Development of a cosmetic procedure screening questionnaire (COPS) for Body Dysmorphic Disorder

This is longer version of the paper published as short report in

Veale, D, Ellison, N, Werner, T, Dodhia, R, Serfaty, M & Clarke, A. (2012*)* Development of a cosmetic procedure screening questionnaire (COPS) for Body Dysmorphic Disorder. *Journal of Plastic Reconstructive and Aesthetic Surgery,* 65:530-532 http://dx.doi.org/10.1016/j.bjps.2011.09.007

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Abstract:

Background: Practitioners in a cosmetic setting need a screening questionnaire to identify people with Body Dysmorphic Disorder (BDD). Method: Two groups who desired a cosmetic procedure completed the Cosmetic Procedure Screening Questionnaire (COPS): (a) a group diagnosed with BDD (n =97) and (b) a community control group (n=108). Both groups desired a cosmetic procedure. Item characteristics, reliability and factorial structure were analysed. Convergent validity with selected questionnaires was determined. Sensitivity to change during cognitive behaviour therapy was also determined in a sub-sample of BDD patients. Results: The most sensitive items discriminating between the two groups were used to form the final questionnaire. Receiver Operating Characteristics analysis was used to assess sensitivity and specificity of the COPS to discriminate between the groups and a cut-off score of 40 was chosen. Conclusions: The COPS is a sensitive and specific screening measure for BDD that can be used in cosmetic settings and as a potential research tool to predict dissatisfaction or changes in BDD symptoms after any treatment.

Background:

The reasons for dissatisfaction with outcome after cosmetic procedures are not well understood and dissatisfaction with cosmetic procedures leads to psychological distress for patients and a significant number of litigious complaints. Guidelines recommend screening patients prior to cosmetic surgery to identify those who may require further psychological assessment [1] but there are few validated instruments available.

BDD consists of a *preoccupation* with an imagined defect in one's appearance or where a slight physical anomaly is present, the person's concern is markedly excessive. To fulfil diagnostic criteria, the preoccupation must cause clinically significant distress or impairment in social or occupational functioning [2]. Any part of the body may be the focus of BDD and the preoccupation is frequently on several aspects of the face or body. Complaints typically involve perceived or slight flaws on the face or skin, such as a feature being too small or too big or not straight, hair thinning, acne, wrinkles, scars, vascular markings, paleness or redness of the complexion, asymmetry or lack of proportion [3, 4]. Its prevalence is high at 3-15% in cosmetic or dermatology settings [5].

The difficulty in cosmetic settings is that a mental health professional may view a feature as minor anomaly or within the range of normality (one of the criterion for BDD), whilst a cosmetic practitioner views the same feature as something that can be improved or modified. Also, the degree of self-consciousness and distress may overlap between people with mild BDD and people without BDD. Clinicians usually advise people with BDD not to proceed with a cosmetic procedure, as the results are unpredictable [6, 7]. Sometimes people with BDD may be partly satisfied by a cosmetic procedure or become less satisfied over time since surgery. Whatever the degree of satisfaction with the procedure, people with BDD frequently remain preoccupied and distressed about the same or a different feature [8].

The aim of the current study was to develop (a) a screening questionnaire that was brief, free to download and could identify people who may require further specialist assessment, (b) a research tool that might predict either dissatisfaction with a cosmetic procedure or no change or deterioration in overall symptoms of BDD, and (c) a tool that may be sensitive to change after an intervention. Although questionnaires such as the Body Dysmorphic Disorder Questionnaire (BDDQ) [9] have been validated in a dermatology setting [10] they have not been validated in a cosmetic surgery setting and do not provide a dimensional score for the severity of symptoms. Cash and colleagues [11, 12] used the BDDQ to develop the Body Image Disturbance Questionnaire (BIDQ), which was dimensional. The scale, however, is copyright and not free, and has not been validated in people seeking cosmetic surgery. The Dysmorphic Concern Questionnaire (DCQ)[13-16] assesses a broader measure of "dysmorphic concern" and has recently been validated in a cosmetic setting [17]. Compared to the DCQ, the new scale was informed by the diagnostic criteria and a previous study that compared patients satisfied with cosmetic rhinoplasty with BDD patients who craved rhinoplasty but had not been able to obtain it [18].

