

Validation of genital appearance satisfaction scale and the cosmetic procedure screening scale for women seeking labiaplasty

David Veale¹, Ertimiss Eshkevari¹, Nell Ellison¹, Linda Cardozo², Dudley Robinson², and Angelica Kavouni³

¹NIHR Specialist Biomedical Research Centre for Mental Health at the South London and Maudsley NHS Foundation Trust and The Institute of Psychiatry, King's College London, London, UK, ²Department of Uro-gynaecology, King's College London, London, UK and ³Cosmetic Solutions, London, UK

Abstract

Background: Existing outcome studies on women seeking labiaplasty have not used a validated scale that is specific for satisfaction with genital appearance. They have also not screened for the presence of body dysmorphic disorder (BDD). There are therefore two primary aims of this study (1) to validate the Genital Appearance Satisfaction (GAS) scale in women seeking labiaplasty and (2) to modify and validate a version of the Cosmetic Procedures Screening questionnaire (COPS-L), which has previously been used to screen for BDD.

Method: Two groups of women were recruited: a group desiring labiaplasty and a control group. All participants completed the GAS, the COPS-L and other general measures of mood, disgust sensitivity, sexual satisfaction and body image quality of life.

Results: Both the GAS and COPS-L demonstrated good internal consistency, concurrent and convergent validity with measures of related constructs, and discriminated between women seeking labiaplasty and controls. Three factors were identified in the GAS but were not robust enough to recommend their use clinically as subscales. The COPS-L discriminated between women seeking labiaplasty with and without BDD.

Discussion: We recommend that both the GAS and the COPS-L be routinely used for audit and outcome monitoring of interventions for women distressed by the appearance or function of their genitalia. The GAS has an advantage in assessing additional functional symptoms in such women. The COPS-L may be helpful in identifying women with BDD.

Keywords

body image, labiaplasty, mental health

History

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Introduction

Labiaplasty is a surgical procedure that consists of reducing the degree of protrusion of the labia minora. Women may seek labiaplasty for functional reasons (e.g. a complaint that their labia rub on their clothes or are trapped in their vagina when they have penetrative sexual intercourse) or for cosmetic reasons (e.g. being excessively self-conscious about their appearance during intimacy). Cartwright and Cardozo [1] reported that labiaplasty is often not justified on medical grounds, and is being performed without adequate evidence of psychosocial benefit. Liao et al. [2] reviewed the literature on labiaplasty up to March 2009 and identified 18 publications covering 937 cases. We conducted a similar search of reports published after March 2009 and found a further six publications and 64 additional cases. Out of the 35 publications, only one study used a scale relevant for body image (specifically for body dysmorphic disorder) [3], whilst some used non-

standardised satisfaction scales. None used validated scales that are specific for genital appearance as an outcome measure.

Bramwell and Morland [4] developed the Genital Appearance Satisfaction (GAS) scale. This scale was validated in a sample of 135 women. Factor analysis revealed three factors: “appearance of genitals”, “impact on daily living” and “impact on sex”. GAS scores were significantly correlated with appearance schemas, body satisfaction and self-esteem. Multiple regression analysis showed that only self-esteem significantly predicted genital satisfaction.

Given that previous reports on labiaplasty have not used a validated scale that is specific for genital appearance, coupled with the fact that the GAS has not been validated in women desiring labiaplasty, the first aim of this study was therefore to validate the GAS in a sample of women who desired labiaplasty. We also aimed to validate the GAS against a broader range of measures including disgust sensitivity, body image quality of life, sexual functioning, depression and anxiety. The measures were chosen as we hypothesised that a measure of genital dissatisfaction would correlate with (1) disgust sensitivity as women seeking labiaplasty may be more prone to disgust towards the genitalia, (2) quality of life

Address for correspondence: David Veale, NIHR Specialist Biomedical Research Centre for Mental Health at the South London and Maudsley NHS Foundation Trust and The Institute of Psychiatry, King's College London, London, UK. Email: David.Veale@kcl.ac.uk

relating to their body image because genital dissatisfaction will affect body image, (3) sexual satisfaction since women seeking labiaplasty report interference in their sexual life and (4) depression and anxiety because of the interference of their genital appearance in their life.

