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Body Dysmorphic Disorder in Rhinoplasty Candidates: Prevalence and Functional Correlations

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Abstract

Background Rhinoplasty is one of the most commonly performed aesthetic/functional procedures worldwide. Among those who seek rhinoplasty are those whose aesthetic defect is interpreted by themselves disproportionately, leading to significant suffering. These are given the diagnosis of body dysmorphic disorder (BDD). They commonly have high expectations regarding the surgical outcome and are often not satisfied postoperatively. The present study aimed to correlate BDD with the patient's self-assessment of nasal function, analysing whether BDD would have any influence on it. In addition, we verified the prevalence of the disorder in our population.

Methods Cross-sectional, comparative and analytical study. Eighty-eight patients participated in the trial, 57 of them being candidates for rhinoplasty, rhinoplasty group (RG), and 31 from a random population, control group (CG). Through self-assessment, the BDSS, The Utrecht, SNOT-22 and NOSE questionnaires were applied. Patients with BDSS score ≥ 6 were considered as positive for BDD. Comparisons were made between the groups and among the candidates for rhinoplasty with positive or negative BDD.

Results The prevalence of the disorder was 35.1% in the RG and 3.2% in the CG. Significantly, higher NOSE and SNOT-22 scores, reflecting worse nasal function, were obtained by the RG, especially in those with positive screening for BDD, when compared to those with negative screening ($p < 0.05$).

Conclusions BDD affects about one-third of the rhinoplasty candidate population. Their presence seems to exert a negative influence on the patients' self-assessment regarding their nasal function.

Level of Evidence III This journal requires that authors assign a level of evidence to each article. For a full description of these evidence-based medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Body dysmorphic disorder · Rhinoplasty · Nasal obstruction

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Introduction

Facial aesthetics, along with other bodily characteristics that make up certain Western beauty standards, have a marked cultural value [1, 2]. It is believed that the beauty of the face is achieved when its components coexist harmoniously. Among them, the nose ends up showing a certain notoriety due to its central and prominent position, showing itself to be a frequent target of aesthetic dissatisfactions [1, 2]. In addition to being a key element in the harmony of face, the nose also has an important respiratory function, and changes in the passage of air often lead to nasal obstruction, with a relevant impact on the quality of life [3]. Due to the above, rhinoplasty has become one of the most performed aesthetic/functional surgical

procedures across the world [4]. The population that predominantly seeks this type of intervention is composed of adults from the second to the fourth decade of life, mostly female, who look for the correction of certain defects in the nasal appearance that cause dissatisfaction [1, 2], in addition to respiratory improvement [3, 5].

The growth in the number of cosmetic procedures performed worldwide has raised awareness on the existence of body image disorders [5, 6]. First described in 1886, body dysmorphic disorder (BDD) became part of the diagnostic and statistical manual of mental disorders (DSM) only in 1987 [7, 8], remaining until the current edition [9]. Such disorder is characterised by excessive concern with body image due to a defect in physical appearance that may be real, but interpreted disproportionately [10], or even non-existent, but imagined by the patient. This can lead to suffering and/or significant impairment of psychosocial functioning, interfering in interpersonal relationships, such as family and work [1, 7]. Among the bodily defects perceived by these patients, the most common are those of the nose, skin and hair [1, 7], which leads up to 76% of them to look for aesthetic procedures [7]. The literature is still divergent as to the actual prevalence of BDD. Studies point to a prevalence of around 2% in the general population [1, 7], while in the candidates for rhinoplasty it can reach 32–48% [1, 2, 11, 12]. Due to body image disorder, the patient generally has a high expectation for post-operative results, both aesthetic [13] and functional [11], which are often not achieved [13]. Despite this, there is still no standardised approach or guidance for identifying patients with BDD in an aesthetic surgery environment [1], although some tools have been developed and validated in recent years for this purpose [2, 11–13].

The present study aims to correlate body dysmorphic disorder with the patient's self-assessment of nasal function, analysing whether the body image disorder would have any positive or negative influence on it. Correlations between BDD and functional nose complaints are still poorly explored in the literature and have not been well defined thus far. In addition, we evaluated the prevalence of BDD in patients, who were candidates for aesthetic/functional rhinoplasty at a Brazilian otolaryngology centre.

Materials and Methods

Study Design and Ethical Considerations

The study was presented as cross-sectional, comparative and analytical. It was duly approved by the local ethics and research committee (3.509.107).