Method:

Two groups of participants were recruited:

a) Community group

A community group wanting a cosmetic procedure was identified by email, sent to 1833 volunteers on the Mind Search database at the Institute of Psychiatry. We asked recipients if they wanted to improve one or more features in his or her appearance and were very motivated to have a cosmetic procedure (for example, if the person was planning a cosmetic procedure). The questionnaire was completed by n=108 participants. The questionnaire was repeated by n=67 participants one week later to determine test-retest reliability of the new scale.

b) BDD group

A structured diagnostic interview, based on DSM-IV, was used to diagnose BDD. Study participants were selected if they desired a cosmetic procedure to correct a perceived defect, and if the main feature for which they desired a cosmetic procedure occupied at least 50% of their appearance concerns. Ninety-seven patients with BDD seeking a cosmetic procedure were recruited. All participants completed the following:

1) Cosmetic Procedure Screening (COPS) questionnaire

The questionnaire asks for the feature(s) that the person finds unattractive, the nature of the cosmetic procedures they are seeking and follows the diagnostic criteria of BDD (Table 2). The final version of COPS questionnaire comprises 9 items. Items are scored from 0 (least impaired) to 8 (most impaired). The scale is free to download from: http://www.iop.kcl.ac.uk/cadatquestionnaire. The score is achieved by summing Q 2-10. Items 2, 3 and 5 are reversed. The total ranges from 0 to 72 with a higher score reflecting greater impairment.

2) SCOFF questionnaire

The questionnaire consists of five items addressing the core features for screening of anorexia and bulimia nervosa. [19, 20]. A score of 2 or more suggests an eating disorder.

3) Hospital Anxiety and Depression Scale (HAD)

The HAD scale is a 14-item self-report instrument to screen for presence and severity of symptoms of depression and anxiety over the past week [21, 22]. There are two seven-item sub-scales for anxiety and depression, with a range of scores from 0 to 21 on each sub scale. The standard cut offs for depression or anxiety sub-scale are 11+ for caseness.

4) Body Image Quality of Life Inventory (BIQLI) [12]

The BIQLI consists of 19 items, which measures the impact of body image concerns

on a range of life domains [23]. The range is -3 to +3. A lower score indicates more negative impact of body image on a person's quality of life.

5) Body Image Disturbance Questionnaire (BIDQ)

Only the community group completed the BIDQ. The scale contains seven items on a 5-point Likert scale and is designed as a screening tool for BDD [11]. Higher scores indicate greater severity.

Statistical Analysis

The Mann-Whitney test determined which items of the COPS were most sensitive at discriminating between the BDD group and the community group. The most sensitive items were used to form the final COPS questionnaire. Group x sex interaction was calculated by conducting Mann Whitney tests for each sex separately. There is no group x sex interaction if the difference between the groups remains significant when males and females are divided. The reliability of the COPS was evaluated using Cronbach's alpha. Pearson correlation of the COPS with the HAD, BIQLI was computed to test convergent validity. Horn's Parallel Factor Analysis [25] was used to examine factorial validity. This was computed using the factor analysis programme 'FACTOR' [26]. This method was chosen as it is more accurate than Cattell's scree and Kaiser-Guttman methods [27, 28]. Receiver Operating Characteristics (ROC) analysis was used to assess sensitivity and specificity of the COPS in discriminating between BDD patients and the community group. To determine the optimal cut of value of the COPS for the identification of subjects with BDD, kappa coefficients were computed for different cut off scores.