Some women seeking labiaplasty may have body dysmorphic disorder (BDD). BDD is defined as a preoccupation with a perceived defect that is not observable or appears slight to others and the person's concern is markedly excessive. In addition, it must be either significantly distressing or cause impairment in social, occupational or other important areas of functioning [5,6]. BDD is a body image disorder in which an individual may experience a "felt impression" of their feature that may be distorted [7]. People with BDD will therefore often seek help from a cosmetic surgeon to camouflage or enhance a feature to change their body image. Any part of the body may be the focus of BDD and the preoccupation is frequently on several aspects of the face or body, commonly the skin, nose, hair, eyes or lips, or being ugly in general. A preoccupation about the appearance of the genitalia is, however, relatively uncommon in a specialist service for BDD.

Veale et al. [8] have developed the Cosmetic Procedures Screening Questionnaire (COPS), a screening questionnaire to identify people with BDD in a cosmetic setting. It may be important for cosmetic surgeons and gynaecologists to identify those women who require further assessment for the diagnosis of BDD before an irreversible surgical procedure.

Although there is only one small prospective study of people with BDD identified pre-operatively and followed up [9], cosmetic procedures are regarded as contraindicated in those with a diagnosis of BDD on the basis of retrospective studies of people with BDD [10,11]. The COPS has not been validated in a sample of women seeking labiaplasty. Therefore, the second aim of this study was to validate a modified version of the COPS and to determine whether it discriminated between women seeking labiaplasty with and without BDD.

Method

Participants

We recruited two groups of participants.

(1) Labiaplasty group

Women desiring labiaplasty were recruited from (a) a private cosmetic clinic or (b) a gynaecology clinic in the state (NHS) sector or (c) a community setting from the Mind Search database at the Institute of Psychiatry, Kings College London. This database contains details for over 3500 individuals in the local community who have volunteered to participate in psychological or psychiatric research. All those recruited in the labiaplasty group were seeking labiaplasty or indicated that they would seek a labiaplasty if they could afford it in the future.

(2) Control group

For comparison we recruited a control group of women from (a) a gynaecology clinic in the state sector, who were having a non-cosmetic gynaecological surgical procedure or (b) community setting from the Mind Search database (as above). They were characterised by not desiring labiaplasty.

In order to take part, the participants in either group had to be aged 18 or above and be proficient in English in order to provide consent and complete the questionnaires.

Materials and procedure

Participants from both groups completed the following questionnaires, either online or in a pen-and-paper format:

(1) Genital Appearance Satisfaction (GAS) scale [4]

This scale contains 11 statements about attitudes towards genital appearance to be rated by the participant. Each item is scored between 0 and 3 (from "Never" to "Always") and the total scores range from 0 to 33. Higher scores represent greater dissatisfaction with the genitalia. The sample for the original study had a mean of 5.65 (SD 4.68) (Bramwell, personal communication). Items 1 and 4 are reverse scored.

(2) Cosmetic Procedure Screening Scale (COPS) [8]

There are nine items in the original COPS [8], which is validated as a screening questionnaire for identifying BDD and as an outcome measure after any intervention. It incorporates the diagnostic criteria of BDD that includes preoccupation, distress and handicap with one or more feature(s) that are not noticeable to others. Participants respond on a Likert scale ranging from 0 to 8. The COPS is scored by summing all of the items to provide a total score (items 1, 2 and 4 are reverse scored). Total scores possible range from 0 to 72. Scores above 40 reflect increased preoccupation, distress and handicap with a bodily feature and therefore the likelihood of a diagnosis of BDD. Scores above 40 resulted in a maximal kappa coefficient ($k=0.82$, $p<0.001$), in which 88.9% of BDD patients and 93.2% of community group were classified correctly.