Patient Recruitment and Data Collection

The study was conducted between January 2019 and November 2019. Two study groups were formed from a cohort of patients over 18 years old seeking care at a Brazilian otolaryngology centre, who agreed to participate in the study. The first group, rhinoplasty group (RG), was composed of patients with a desire for functional/aesthetics nasal surgery. The second group, the control group (CG), in the other hand, was composed of patients who consulted for reasons other than the desire for rhinoplasty.

Once recruited, patients filled out the questionnaire prepared by the researchers for the present study, from which the data were collected. Patients who claimed problems with filling out the questionnaire or who filled it incompletely were excluded.

After completing the questionnaire, patients in the RG were divided into two other subgroups. The criteria used for the separation was positive screening for BDD, positive screening subgroup (PSS), or negative screening for BDD, negative screening subgroup (NSS), according to the score obtained from the body dysmorphic symptoms scale (BDSS) (Fig. 1). The BDSS score was calculated based on the questionnaire designed for the study, as shown in sequence.

Composition of the Questionnaire

The questionnaire prepared by the authors of this study was composed of three fractions:

First part consisted of sociodemographic data of the patients, such as sex, age, marital status and education degree.

The second portion was intended to assess the patient's self-perception regarding his own body image. This part comprised the body dysmorphic symptoms scale questionnaire, a screening test for BDD consisting of 10 "yes" or "no" items, with the patient being considered positive when scoring six or more "yes" answers (BDSS $\geq$ 6). The visual analogue scale of the The Utrecht questionnaire, in which the patient graduates his nose, in terms of aesthetics, between 0 and 10, also integrated this part.

The third part was intended to assess patients' nasal function. This part included the sino-nasal outcome test questionnaire (SNOT-22), composed of 22 questions that ask about specific sino-nasal disorders and general health; and the nose obstruction symptom evaluation (NOSE) test, composed of five questions in order to assess nasal obstruction. In both tests, the higher the score obtained, the worse the patient's nasal function.

All self-applicable versions of the questionnaires used during the study were initially developed in English, with subsequent validation in Portuguese [9, 14–16].

Fig. 1 Flow chart showing the division of patients into groups and subgroups. Body dysmorphic symptoms scale (BDSS)
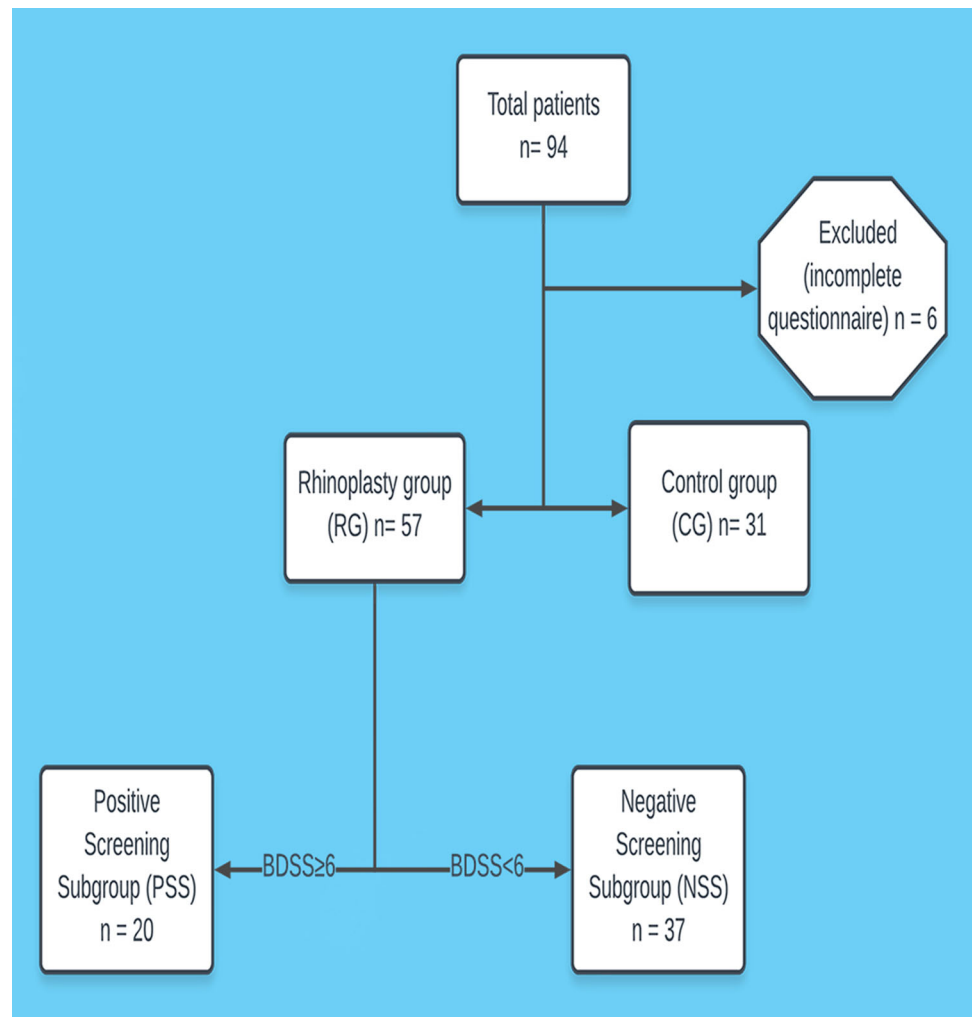
Statistical Methods