Results

Out of 108 participants in the community sample 20 had a BIDQ score above 21, whose main feature causing concern was <u>not</u> weight or shape, indicating probable BDD. We did not exclude them from the community group for the descriptive analysis as it made our sample more representative of our target population. For the receiver operating characteristic calculation sensitivity analysis were performed for the whole

community sample and for the sample excluding possible BDD cases. Table 1 provides demographic data for the community group and the BDD group. The procedures sought are also reported. T-tests revealed there were no significant differences between the BDD group and the community group on log transformed age or Body Mass Index (BMI). There were significant differences with respect to gender, ethnic origin and the main procedure sought. There were also significant differences between the groups on employment status χ^2 (5, N=202) = 19.73, $p<0.01$ and marital status χ^2 (3, N=204) = 12.26, $p<0.01$. There was a significant difference between the groups on occupation χ^2 (3, N=153) = 8.29, $p<0.05$. This was due to the higher proportion of participants in the BDD group having a career in art or design. 9.7% of the BDD group had a career in art or design compared to 1.2% of controls. χ^2 (1, N=153) = 5.54, $p>0.05$.

The BDD group were more depressed on the HAD (M = 10.5. SD = 4.7) than the community group (M = 4.9, SD = 3.9) t (196) = -8.91, $p < 0.001$. The BDD group were also more anxious (M = 13.01, SD 4.24) than the community group (M=8.24, SD = 4.26) t (185) = -7.58, $p < 0.001$. The BDD group had a lower body image quality of life on the BIQLI (M = -1.48, SD = 0.91) than the community group (M = 0.10, SD = 1.33) t (177) = 8.26, $p < 0.001$.

SCOFF total scores were calculated and participants were then grouped by whether they met criteria for a possible eating disorder or not. This was based on the recommended SCOFF cut of score of 2 or more [19]. Thirty-one participants in the community control group and 18 participants in the BDD group were positive for an eating disorder on the SCOFF. Chi square revealed that this difference between the groups was not statistically significant χ^2 (1, N=194) = 1.52, $p>0.05$. Of the 18 patients in the BDD group who screened positive, 2 had comorbid bulimia nervosa, 10 had comorbid EDNOS, and 6 did not have an eating disorder. For the 12

participants who had a an eating disorder, BDD was reported as their main psychological problem.

The BDD group were significantly more likely than the community group to have had cosmetic procedures in the past χ^2 (1, N=200) = 15.7, p<0.001. They were also significantly more likely to have attempted suicide or self harmed χ^2 (1, N=202) = 13.52, p<0.001.

Cosmetic Procedure Screening (COPS) item selection

Items that showed a significant difference between the groups, which did not have a significant group x sex interaction and had an effect size (Cohen's d) of at least 0.80 were retained in the item discriminatory analysis. Although time thinking about features met the criteria, this item is a categorical one and it was decided not to include it in the final COPS as another item covers the degree of preoccupation. Nine items met these criteria and were used to form the final questionnaire (see Table 2). The following statistics are all based on the final 9 item COPS.

A total score was then computed for each participant. A t-test was conducted to compare COPS total score between the BDD group and the community group. This indicated that the BDD group scored significantly higher on the COPS (M = 53.23, SD = 11.46) than the community group (M = 27.94, SD = 13.9), t (187) = 13.24, p< 0.001.

Internal Consistency

Reliability analysis resulted in an internal consistency of Cronbach's α = 0.91 with corrected item total ranging from 0.41 to 0.86.

Test-retest Reliability

67 participants in the community group repeated the COPS after 1 week. The COPS had good test–retest reliability ($r = 0.87$, $p < 0.01$). First administration ($M=27.94$, $SD=13.89$), second administration ($M=30.71$, $SD=14.04$).

Factor Validity

Horn's Parallel analysis was computed for each group separately. For the BDD group, this resulted is a single factor accounting for 41.2% of the variance, which had an Eigenvalue of 3.71. Items were retained when factor score coefficients were greater than or equal to 0.3. For the community group, Horn's parallel analysis also resulted is a single factor accounting for 49.1% of the variance. This factor has an Eigenvalue of 4.42. No items were removed.