(3) Cosmetic Procedure Screening Scale modified for labia (COPS-L)

While the original COPS [8], as outlined above, covers general appearance concerns for people without any significant defect or disfigurement, in the present study we modified the COPS to ask the respondent to focus on concerns about the appearance of the labia (rather than general appearance). After piloting the COPS in women with BDD who were seeking labiaplasty, we replaced five items with domains that had more face validity (e.g. perceived abnormality, effect on sexual relationship, interference with leisure activities, noticeability in public and comparison with others) and which still included the diagnostic criteria for BDD. Table 4 lists the following items: (i) Items 1, 2 and 9 reflect the perceived abnormality or evaluation of the labia as ugly; (ii) item 3 reflects the degree of preoccupation on the labia; (iii) item 4 reflects the degree of distress caused by the appearance of the labia and (iii) items 5, 6, 7 and 8 reflect the extent of interference in one's life due to the appearance of the labia. The final version was then pilot tested in women before being used for this study.

(4) Hospital Anxiety and Depression Scale (HADS) [12]

The HADS is a 14-item self-report instrument used to examine the severity of anxiety and depression symptoms in its anxiety and depression subscales, respectively. Each subscale is comprised of seven items, and the possible range of scores is from 0 to 21 on each subscale. Higher scores represent increased severity of anxiety and depression. Scores above 8 are classified as a borderline case, while scores of 11 or more are classified as a case for either depression or anxiety.

(5) Disgust Scale Revised (DS-R) [13]

Based on the original self-report Disgust Scale developed by Haidt and colleagues [14] to provide a measure of

individual differences in sensitivity to disgust, the Disgust Scale Revised (DS-R) has fewer items and subscales and a modified response (5-point scale). The DS-R consists of 25 items with three subscales: core disgust, animal-reminder disgust and contamination disgust. A total score can also be calculated, and the possible range is 0–100 with higher scores indicating increased disgust sensitivity.

(6) *Body Image Quality of Life Inventory (BIQLI)* [15]

The BIQLI is a 19-item self-report assessment scale that measures the impact of body image concerns on a broad range of life domains (including social functioning, sexuality and emotional well-being). Each item is rated by the participant on a 7-point Likert Scale, ranging from –3 (very negative effect) to +3 (very positive effect). The BIQLI is scored as an average numeric score of the 19 items, where a more negative score reflects a more negative body image.

(7) *The Prolapse–Urinary Incontinence Sexual Function Questionnaire (PISQ)* [16]

This scale has 31 items and, despite the name, covers a broad measure of sexual satisfaction in women. Examples of items include “How frequently do you and your partner have sexual intercourse or activity?” Participants are provided with five corresponding answers to choose from, such as “every day”, “1 to 3 times a week”, “1 to 3 times a month”, “less than once a month” and “never” with respect to the example above. Items are scored from 0 to 4, and a total score is computed by summing all items, with the possible range of scores being between 0 and 125. Higher scores represent increasing sexual satisfaction. There are three subscales, which represent behavioural/emotive, partner-related and physical impacts.

(8) *Structured Clinical Interview for Diagnosis of DSM-IV (SCID; [17])*

We used the BDD module from the SCID to assess women who scored above the COPS cut-off score of 40 in order to ascertain the presence or absence of diagnosis of BDD. The SCID was administered by a trained research worker.

Statistical analyses

Parallel factor analysis was performed in FACTOR [18] in order to validate the GAS in the sample seeking labiaplasty. Parallel factor analysis was performed, as opposed to the principal component analysis used by the original authors of the GAS [4], as parallel analysis is recommended as the best technique for factor extraction [19]. SPSS version 20 (SPSS Inc., Chicago, IL) was used for all other statistical analysis.

Results

A total of 125 women participated in this study: 55 labiaplasty participants and 70 control participants. Source of recruitment for women seeking labiaplasty was 19 (34.5%) from a state (NHS) gynaecology setting; 31 (56.4%) from a private cosmetic surgery clinic and a further 5 (9.1%) from the volunteer research database.