The data obtained were then tabulated, and the analyses were performed using the R software for statistical computing, in version 3.6.1. The level of significance was set at 5% ($p < 0.05$). To verify the normality of the variables, the Shapiro–Wilk test was used. As the hypothesis of normality was rejected for all questionnaires by the Shapiro–Wilk test, it was decided to use the median alongside the interquartile range (IQR) values to represent quantitative variables, and nonparametric tests for their comparisons. For comparisons of quantitative variables between groups and subgroups, the Mann–Whitney test was used, and for comparisons of qualitative variables between groups and subgroups, Fisher's exact test was used. The calculated odds ratios were estimated using the conditional maximum likelihood method. Correlations between quantitative variables correspond to Spearman's correlation coefficient.

Results

Study Sample

A total of 94 patients participated in the study. Six of them were excluded for not completing the proposed questionnaires, leaving 88 patients who effectively had their data analysed and were included in the study. Of these, 57 belonged to RG and 31 to CG (Table 1; Fig. 1).

Comparisons Between Groups

There was no significant difference between groups in terms of age, with a median (IQR) of 27 (20–39) years in the RG and 31 (25–49.75) years in the CG; as well as gender, with female predominance in both; and marital status, despite the higher prevalence of singles in the RG (63.2%) compared to the CG (48.4%). The difference between the proportions of education degree for the two groups was significant. In the RG, the highest proportion

Table 1 Comparison between groups

Variable	No. of patients	RG n = 57	CG n = 31	p Value
Age	88	27 (20–39)[a]	31 (25–49.75)[a]	0.11
Gender				
Female	60	39 (68.4%)	21 (67.7%)	1
Male	27	18 (31.6%)	9 (29%)	
Education degree				
Incomplete PE	12	8 (14%)	4 (12.9%)	0.002
Complete PE	3	1 (1.8%)	2 (6.5%)	
Incomplete SE	13	6 (10.5%)	7 (22.6%)	
Complete SE	26	24 (42.1%)	2 (6.5%)	
Incomplete TE	18	12 (21.1%)	6 (19.4%)	
Complete TE	15	6 (10.5%)	9 (29%)	
Marital status				
Married	18	9 (15.8%)	9 (29%)	0.54
Divorced	5	3 (5.3%)	2 (6.5%)	
Stable relationship	12	8 (14%)	4 (12.9%)	
Single	51	36 (63.2%)	15 (48.4%)	
Others	2	1 (1.8%)	1 (3.2%)	
BDSS score	88	5 (3–6)[a]	1 (0–2)[a]	< 0.001
BDSS ≥ 6	21	20 (35–1%)	1 (3.2%)	< 0.001
Visual analogue scale	88	3 (1–5)[a]	7 (5.25–8.75)[a]	< 0.001
SNOT-22	88	38 (27–63)[a]	25.5 (14–37.5)[a]	0.003
NOSE	88	65 (35–75)[a]	27.5 (15–50)[a]	< 0.001

Abbreviations: *RG* rhinoplasty group, *CG* control group, *PE* primary education, *SE* secondary education and *TE* tertiary education

[a]Median (interquartile range)

was that of patients with completed secondary education degree (42%), while for the CG this category corresponded to only 6.5%. In the latter, the highest prevalence was in patients, who reported having completed tertiary education degree (29%) (Table 1).