Convergent validity

Based on the data from both groups the COPS correlated highly with the HAD depression subscale ($r = 0.7$, $p < 0.01$) and anxiety subscale ($r = 0.66$, $p < 0.01$). COPS also correlated highly with the BIQLI ($r = - 0.68$, $p<0.01$) indicating that higher scores on COPS are associated with lower body image quality of life.

Cut-off value and ROC analysis

Figure 1 represents the ROC curve for BDD patients compared with community controls. The area under the curve (AUC) for this analysis was .905 (95% CI = .862 - .948) indicating that the COPS is a very accurate diagnostic test. To determine an optimal cut-off value, kappa coefficients were computed for each cut off value, with the highest kappa coefficients indicating a maximum of sensitivity and specificity. Based on the discrimination of BDD patients from the community group, a cut-off value of ≥ 40 (or average score of 4.4 per item) resulted in a maximal kappa

coefficient (k = 0.69, p<0.001). On the basis of this cut-off value, 88.9% of BDD patients and 80.6% of the community group were classified correctly. In total, 84.1% of all patients were classified correctly. Table 3 presents the sensitivity, specificity, classification accuracy, and kappa coefficient for a range of COPS cut-off scores in discriminating BDD patients from the community group. Table 4 and Figure 2 is the same data with probable BDD participants based on the BIDQ removed from the community group. This made no difference to the recommended cut-off score.

Sensitivity to change

We examined sensitivity to change in a sub-sample of 5 patients with BDD who were undergoing cognitive behaviour therapy [35, 36]. Scores on the COPS were examined at baseline, mid-treatment (6 weeks), and end-of-treatment (12 weeks). The mean and SD on the 9-item COPS was 52.40 (SD= 16.70) at baseline, 50.80 (SD= 17.64) at mid-treatment, and 35.00 (SD= 22.88) at end-of-treatment. A one-way repeated measures ANOVA was conducted to compare scores across these 3 treatment points. There was a significant effect across the 3 treatment points [F (1.10, 4.38)= 7.35, p = .047]. Concurrent measurement of the observer rated Yale Brown Obsessive Compulsive Score (for BDD) [37] showed a decrease from scores at baseline (M= 40.75, SD= 2.97) to mid-treatment (M= 35.00, SD= 6.06) to end-of-treatment (M= 25.75, SD= 10.40). A one-way repeated measures ANOVA showed that there was a significant effect across the 3 treatment points on the BDD-YBOCS, [F (2, 6)= 6.03, p= .037].

Discussion

We have developed a brief (nine item) screening questionnaire (COPS) that can be used in a cosmetic procedure setting to screen patients with BDD for referral for further assessment. The scale has acceptable internal consistency, test-retest

reliability, convergent validity and is uni-dimensional. It is sensitive to change during cognitive behaviour therapy.

We found that the COPS had a high sensitivity for the diagnosis of BDD in patients seeking cosmetic procedures. We suggest that individuals who score 40 or more should be referred for further assessment. Of note is that the five items with the highest effect size between the two groups are (a) degree of preoccupation with feature, (b) degree of distress over feature, (c) the two items which measure the degree of interference in one's social life and ability to work or study. These are core diagnostic items of BDD, which justifies their importance in the diagnostic criteria above other aspects of psychopathology.

Our groups varied on various dimensions of gender, martial status, occupation and type of procedure sought. Our controls were consistent with the finding that more women than men desire a cosmetic procedure in the community but there is generally an equal sex ratio in BDD [29]. A greater proportion of the BDD group had a career in art or design compared with controls. This is keeping in line with Veale and colleagues [31] who found that patients with BDD were significantly more likely to have an occupation or education in art or design than patients with other psychiatric diagnoses. The type of procedure sought was also consistent with previous findings. The control group were more likely to seek breast augmentation or liposuction, while the BDD group were more likely to seek a rhinoplasty or dermatological procedure.

One limitation is the difference between the groups for the procedures sought. This was due to the higher proportion of participants in the cosmetic procedure group than the BDD group seeking breast enlargement and liposuction. This finding is in line with statistics from the USA and UK that breast augmentation and liposuction are the most common procedure sought in cosmetic settings [32]. People with BDD are more likely to seek rhinoplasty [18] or skin procedures, such as laser treatment or

dermabrasion. Future research will need to directly compare COPS scores with specific procedures (for example, in patients with and without BDD who are seeking a specific procedure like rhinoplasty).