The source of recruitment of control women having a minor non-cosmetic gynaecological surgery was 31 (44.3%) from the state (NHS) setting, while a further 39 (55.7%) controls were recruited from the volunteer research database.

Table 1. Participant demographics and clinical details of labiaplasty control group.

	Labiaplasty MDN (IQR)	Control MDN (IQR)	Comparison
Age	30.00 (19)	28.50 (20)	$U = 1902.50$ $Z = -0.11$ $p = 0.911$
Ethnicity: n (%)			
White	48 (87.3)	53 (75.7)	$\chi^2 = 7.165$
Black/Black British	0	8 (11.4)	$df = 3$
Mixed	2 (3.6)	4 (5.7)	$p = 0.067$
Other	3 (5.5)	3 (4.3)	–
Education: n (%)			
Secondary	19 (34.5)	21 (30)	$\chi^2 = 0.253$
Tertiary	35 (63.6)	47 (67)	$df = 1$ $p = 0.615$
GAS	24.00 (7.00)	3.00 (6.50)	$U = 49.00$ $Z = -9.123$ $p < 0.001$

Table 1 reports the demographic and clinical details of the two groups. The two groups did not differ in age, ethnic status or education (see Table 1). Given the non-normal distribution of most of these variables, as demonstrated from Kolmogorov–Smirnov tests, non-parametric parameters (e.g. median and inter-quartile range) and comparison tests (i.e., chi-square, Mann–Whitney U tests) are reported.

Clinical interviews were attempted with all participants who scored greater than the 40 cut-off score on the COPS ($n = 14$; 10 in the labiaplasty, 4 controls). Ten women in the labiaplasty group and no women in the control were diagnosed with BDD. All 10 women had been examined by one of the gynaecologists and found to have a measurement of the labia minora to be within the normal range.

Of the controls, one individual was not diagnosed with BDD as she was morbidly obese. One individual did not meet the diagnostic criteria of BDD, while the remaining two did not respond to follow-up contact for a diagnostic interview after their initial participation.

Study 1: Validation of Genital Appearance Satisfaction scale

Factor analysis

The first aim was to validate the GAS in individuals seeking labiaplasty. Parallel factor analysis was therefore performed in the labiaplasty group only, using the original 11-item pool. Principal component analysis was used in an attempt to replicate the three components found by Bramwell and Morland [4], and the procedure for determining the number of factors was optimal implementation of Parallel Analysis (PA). Direct oblimin rotation was used for factor simplicity and the polychoric (tetrachoric) correlation matrix was analysed since the data were not normally distributed, with skewness corrected for small sample = 447.15, $df = 286$, $p = 1.00$ and kurtosis = –0.56, $p = 0.288$. Four participants had missing data and they were excluded from this analysis, resulting in $n = 51$ for this analysis. The Kaiser–Meyer–Olkin (KMO) measure verified sampling adequacy for the analysis, and Bartlett’s test of sphericity ($\chi^2 = 259.5$, $df = 55$, $p = 0.00001$) indicated that correlations between items were sufficiently

Table 2. Factor loadings for the three-factor solution on the Genital Appearance Satisfaction scale.

Item		Factor loadings		
		I	II	III
1	I feel that my genitals are normal in appearance	-0.17	0.87	0.09
2	I feel my genitals are unattractive in appearance	0.47	0.59	-0.05
3	I feel my labia are too large	0.50	0.51	-0.06
4	I am satisfied with the appearance of my genitals	-0.06	0.86	-0.05
5	I experience irritation to my labia when exercising/walking	-0.10	0.04	0.86
6	I feel, or have felt, conscious in sexual situations because of the appearance of my genitals	0.68	0.31	0.01
7	Embarrassment about the appearance of my genitals spoils my enjoyment of sex	0.76	0.09	0.03
8	I feel discomfort around my genitals when I wear tight clothes	0.02	-0.01	0.92
9	I feel that my genital area is visible under tight clothes	0.53	-0.03	0.53
10	I worry about the appearance of my vaginal area	0.32	0.68	0.08
11	I feel that my genital area look asymmetric, or "lopsided"	0.79	-0.316	-0.01

Items in bold refer to the factors extracted which are >0.4.