The scores of the visual analogue scale were different between groups. In the RG the score was significantly lower, with a median (IQR) of 3 (1–5), while in the CG the median (IQR) score was 7 (5.25–8.75) (Table 1).

As for the functional questionnaires (SNOT 22 and NOSE), there was a statistically significant difference in the scores when comparing both study groups, with the RG presenting the highest scores for both SNOT-22 and NOSE (Table 1).

Comparisons of BDSS Between Groups

The score on the BDSS scale had a significant difference between the groups, being higher in the RG, with a median (IQR) of 5 (3–6) versus median (IQR) of 1 (0–2) in the CG ($p < 0.001$). The proportion of patients with positive screening for BDD (BDSS score ≥ 6) was also different

between groups, with the prevalence being significantly higher in the RG (35.1%) compared to the CG (3.2%) ($p < 0.001$) (Table 1). The odds ratio for the presence of positive screening for BDD was estimated at 15.32 (95% CI 2.2–669.5).

Comparisons Between Subgroups

There was no significant difference between subgroups in age, with medians (IQR) of 28.5 (21.5–34.25) years in the PSS and 27 (20–41) years in the NSS, gender (predominantly female in both), education, marital status and main reason for seeking surgery. On the other hand, the score of the SNOT-22 questionnaire was different between them, being significantly higher in PSS, with a median (IQR) of 71 (46.5–85.25), against 34 (27–47) in NSS ($p < 0.001$), a fact that could also be perceived in a similar way in the NOSE questionnaire, with significantly higher values in PSS, with a median (IQR) score of 72.5 (63.75–91.25) against median (IQR) score of 50 (35–70) in NSS ($p = 0.02$) (Table 2; Fig. 2).

Table 2 Comparisons between subgroups

Variable	No. of patients	PSS n = 20	NSS n = 37	p Value
Age	57	28.5 (21.5–34.25)[a]	27 (20–41)[a]	0.65
Gender				
Female	39	15 (75%)	24 (64.9%)	0.55
Male	18	5 (25%)	13 (35.1%)	
Education degree				
Incomplete PE	8	2 (10%)	6 (16.2%)	0.27
Complete PE	1	1 (5%)	0	
Incomplete SE	6	1 (5%)	5 (13.5%)	
Complete SE	24	8 (40%)	16 (43.2%)	
Incomplete TE	12	7 (35%)	5 (13.5%)	
Complete TE	6	1 (5%)	5 (13.5%)	
Marital status				
Married	9	3 (15%)	6 (16.2%)	0.2
Divorced	3	2 (10%)	1 (2.7%)	
Stable relationship	8	5 (25%)	3 (8.1%)	
Single	36	10 (50%)	26 (70.3%)	
Other	1	0	1 (2.7%)	
SNOT-22	57	71 (46.5–85.25)[a]	34 (27–47)[a]	< 0.001
NOSE	57	72.5 (63.75–91.25)[a]	50 (35–70)[a]	0.02

Abbreviations: *PSS* positive screening subgroup, *NSS* negative screening subgroup, *PE* primary education, *SE* secondary education and *TE* tertiary education
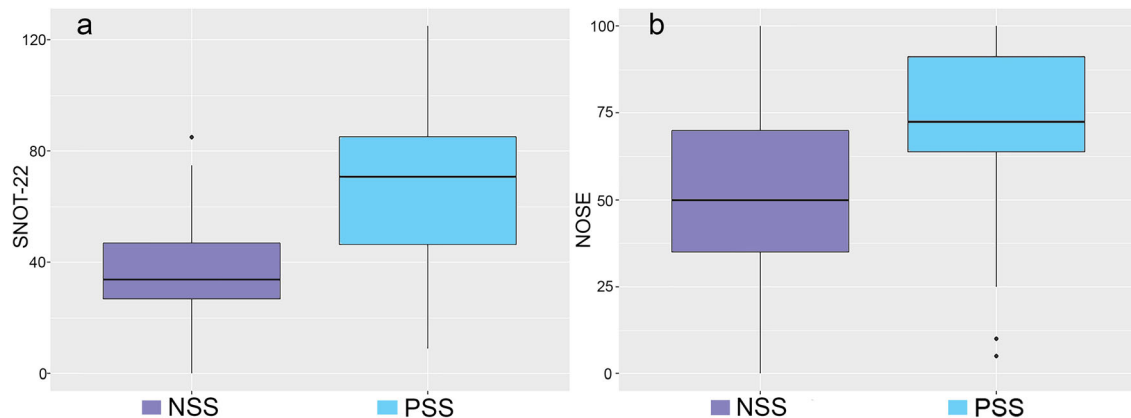
[a]Median (interquartile range)