Despite these limitations, the scale has robust psychometric properties. We will start to accumulate data on future referrals for cosmetic screening, which can be validated against a structured diagnostic interview for BDD in order to replicate the findings. Further validation of the scale can investigate whether there are variations in the cut off levels for the diagnosis of BDD in clients seeking cosmetic surgery in different settings, such as dermatology, dental and maxillofacial surgery, cosmetic genital surgery and in adolescents or general psychiatric patients [33].

We recommend that if the COPS is used to screen for BDD, then a screening for eating disorder such as SCOFF or BITE [34] should also be used, as the COPS is likely to score highly in such a population, as it may in populations of people with disfiguring conditions who show low levels of adjustment. The small sub-sample of BDD patients receiving cognitive behaviour therapy suggests that the COPS is sensitive to change. It is also designed for future research as an outcome measure after any treatment (including cosmetic procedures) to determine (a) if there is any improvement in *symptoms* of BDD on a continuous dimension (b) whether it may predict persistence of symptoms or dissatisfaction with a cosmetic procedure (in the absence of any surgical complications).

Conflict of interest: None

Funding: None

Ethical Approval: Brighton and Sussex Ethics Committee

Acknowledgements: David Veale and Nell Ellison are supported by the National Institute for Health Research (NIHR) Specialist Biomedical Research Centre for

Mental Health award to the South London and Maudsley NHS Foundation Trust and the Institute of Psychiatry, King's College London.

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Table 1. Demographic data and procedures sought in the Community group and the BDD group.

	Community Group	BDD Group	Difference between groups
Sex	Male (22%) female (78%)	Male (46%) female (54%)	χ^2 (1, N=205) = 11.24, p<0.01
Age	Mean 33 (SD: 11.7)	Mean 30 (SD: 9)	t (203) = 1.23, p > 0.05
BMI	Mean 23.8 (SD: 4.2)	Mean 22.9 (SD: 3.6)	t (150) = 1.69, p > 0.05
Ethnicity	White (76%) Asian/Asian British (0%) Black British (0%) Other (24%)	White (80%) Asian/Asian British (6.3%) Black British (5.3%) Other (8.4%)	χ^2 (3, N=203) = 20.01, p<0.001
rocedures Sought	Rhinoplasty (22.2%) Liposuction (16 %) Breast Enlargement & lift (13.6%) Dental Procedure (7.4%) Abdominoplasty (6.2%) Face Lift (4.9%) Botox (3.7%) Skin Laser Treatment (3.7%) Brest reduction (3.7%) Chemical Peel (2.5%) Eyelid Surgery (2.5%) Jaw or Chin realignment (2.5%) Hair removal (1.2%) Dermabrasion (1.2%) Buttock Lift (1.2%) Correction of Ears (1.2%) Lip Surgery (1.2%) Chest Implants (1.2%)	Rhinoplasty (34.7%) Skin Laser Treatment (12.5%) Dermabrasion (6.9%) Eyelid Surgery (5.6%) Breast Enlargement & lift (4.2%) Abdominoplasty (4.2%) Liposuction (4.2%) Botox (4.2%) Face Lift (4.2%) Penis Enlargement Surgery (4.2%) Chin or Jaw realignment (4.2%) Hair Transplant (2.8%) Arm Lift (1.4%) Thigh Lift (1.4%) Acne Scar Removal (1.4%) Hair Removal (1.4%) Buttock Implants (1.4%) Vaginoplasty (1.4%)	χ^2 (26, N=197) = 54.25, p<0.01

Table 2. Difference between the community group and BDD group, effect size and group x sex interaction for all items (items in bold were retained for use in the final questionnaire)