Table 3. Correlations between measures in the labiaplasty group.

	COPS-L	COPS	HADS-Anxiety	HADS-Depression	Disgust Scale-Revised	BIQLI	PISQ
GAS	0.74**	0.34*	0.29*	0.26	0.11	-0.44**	-0.22
COPS-L	-	0.37**	0.12	0.21	-0.04	-0.25**	-0.11
COPS	-	-	0.17	0.27	0.19	-0.38**	-0.37*
HADS-Anxiety	-	-	-	0.62**	0.30*	-0.26**	-0.22
HADS-Depression	-	-	-	-	0.07	-0.44**	-0.32*
Disgust Scale-Revised	-	-	-	-	-	0.02	0.06
BIQLI	-	-	-	-	-	-	0.30*

* $p < 0.05$; ** $p < 0.01$.

large for factor analysis, as the Kaiser–Meyer–Olkin (KMO) test = 0.726 (fair), and the determinant = 0.003. The mean value of all communalities was 0.689, and with the exception of item 11 (0.571), communalities of all items were greater than 0.60. Three factors were extracted, and the factor loadings after rotation are reported in Table 2. Items 2, 3 and 9 demonstrated complex loadings (loadings > 0.40 on more than one factor).

Reliability – internal consistency

Internal consistency for the GAS was analysed separately for the women seeking labiaplasty and control group. Cronbach's alpha was $\alpha = 0.78$ for the labiaplasty group, and $\alpha = 0.84$ for the control sample, indicating good internal consistency.

Validity – concurrent and convergent

Concurrent validity was analysed through Spearman's rho correlation coefficients with related measures. We examined the relationship between the GAS and the COPS-L, COPS, HADS-Depression, HADS-Anxiety, Disgust Sensitivity, Body Image Quality of Life and PISQ (see Table 3). The GAS was significantly positively correlated with the COPS-L, COPS, HADS-Anxiety, and significantly negatively correlated with the BIQLI. The GAS was not significantly correlated with the HADS-Depression, DS-R or PISQ. The GAS was strongly correlated with the COPS-L, moderately with the original COPS and BIQLI and weakly with the HADS-Anxiety.

Validity – group differences

GAS total scores were compared between the labiaplasty and control groups using Mann–Whitney U tests. As shown in

Table 1, women had a significantly higher score on the GAS in the labiaplasty group compared to the controls.

Study 2: Validation of Cosmetic Procedure Screening questionnaire modified for labia (COPS-L)

The second study aimed to validate the COPS-L, which was adapted for concerns about the labia. All the items are shown in Table 4.

Reliability – internal consistency

The internal consistency for the nine items was analysed separately for the women seeking labiaplasty and control groups. Cronbach's alpha was $\alpha = 0.91$ for the labiaplasty group, and $\alpha = 0.74$ for the control sample, indicating good internal consistency.

Validity – concurrent and convergent

Concurrent and convergent validity was analysed through correlations with related measures. Correlations between the COPS-L and DS-R, HADS-Depression, HADS-Anxiety, BIQLI and PISQ are shown in Table 3. The relationship between the GAS and the COPS and COPS-L was significantly correlated. The BIQLI was the only other scale that was significantly correlated with the COPS-L, and this was weak.

Validity – group differences

COPS-L total score was compared between the labiaplasty and control groups using Mann–Whitney tests. As is shown in Table 4, each item, as well as the total score, demonstrated a significantly higher score in the labiaplasty group compared

Table 4. Items in COPS-L comparing women desiring labiaplasty and control group.