Fig. 2 Box plot graphs showing the scores of the SNOT-22 (**a**) and NOSE (**b**) questionnaires between the subgroups. The purple (negative screening subgroup—NSS) and blue (positive screening subgroup—PSS) bars are the 25th to 75th quartile, with the horizontal black lines indicating the median. The error bars represent the remainder of the range of patients who were outside of the 25th to 75th percentile. The black dots represent outliers

Correlations with the Visual Analogue Scale

When RG patients alone were analysed, significant correlations were found between the scores of the visual analogue scale and the scores of the BDSS ($p < 0.001$) and SNOT-22 questionnaires ($p = 0.004$), which were negative (inversely proportional). This fact could also be verified, when the visual analogue scale was compared to the NOSE questionnaire, but without the same significance (Table 3).

Table 3 Correlations between the visual analogue scale and BDSS; SNOT-22; and NOSE questionnaires

Questionnaire	Estimated correlation	p Value
BDSS	− 0.51	< 0.001
SNOT 22	− 0.37	0.004
NOSE	− 0.2	0.14

Abbreviations: *BDSS* body dysmorphic symptoms scale

Discussion

BDD is a condition that represents a point of intersection between the surgical area and psychiatry [2, 17]. It was initially described as "Dysmorphophobia," in 1886 [8]. Currently the diagnosis is listed by the DSM-V as body dysmorphic disorder [2, 6].

The prevalence of the disorder, both in the general population and in that of cosmetic surgery, is still not a consensus in the literature, due to the different methods used for its diagnosis, often based on screening tools [1, 2, 11–13]. One of the objectives of the present study was to verify this prevalence in our population. It is noteworthy the fact that the two groups showed similar composition both in terms of gender, age and marital status. It was decided to use the BDSS questionnaire in order to identify patients affected by BDD, as this is a simple tool, self-applicable and validated in the Portuguese language. It consists of 10 "yes' or "no" questions, read and answered by the patient without assistance. Upon obtaining six or more "yes' answers (BDSS ≥ 6), the patient presents positive screening for BDD, with a sensitivity of 100% and specificity of 86% [2]. Thus, in our study, a prevalence of the disorder of 35.1% was found among RG patients, whereas the prevalence among individuals in the CG was 3.2%. Such data were consistent with those reported in previously published trials, which show a significantly higher prevalence of the disorder in patients who are candidates for cosmetic surgery, when compared to the general population [1, 2, 7, 12]. The prevalence of BDD found in RG was, in fact, very close to that found by Bender et al. [18] (33.9%) in a study that assessed the prevalence of BDD among candidates for functional rhinoplasty. The median age of patients in our study with positive screening for BDD was 28.5, consistent with the literature, which points to a majority of young adults, between the second and third decade of life [3, 9, 11]. As for gender, the literature is still unclear. Some studies point to a similar prevalence of the disorder between males and females [2], while others point to females as the most frequently affected [7]. The present study showed a predominance of females (75%) over males (25%) in the PSS,

but also in the NSS (64.9% of females against 35.1% of males), with no significant difference in the distribution gender between subgroups. We believe that part of this was due to the predominantly female audience that sought rhinoplasty surgery in our otolaryngology service during the trial period, since of the 57 patients in the RG, 68.4% were females.

The prevalence data presented, aligned with those found in the literature, reinforce the great importance of the identification of patients possibly affected by BDD by the healthcare professionals who surround them, with emphasis on those who perform cosmetic procedures. In our study, there was a 15.32 (95% CI 2.2–669.5) times greater chance of a patient who is a candidate for cosmetic surgery to present BDD, when compared to non-candidates. Despite this, few plastic surgeons routinely use tools with the objective of identifying patients at risk for BDD, even though many of them have been validated and have shown good accuracy [7]. It is worth mentioning that our otorhinolaryngology centre also did not use, in the usual way, mechanisms to identify the disorder until the conclusion of this study, and the application of the BDSS questionnaire became routine afterwards, being part of the preoperative evaluation of candidates for cosmetic surgery. Although we see the surgeon's experience as an important point in recognising potential BDD patients, we also consider validated questionnaires for this purpose to be a valuable auxiliary tool for all plastic surgeons, especially for those less experienced.