Variable	Community group	BDD Group	Difference between Groups		Effect Size (d)	Group x Sex interaction
	M (SD)	M (SD)	U value	p value		p value
1. Avoid looking at my feature(s)	3.32 (2.71)	3.00 (2.62)	4346.5	0.615 **ns**	0.12	Men:>0.05 **ns** Women: >0.05 **ns**
2. Frequency of checking feature(s)	**2.82 (2.05)**	**5.15 (1.66)**	**2891**	**<0.001**	**1.25**	**Men: <0.01 Women: <0.001**
3. How ugly, unattractive or 'not right' feature(s) are	**4.83 (2.19)**	**7.15 (1.60)**	**2615.5**	**<0.001**	**1.22**	**Men: <0.001 Women:<0.001**
4. Distress caused by feature(s)	**3.92 (2.27)**	**7.05 (1.1)**	**1640**	**<0.001**	**1.84**	**Men: <0.001 Women:<0.001**
5. Avoid situations or activities because of feature(s)	**2.64 (2.43)**	**5.95 (1.9)**	**2609**	**<0.001**	**1.53**	**Men: <0.01 Women:<0.001**
6. Preoccupation with feature(s)	**3.28 (2.14)**	**7.15 (1.27)**	**993**	**<0.001**	**2.26**	**Men: <0.001 Women:<0.001**
7. Interference with relationship/dating	**3.10 (2.74)**	**6.25 (1.62)**	**2008**	**<0.001**	**1.79**	**Men:<0.001 Women:<0.001**
8. Interference with sexual relationship	2.68 (2.74)	3.7 (3.13)	2257	<0.001	0.35	Men: <0.05 Women:<0.001
9. Inability to work/study due to feature(s)	**1.32 (4.22)**	**5.25 (1.86)**	**1231**	**<0.001**	**0.83**	**Men: <0.001 Women:<0.001**
10. Interference with social life	**2.42 (2.4)**	**6.2 (1.77)**	**1301.5**	**<0.001**	**1.8**	**Men: <0.001 Women:<0.001**
11. Noticeability of feature(s) to other people	4.74 (2.43)	5.95 (2.28)	3067.5	<0.001	0.51	Men: <0.01 Women:<0.001
12. Frequency of comparing feature(s) to other people	4.33 (1.7)	6.2 (1.32)	1606.5	<0.001	0.62	Men: <0.001 Women:<0.001
13. Trying to please self or others by having procedure	6.44 (1.53)	7.35 (0.93)	2251	<0.001	0.74	Men:<0.01 Women:<0.01
14. Amount of discouragement from having procedure	4.03 (2.8)	3.7 (2.9)	2405	0.54 **ns**	0.11	Men:>0.05 **ns** Women:>0.05 **ns**
15. Understanding from family/friends about feature(s)	4.3 (2.47)	4.92 (2.50)	3064	0.086 **ns**	0.25	Men: >0.05 **ns** Women:>0.05 **ns**
16. Importance of appearance in defining who you are	**3.77(1.79)**	**5.65(1.97)**	**1900.5**	**<0.001**	**0.96**	**Men: <0.001 Women: <0.001**

Table 3. Sensitivity and specificity of cut-off scores for COPS for whole sample

Cut-off score	Sensitivity	Specificity	Correctly classified	k
30	95.1%	60.2%	75.10%	0.52***
31	93.8%	63.9%	76.70%	0.55***
32	93.8%	64.80%	77.20%	0.56***
33	93.8%	65.7%	77.70%	0.57***
34	93.8%	68.5%	79.40%	0.6***
35	93.8%	73.1%	82.00%	0.65***
36	92.60%	73.1%	81.50%	0.64***
37	88.9%	74.10%	80.40%	0.61***
38	88.9%	76.0%	81.50%	0.63***
39	88.9%	77.8%	83%	0.65***
40	**88.9%**	**80.6%**	**84.10%**	**0.68*** **
41	85.20%	82.4%	83.60%	0.67***
42	84.00%	83.30%	83.60%	0.67***
43	81.50%	83.30%	82.50%	0.65***
44	79.00%	85.2%	82.50%	0.64***
45	76.50%	88.0%	83%	0.65***
46	74.10%	88.0%	82.00%	0.63***
47	70.40%	88.0%	80.40%	0.59***
48	69.10%	88.8%	80.40%	0.59***
49	66.70%	90.7%	80.40%	0.59***
50	66.70%	91.7%	81.00%	0.6***