Item (Range 0–8)	Labiaplasty MDN (IQR)	Control MDN (IQR)	Difference between groups	Effect size (<i>r</i>)
1. Abnormality of labia to a sexual partner	5 (3)	0 (1)	$U = 188.50, Z = -8.86, p < 0.001$	-0.80
2. Appearance of labia as ugly, unattractive or “not right”	6 (4)	1 (2)	$U = 337.00, Z = -8.01, p < 0.001$	-0.72
3. Degree of distress caused by labia	5 (2)	0 (0)	$U = 283.50, Z = -8.52, p < 0.001$	-0.77
4. Preoccupation with appearance of the labia	4 (3)	0 (0)	$U = 302.50, Z = -8.57, p < 0.001$	-0.77
5. Extent labia concerns effect relationship/dating	4 (5)	0 (0)	$U = 414.00, Z = -7.54, p < 0.001$	-0.71
6. Extent labia concerns effect sexual relationship	4 (4)	0 (0)	$U = 245.00, Z = -8.23, p < 0.001$	-0.76
7. Extent labia concerns interfere with leisure activities	2 (3)	0 (0)	$U = 585.50, Z = -6.91, p < 0.001$	-0.63
8. Extent labia noticeable to others in public situations	5 (5)	0 (0)	$U = 192.50, Z = -9.02, p < 0.001$	-0.81
9. Appearance of labia compared to other women of the same age and ethnic group	4 (2)	2 (2)	$U = 506.50, Z = -7.00, p < 0.001$	-0.63
Total score	39 (24)	4 (9)	$U = 99.00, Z = -9.09, p < 0.001$	-0.81

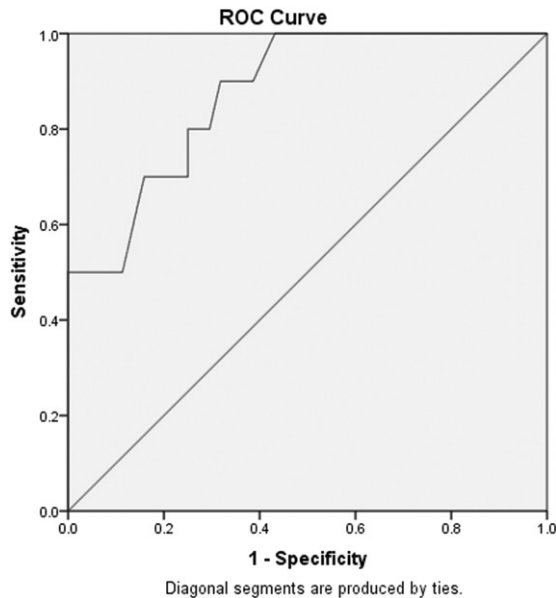


Figure 1. Receiver operating characteristics plot for COPS-L scores of women seeking labiaplasty with BDD compared with women seeking labiaplasty without BDD.

to the controls. All items had an effect size (*r*) of at least 0.6. Women in the labiaplasty group had a mean and standard deviation of $M = 38.7$ ($SD = 15.1$), and the controls $M = 6.7$ ($SD = 7.4$).

A subgroup of 10 women in the labiaplasty group with a diagnosis of BDD was compared to the remaining women on the COPS-L. Those with BDD scored significantly higher in the COPS-L total score (MDN COPS-L score = 56.5, IQR = 17.75) than those without BDD (MDN COPS-L score = 32.5, IQR = 21.75) ($U = 54.50, Z = -3.69, p < 0.001$. Effect size, $r = -0.50$). This subgroup of women in the labiaplasty group with BDD was compared to the remaining women without BDD in the labiaplasty group on the GAS scores. Those with BDD (MDN GAS score = 27.0, IQR = 6.25) scored significantly higher than those without BDD (MDN GAS score = 23.0, IQR = 8.0) ($U = 101.5, Z = -2.464, p = 0.012$) revealing a small effect size ($r = -0.35$).

