.2017.09.007
18. Phillips KA, Menard W, Fay C. Gender similarities and differences in 200 individuals with body dysmorphic disorder. *Compr Psychiatry*. Mar-Apr 2006;47(2):77-87. doi:10.1016/j.comppsy.2005.07.002
19. Phillips KA. *Body Dysmorphic Disorder: Advances in Research and Clinical Practice*. . Oxford University Press; 2017.
20. Greenberg D, R DS. Ethics and the psychiatry journal editor: responsibilities and dilemmas. *Isr J Psychiatry Relat Sci*. 2014;51(3):204-10.
21. Castle D, Beilharz F, Phillips KA, et al. Body dysmorphic disorder: a treatment synthesis and consensus on behalf of the International College of Obsessive-Compulsive Spectrum Disorders and the Obsessive Compulsive and Related Disorders Network of the European College of Neuropsychopharmacology. *Int Clin Psychopharmacol*. Mar 1 2021;36(2):61-75. doi:10.1097/YIC.0000000000000342
22. Sarangi A, Yadav S, Gude J, Amor W. Video Conferencing Dysmorphia: Assessment of Pandemic-Related Body Dysmorphia and Implications for the Post-lockdown Era. *Cureus*. Mar 2022;14(3):e22965. doi:10.7759/cureus.22965
23. Phillips KA, Grant J, Siniscalchi J, Albertini RS. Surgical and nonpsychiatric medical treatment of patients with body dysmorphic disorder. *Psychosomatics*. Nov-Dec 2001;42(6):504-10. doi:10.1176/appi.psy.42.6.504
24. Veale D, Boocock A, Gournay K, et al. Body dysmorphic disorder. A survey of fifty cases. *Br J Psychiatry*. Aug 1996;169(2):196-201. doi:10.1192/bjp.169.2.196

25. Khanna A, Sharma MK. Selfie use: The implications for psychopathology expression of body dysmorphic disorder. *Ind Psychiatry J*. Jan-Jun 2017;26(1):106-109. doi:10.4103/ipj.ipj_58_17
26. Pereira IN, Chattopadhyay R, Fitzpatrick S, Nguyen S, Hassan H. Evidence-based review: Screening body dysmorphic disorder in aesthetic clinical settings. *J Cosmet Dermatol*. Feb 27 2023;doi:10.1111/jocd.15685
27. Lekakis G, Picavet VA, Gabriels L, Grietens J, Hellings PW. Body Dysmorphic Disorder in aesthetic rhinoplasty: Validating a new screening tool. *Laryngoscope*. Aug 2016;126(8):1739-45. doi:10.1002/lary.25963
28. Spataro EA, Kandathil CK, Saltychev M, Olds CE, Most SP. Correlation of the Standardized Cosmesis and Health Nasal Outcomes Survey With Psychiatric Screening Tools. *Aesthet Surg J*. Nov 19 2020;40(12):1373-1380. doi:10.1093/asj/sjaa004
29. Stewart MG, Witsell DL, Smith TL, Weaver EM, Yueh B, Hannley MT. Development and validation of the Nasal Obstruction Symptom Evaluation (NOSE) scale. *Otolaryngol Head Neck Surg*. Feb 2004;130(2):157-63. doi:10.1016/j.otohns.2003.09.016
30. Klassen AF, Cano SJ, East CA, et al. Development and Psychometric Evaluation of the FACE-Q Scales for Patients Undergoing Rhinoplasty. *JAMA Facial Plast Surg*. Jan-Feb 2016;18(1):27-35. doi:10.1001/jamafacial.2015.1445
31. Lohuis P, Hakim S, Duivesteijn W, Knobbe A, Tasman AJ. Benefits of a short, practical questionnaire to measure subjective perception of nasal appearance after aesthetic rhinoplasty. *Plast Reconstr Surg*. Dec 2013;132(6):913e-923e. doi:10.1097/01.prs.0000434403.83692.95
32. Little RJ, Schluchter MD. Maximum likelihood estimation for mixed continuous and categorical data with missing values. *Biometrika*. 1985;72(3):497-512.