*** p<0.001

Table 4. Sensitivity and specificity of cut-off scores for COPS with probable BDD participants removed from the community group

Cut-off score	Sensitivity	Specifity	Correctly classified	k
30	95.1%	71.6%	82.80%	0.66***
31	93.80%	76.10%	84.60%	0.69***
32	93.80%	77.30%	85.20%	0.71***
33	93.80%	78.40%	85.80%	0.72***
34	93.80%	81.80%	87.60%	0.75***
35	93.80%	86.40%	89.90%	0.8***
36	92.30%	86.40%	89.30%	0.79***
37	88.90%	87.50%	88.20%	0.76***
38	88.90%	88.60%	88.80%	0.78***
39	88.90%	90.90%	89.90%	0.8***
40	**88.9%**	**93.2%**	**91.10%**	**0.82*** **
41	85.20%	94.3%	89.94%	0.8***
42	84.00%	95.50%	89.94%	0.8***
43	81.50%	95.50%	88.80%	0.77***
44	79.00%	97.7%	88.80%	0.77***
45	76.50%	97.7%	87.60%	0.75***
46	74.10%	97.7%	86.40%	0.73***
47	70.40%	97.7%	84.60%	0.69***
48	69.10%	97.7%	84.00%	0.68***
49	66.70%	97.7%	82.80%	0.65***
50	66.70%	98.9%	83.40%	0.66***

*** $p<0.001$

Figure 1. Receiver operating characteristics plot of COPS scores of BDD patients compared with community controls.

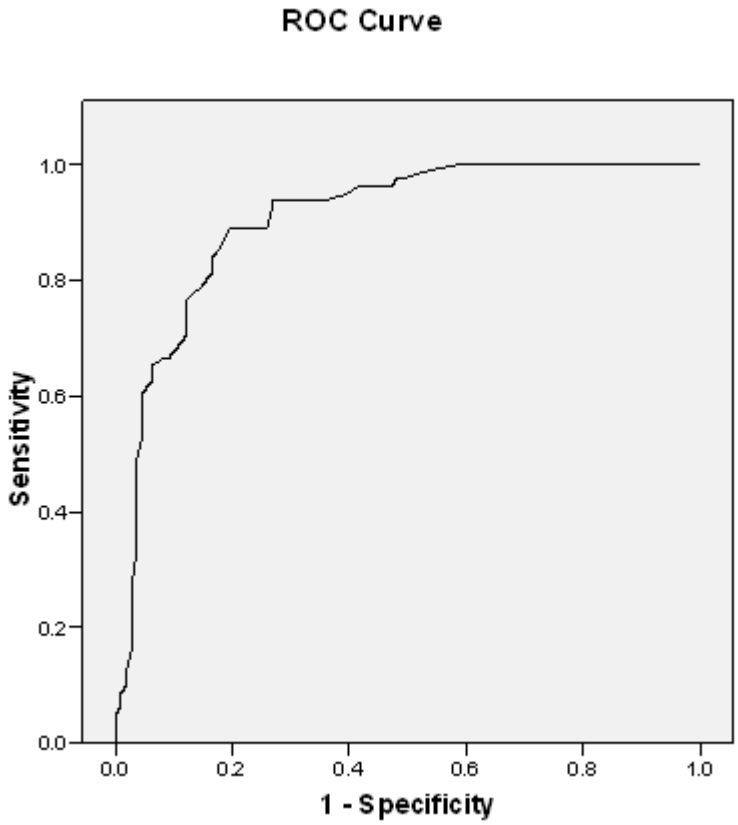

Figure 2. Receiver operating characteristics plot of COPS scores of BDD patients compared with community controls with probable BDD participants removed from the community group.