ROC analysis of the COPS-L

We performed a receiver operating characteristics (ROC) analysis to explore sensitivity and specificity levels, as well as cut-off scores. Figure 1 represents the ROC curve for women

Table 5. Sensitivity and specificity of cut-off scores for COPS-L for women seeking labiaplasty.

Cut-off score	Sensitivity	1-Specificity	Kappa coefficient (<i>k</i>)
32.5	1.000	0.500	0.270, $p = 0.003$
34.0	1.000	0.477	0.289, $p = 0.003$
36.5	1.000	0.455	0.308, $p = 0.003$
38.5	1.000	0.432	0.328, $p = 0.001$
40.5	0.900	0.386	0.317, $p = 0.004$
42.5	0.900	0.318	0.387, $p = 0.001$
43.5	0.800	0.295	0.354, $p = 0.005$
45.0	0.800	0.250	0.408, $p = 0.002$
47.0	0.700	0.250	0.344, $p = 0.011$
48.5	0.700	0.227	0.372, $p = 0.007$
49.5	0.700	0.205	0.402, $p = 0.004$
51.0	0.700	0.159	0.469, $p = 0.002$
52.5	0.500	0.114	0.386, $p = 0.013$
54.0	0.500	0.091	0.426, $p = 0.007$
56.5	0.500	0.068	0.468, $p = 0.003$

Items in bold refer to the factors extracted which are >0.4 .

seeking labiaplasty with BDD compared with the remainder of the sample of women seeking labiaplasty. The area under the curve (AUC) for this analysis was good (0.876, 95% CI = 0.770–0.982). 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 (see Table 5). As reported in Table 5, although a cut-off score of 51 demonstrated the highest kappa value, a cut-off value of ≥ 45 was chosen as the cut-off to be used for the COPS-L by taking into account sensitivity, specificity and the higher kappa coefficient ($k = 0.408, p = 0.002$) based on the discrimination of those with BDD from the remainder of the group. On the basis of this cut-off value, 8 (80%) of BDD participants and 33 (75%) of the remaining labiaplasty seeking participants were classified correctly. Table 5 presents the sensitivity, specificity, classification accuracy and kappa coefficient for a range of COPS-L cut-off scores in discriminating between the women seeking labiaplasty with and without BDD.

Discussion

We have demonstrated the validity of the GAS and COPS-L in women seeking labiaplasty. Both the GAS and COPS-L demonstrated good internal consistency, as well as concurrent and convergent validity in women seeking labiaplasty and controls.

We have also demonstrated theory-consistent group differences between women seeking labiaplasty on the GAS and COPS-L. Our findings indicate that GAS and COPS-L are specific measures of genital appearance satisfaction, sharing moderate correlations with other measures of body image and limited or non-significant correlations with other general measures, such as anxiety and depression. Interestingly, neither the GAS nor the COPS-L was associated with sexual satisfaction.

The factor analysis of the GAS scale in a sample of women seeking labiaplasty extracted three factors. Our results were very similar to those obtained by Bramwell and Morland [4] who also had slightly complex loadings on two items, 2 and 10. Our first factor was items 6, 7 and 11 (whereas Bramwell & Morland [4] found items 6, 7 and 10). Item 9 could also be part of this factor as it has a complex loading. Our second factor was items 1, 2, 3, 4 and 10 (while Bramwell and Morland [4] found items 1, 2, 3, 4 and 11). The third factor was items 5, 8 and 9 (which was the same as Bramwell and Morland [4]). Factor 1 represents impact on sex and self-consciousness. Factor 2 represents perceived unattractiveness and abnormality of the labia. Factor 3 represents impact on daily living including physical discomfort. However the stability and replication of these factors may be problematic. Furthermore, some of the items (especially items 2, 3 and 9) have a complex loading on more than one factor and a different sample may easily load on an alternative factor. We would therefore recommend that only the total score be used for the GAS at present, rather than any subscales. If the aim of a future study is to reduce the number of items in the scale, then a larger sample would be needed to conduct a second or further iteration in the factor analysis after removing items 2, 3 and 9 and this may also reduce the number of factors.