33. Dey JK, Ishii M, Phillis M, Byrne PJ, Boahene KD, Ishii LE. Body dysmorphic disorder in a facial plastic and reconstructive surgery clinic: measuring prevalence, assessing comorbidities, and validating a feasible screening instrument. *JAMA Facial Plast Surg*. Mar-Apr 2015;17(2):137-43. doi:10.1001/jamafacial.2014.1492
34. Joseph AW, Ishii L, Joseph SS, et al. Prevalence of Body Dysmorphic Disorder and Surgeon Diagnostic Accuracy in Facial Plastic and Oculoplastic Surgery Clinics. *JAMA Facial Plast Surg*. Jul 1 2017;19(4):269-274. doi:10.1001/jamafacial.2016.1535
35. Kuck N, Cafitz L, Burkner PC, Hoppen L, Wilhelm S, Buhlmann U. Body dysmorphic disorder and self-esteem: a meta-analysis. *BMC Psychiatry*. Jun 15 2021;21(1):310. doi:10.1186/s12888-021-03185-3
36. Orth U, Erol RY, Luciano EC. Development of self-esteem from age 4 to 94 years: A meta-analysis of longitudinal studies. *Psychol Bull*. Oct 2018;144(10):1045-1080. doi:10.1037/bul0000161
37. Bjornsson AS, Didie ER, Grant JE, Menard W, Stalker E, Phillips KA. Age at onset and clinical correlates in body dysmorphic disorder. *Compr Psychiatry*. Oct 2013;54(7):893-903. doi:10.1016/j.comppsy.2013.03.019
38. Watson C, Ban S. Body dysmorphic disorder in children and young people. *Br J Nurs*. Feb 11 2021;30(3):160-164. doi:10.12968/bjon.2021.30.3.160
39. Daar DA, Chiodo MV, Rohrich RJ. The Zoom View: How Does Video Conferencing Affect What Our Patients See in Themselves, and How Can We Do Right by Them? *Plast Reconstr Surg*. Jul 1 2021;148(1):172e-174e. doi:10.1097/prs.00000000000008031
40. Picavet VA, Gabriels L, Grietens J, Jorissen M, Prokopakis EP, Hellings PW. Preoperative symptoms of body dysmorphic disorder determine postoperative

satisfaction and quality of life in aesthetic rhinoplasty. *Plast Reconstr Surg.* Apr 2013;131(4):861-868. doi:10.1097/PRS.0b013e3182818f02

41. Felix GA, de Brito MJ, Nahas FX, et al. Patients with mild to moderate body dysmorphic disorder may benefit from rhinoplasty. *J Plast Reconstr Aesthet Surg.* May 2014;67(5):646-54. doi:10.1016/j.bjps.2014.01.002
42. von Soest T, Kvalem IL, Roald HE, Skolleborg KC. The effects of cosmetic surgery on body image, self-esteem, and psychological problems. *J Plast Reconstr Aesthet Surg.* Oct 2009;62(10):1238-44. doi:10.1016/j.bjps.2007.12.093
43. Moss TP, Harris DL. Psychological change after aesthetic plastic surgery: a prospective controlled outcome study. *Psychol Health Med.* Oct 2009;14(5):567-72. doi:10.1080/13548500903112374
44. Sarwer DB, Gibbons LM, Magee L, et al. A prospective, multi-site investigation of patient satisfaction and psychosocial status following cosmetic surgery. *Aesthet Surg J.* May-Jun 2005;25(3):263-9. doi:10.1016/j.asj.2005.03.009

Figure 1 Evolution of the PROMS at the different time points depending on their pre-operative BDDQ-AS screening.

Figure 2. Evolution of BDDQ-AS outcome: the number of BDDQ-AS positive (1) and BDDQ-AS negative (0) patients across the 4 different time points.

Figure 3. Raincloud plot demonstrating the progress of BDDQ-AS positive (1) and negative (0) patients in time.

Table 1 DSM-5 criteria for Body dysmorphic disorder. ¹

DSM-5: Body dysmorphic disorder

Disorder Class: Obsessive-Compulsive and Related Disorders

A. Preoccupation with one or more perceived defects or flaws in physical appearance that are not observable or appear slight to others.

B. At some point during the course of the disorder, the individual has performed repetitive behaviours (e.g., mirror checking, excessive grooming, skin picking, reassurance seeking) or mental acts (e.g., comparing his or her appearance with that of others) in response to the appearance concerns.

C. The preoccupation causes clinically significant distress or impairment in social, occupational or other areas of functioning.

D. The appearance preoccupation is not better explained by concerns with body fat or weight in an individual whose symptoms meet diagnostic criteria for an eating disorder.

Specify if:

- With muscle dysmorphia: The individual is preoccupied with the idea that his or her body build is too small or insufficiently muscular. This specifier is used even if the individual is preoccupied with other body areas, which is often the case.

Specify if:

- Indicate degree of insight regarding body dysmorphic disorder beliefs (e.g., “I look ugly” or “I look deformed”).
 - With good or fair insight: The individual recognizes that the body dysmorphic disorder beliefs are definitely or probably not true or that they may or may not be true.
 - With poor insight: The individual thinks that the body dysmorphic beliefs are probably true.
 - With absent insight/delusional beliefs: The individual is completely convinced that the body dysmorphic beliefs are true.

Table 2. Simple logistic regression on covariates at preoperative baseline. The odds ratios (OR) are given along with the 95% confidence interval using the preoperative time point as reference level (odds that BDDQ-AS=1). Significant p-values are set in bold.