Dysmorphic patients often tend to look for cosmetic surgeries, but after their performance, many end up not being completely satisfied with the result [7, 8, 12, 13]. Such dissatisfaction can lead the patient to seek legal measures against the surgeon, or even lead to physical violence [7, 8, 12, 19].

Among the plastic surgery most sought after by these patients [4], rhinoplasty consists of a procedure that has as one of its main objectives the improvement of nasal aesthetics [16]. The prominent characteristics of the nose on the face make it a frequent target of discontent, which is one of the reasons that lead the patient to seek the facial plastic surgeon [1, 2]. In the present study, the difference in beauty attributed by patients to their own nose was significant when comparing the RG with the CG Such graduation was performed by them on The Utrecht questionnaire's visual analogue scale [16]. In it, the higher the score given by the patient, the more beautiful the nose would be, and vice versa [16, 20].

Another basic objective of rhinoplasty is to improve nasal function. The correction of nasal septum tortuosity, as well as the possibility of acting on the nasal valves, makes surgery one of the therapeutic possibilities for one of the most recurrent symptoms in otolaryngology clinics:

nasal obstruction [3]. In order to document the nasal function in the preoperative period, in addition to allowing an objective measure of the improvement of complaints in the post-operative period, functional questionnaires such as SNOT-22 and NOSE have been widely used during the consultation of patients, who are candidates for nasal surgeries [11, 21].

SNOT-22 was initially developed to be applied to patients with chronic rhinosinusitis [21], but it currently has validation for rhinoplasty as well [11]. It consists of 22 questions. The higher the score obtained, the worse the patient's nasal function [11, 21]. NOSE, on the other hand, is shorter, composed of only five questions. Like the SNOT-22, the higher the score obtained, the worse the nasal function [3, 11, 21].

In our study, it was found that both SNOT-22 and NOSE had significantly higher scores in the RG when compared to the CG. Such a fact was expected, pointing out that patients who seek rhinoplasty surgery mostly have unsatisfactory nasal function. However, the comparison of the functional questionnaires between the subgroups (PSS and NSS) stands out. Significantly, higher SNOT-22 scores were seen in PSS when compared to NSS, similarly to that reported by Joseph et al. [11]. This fact was also found in NOSE, with a significant difference in favour of PSS patients. Such results are in line with what was hypothesised by the authors, demonstrating that patients with BDD who are candidates for rhinoplasty consider their own nasal function significantly worse when compared to those without the disorder. Further reinforcing these findings, the study found significantly negative (inverse) correlations between the visual analogue scale and the BDSS, as well as the scale with the SNOT-22, demonstrating that the higher the BDSS score, the more unsightly the patient considers his own nose. Likewise, the lower the score given by the patient to the beauty of his nose, the worse the self-assessment of his nasal function. Such results point to an influence of the disorder in the way the patient evaluates his own nasal function. We believe the fact that the patient considers his nose to be aesthetically defective, to the point of affecting his ordinary activities, contributes to his negative perception of its function as well. This adds another variable to the already difficult decision of the surgeon to indicate or not the aesthetic and functional surgery of the nose in these patients.

There is still no consensus in the literature regarding the performance or not of aesthetic procedures in patients with BDD [4]. Although studies have shown that these patients may even worsen the symptoms inherent to the disorder in the post-operative period [12], some authors consider that some may indeed benefit, especially those who have a less intense disorder [2, 4]. Despite this, the recommended standard treatment for BDD remains non-surgical, through cognitive behavioural therapy and anxiolytic drugs [12, 16]. Unfortunately, many of the patients are resistant to looking for a psychiatrist, which delays correct diagnosis and appropriate therapy [11].

Our study was a cross-sectional study, which implies some limitations. We believe that for a better analysis of the data presented here, it would be important to monitor these patients, with the purpose of verifying and comparing, in those who have effectively undergone rhinoplasty surgery, the self-reported aesthetic and functional improvement, in the post-operative period. Because of this, a new trial for this purpose is underway in our otolaryngology centre, comparing pre- and post-surgical data from patients with positive screening for BDD and those without the disorder.

Conclusions

Despite uncommonly seen in the general population, BDD is highly prevalent among rhinoplasty candidates, reaching around one-third of individuals in our patient population. The presence of this disorder seems to have a negative influence on patients' self-assessment regarding their nasal function, which is significantly worse in those patients with BDD who are candidates for rhinoplasty compared to those without the disorder.

Compliance with Ethical Standards

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

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from every patient participating in this study.

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