Strengths, limitations and further research

There is a dearth of research into genital cosmetic surgery despite its rising incidence. This may be because of a number of reasons, including not only the limited general knowledge of this procedure, but also difficulties in recruiting women seeking labiaplasty to participate in research. We recruited a sample comprising 55 women seeking labiaplasty from various settings, including both the public and private sector. Participants in the labiaplasty group were matched for age, ethnicity and educational status to a sample of community control women.

Two prior studies have shown that women seeking labiaplasty have demonstrated normal size labia [20,21] and the women with BDD in our group were recorded as being in the normal range. We are therefore reasonably confident that our labiaplasty group would also be matched for labia size in comparison with our community control group.

The number of participants in the labiaplasty group was adequate, yet the minimum required, for performing a factor analysis. The KMO measure verified sampling adequacy for the analysis, and Bartlett's test of sphericity indicated that correlations between items were sufficiently large for a factor analysis.

A limitation of both the present study and Bramwell and Morland's [4] original study is that repeat (test-retest)

reliability has not been examined and should be done in the future. Another limitation is that we have not yet demonstrated sensitivity to change for the GAS and COPS-L after labiaplasty or any other intervention. We plan to study this in future.

We have demonstrated that women diagnosed with BDD who are seeking labiaplasty score significantly higher on the COPS-L and GAS. However, given the specificity of the items in the COPS-L, as well as the greater effect size in comparing women with BDD to those without, it appears more clinically useful than the GAS for identifying women seeking labiaplasty with BDD. These should, however, be regarded as pilot data as the numbers of women with BDD were small ($n=10$). We performed an exploratory ROC analysis and would at present advise a cut-off score of 45 for women requiring further assessment for BDD. Given the low prevalence rate of BDD, and the difficulties in recruiting women seeking labiaplasty, our ROC analysis should be considered pilot data that suffices for clinicians to adopt a cut-off score of 45 at present, at least until further research can be conducted. The limitations of our ROC analysis that would need to be addressed in future research include the necessity of clinically interviewing all the women in the sample to confirm the presence or absence of a diagnosis of BDD.

Although we do not yet have the evidence from a prospective study that labiaplasty is contraindicated in BDD, especially where the genitalia is the sole concern, it would be sensible to suggest that such women have a more detailed assessment and exploration of their concerns and expectations of the procedure. Further research is needed to determine their outcome in labiaplasty using the GAS, COPS-L and other scales of sexual satisfaction and body image.

Conclusions

We recommend that both the GAS and the COPS-L be routinely used for audit and outcome studies for labiaplasty for women distressed by the appearance or functioning of their genitalia. They are both brief with 20 items in total between them. The scales may also be used to determine the outcome of psychological interventions such as 'reassurance' where a woman, after a physical examination, is informed that their appearance is normal. Alternatively, both scales may be used to determine the outcome of a psychological therapy that is being evaluated [21–23] or in a future randomized controlled trial that compares labiaplasty with a psychological intervention.

The GAS and COPS-L overlap to a certain extent but are different constructs. The COPS-L follows the diagnostic criteria of BDD and may screen for women who may require further assessment. The GAS has an advantage in assessing additional functional symptoms, such as discomfort when wearing tight clothing and irritation when exercising or walking. The COPS-L and GAS may be downloaded free from www.kcl.ac.uk/cadat/ under 'Research', 'Questionnaires' and 'Body Image Questionnaires'.

Declaration of interest

The authors report no conflicts of interest.

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► Current knowledge in the topic

- Studies on women seeking labiaplasty have not used any validated scale for genital satisfaction
- The Genital Appearance Satisfaction (GAS) scale has been validated in women in the community.
- There are no validated scales to screen for body dysmorphic disorder in women seeking labiaplasty.

► What this study adds

- We have validated the GAS and the Cosmetic Procedure Screening Scale (COPS-L) for use in women seeking labiaplasty.
- Both scales may be used to evaluate outcome after labiaplasty or a psychological intervention.