	OR	se(OR)	lowlim	uplim	P-value

Age	0.96551 7	1.01447 5	0.93870 1	0.9931 5	0.014614
Ethnicity	0.85373 1	1.36713 4	0.46252 1	1.57583 5	0.613072
Gender	0.45238 1	1.41011 1	0.23065 8	0.88723 9	0.020992
Respiratory allergies	0.56352 4	1.35064 4	0.31264 6	1.01571 6	0.056376
Smoking	0.67921 5	1.41334 1	0.34476 5	1.33810 9	0.26352
History of nasal surgery	0.67663 8	1.38780 2	0.35595 4	1.28623 4	0.233292
History of nasal trauma	0.35357 1	1.35701 4	0.19436 2	0.64319 4	0.00066

Table 3. Pre- and postoperative UQ, VAS, FACE-Q and NOSE scores according to preoperative BDDQ-AS status. Significant p-values are set in bold.

Time point	Questionnaire	BDDQ-AS -		BDDQ-AS +		P-value ¹
		n	mean \pm SD	n	mean \pm SD	
Preoperative	UQ	83	12.325 \pm 4.47	102	17.667 \pm 4.56	< .001

	VAS	82	4.146±1.91	100	2.910±1.70	< .001
	NOSE	84	63.512±27.44	101	59.683±28.20	0.353
	FACE-Q nose	84	44.440±12.75	103	35.456±10.56	< .001
	FACE-Q nostrils	84	48.940±24.95	103	49.427±25.21	0.895
3 months	UQ	72	7.569±3.39	97	8.330±4.33	0.218
	VAS	72	7.708±1.46	97	8.103±1.23	0.058
	NOSE	74	24.318±24.05	97	17.357±21.14	0.826
	FACE-Q nose	74	70.027±16.04	98	71.714±15.44	0.486
	FACE-Q nostrils	74	67.703±22.974	98	77.765±22.07	< .001
6 months	UQ	66	7.212±3.33	70	7.771±4.09	0.385
	VAS	65	7.985±1.32	71	8.183±1.56	0.427
	NOSE	66	26.364±25.29	70	18.22±20.90	0.075
	FACE-Q nose	68	72.618±16.94	72	73.403±17.61	0.789
	FACE-Q nostrils	68	70.588±21.81	72	78.431±21.74	0.035
12 months	UQ	47	7.298±3.73	49	7.163±3.35	0.853
	VAS	48	7.896±1.24	49	8.204±1.46	0.265
	NOSE	49	24.184±26.65	49	16.939±22.05	0.137
	FACE-Q nose	48	69.958±17.80	51	75.020±17.64	0.159
	FACE-Q nostrils	48	70.396±21.84	51	81.039±20.45	0.014

¹Independent sample Student t-test.

Table 4. Convergent validity between BDDQ-AS and rhinoplasty PROMs at different time points (Spearman's rank correlation ρ). Significant p-values are set in bold.

		UQ	VAS	NOSE	FACE-Q NOSE	FACE-Q NOSTRILS
BDDQ-AS	n	185	182	185	187	187
Preoperative	Spearman's ρ	0.513	-0.325	-0.081	-0.411	0.017
	p-value	< .001	< .001	0.272	< .001	0.821

BDD Q-AS 3 Months	n	158	158	158	159	159
	Spearman's ρ	0.363	-0.221	0.086	-0.241	-0.151
	p-value	< .001	0.005	0.284	0.002	0.057
BDD Q-AS 6 Months	n	135	135	135	136	136
	Spearman's ρ	0.423	-0.173	-0.035	-0.226	-0.184
	p-value	< .001	0.045	0.684	0.008	0.032
BDDA-AS 12 Months	n	93	95	95	94	94
	Spearman's ρ	0.296	-0.173	0.045	-0.207	-0.228
	p-value	0.004	0.094	0.663	0.045	0.027

Table 5. Prediction of BDDQ-AS status in relation to different time points. The odds ratios (OR) are given along with the 95% confidence interval using the preoperative time point as reference level (odds that BDDQ-AS=1). Significant p-values are set in bold.

	BDDQ- AS=1	OR	SE (OR)	Lower limit	Upper limit	P value
Time 3 months	9.4% (N = 159)	0.024	1.836	0.007	0.077	<.001
Time 6 months	8.8% (N=137)	0.024	1.845	0.007	0.078	<.001
Time 12 months	5,2% (N= 96)	0.019	2.216	0.004	0.090	<.001

Table 6. Effect of covariates on BDDQ-AS status. Logistic mixed model (including time) with one covariate at a time (odds that BDDQ-AS=1). The odds ratios (OR) are given along with the 95% confidence interval. Significant p-values

are set in bold.

	OR	SE (OR)	Lower limit	Upper limit	P value
Age	0.94750 8	1.022209	0.90758	0.989191	0.014098
Ethnicity	1.11446 9	1.572619	0.458866	2.706761	0.81081
Gender	0.39066 7	1.738363	0.13217	1.154734	0.089167
Allergy	0.64881 1	1.574725	0.266439	1.579936	0.34073
Smoking	0.90989 5	1.657185	0.338084	2.44883	0.85171
Previous nasal surgery	0.52626 2	1.624429	0.203343	1.361995	0.185771
Nasal trauma	0.28380 6	1.657957	0.105356	0.764514	0.012735





