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# Long-term outcome of Cognitive Behavior Therapy for Body Dysmorphic Disorder: A naturalistic case series of 1 to 4 years after a controlled trial

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Abstract

Background: There is some evidence for the efficacy of cognitive behavior therapy (CBT) for body dysmorphic disorder (BDD) after 1-6 months but none in the long-term. Aims: The aim of this study was to follow-up the participants in a randomized controlled trial of CBT versus anxiety management to determine whether or not the treatment gains were maintained over time. Method: Thirty of the original 39 participants who had CBT were followed up over 1-4 years and assessed using a number of clinician and self-report measures, which included the primary outcome measure of the Yale-Brown Obsessive Compulsive Scale modified for BDD. Results: Outcome scores generally maintained over time from end of treatment to long-term follow-up. There was a slight deterioration from *n*=20 (51.3%) to *n*=18 (46.2%) who met improvement criteria at long-term follow-up. Eleven (28.2%) were in full remission and 22 (56.4%) were in partial remission. Conclusions: The gains made were generally maintained at long-term follow-up. However, there were a significant number of participants who maintained chronic symptoms after treatment and may need a longer-term or more complex intervention and active medication management.

*Keywords:* body dysmorphic disorder; follow-up; long-term; cognitive behavior therapy; treatment

# Long term outcome of Cognitive Behavior Therapy for Body Dysmorphic Disorder: A naturalistic case series of 1 to 4 years

Body dysmorphic disorder (BDD) consists of a preoccupation with a perceived defect or ugliness, most commonly around the face. The 'flaw(s)' is not noticeable to others, or appears only slight, yet causes enormous shame, depression, and a poor quality of life (Phillips, 2000). BDD is reported as a chronic and unremitting condition (Phillips, Pagano, Menard, & Stout, 2006) with sufferers experiencing high rates of being housebound, hospitalization, suicide attempts and completed suicide (Phillips, Coles, et al., 2005; Phillips & Diaz, 1997; Phillips, Menard, & Fay, 2006; Veale, Boocock, et al., 1996). It is therefore particularly important to develop and evaluate interventions for such a disabling condition. The UK National Institute of Health and Clinical Excellence (NICE) guidelines on OCD and BDD recommended the use of Cognitive Behavior Therapy (CBT) that is specific for BDD, and Selective Serotonin Reuptake Inhibitors (National Collaborating Centre for Mental Health, 2006). However, the evidence base for this recommendation is relatively poor and little is known about long-term outcomes of treatment. To date, there are 4 RCTs that have evaluated CBT for BDD against a wait list. These are all small studies that have demonstrated greater efficacy of CBT compared to a wait-list over 12-22 sessions (Rabiei, Mulkens, Kalantari, Molavi, & Bahrami, 2012; Rosen, Reiter, & Orosan, 1995; Veale, Gournay, et al., 1996; Wilhelm et al., 2014). These studies reported follow-up outcomes between 1 to 6 months where participants have generally maintained their gains. McKay (1999) reported on a 2 year follow-up of 10 participants after they received behavior therapy for 6 weeks and were randomly assigned to either a maintenance program or a control group for 6 months. The author found that a maintenance program was superior to no maintenance

at 2-year follow-up. No RCTs have examined whether a selective serotonin reuptake inhibitor (SSRI) can enhance outcome of CBT for BDD either in the short or long-term.

There are 4 long-term naturalistic outcome studies of people with BDD with 12-month outcomes (Fontenelle et al., 2006; Phillips, Grant, Siniscalchi, Stout, & Price, 2005; Phillips, Pagano, et al., 2006). In these studies, full remission was defined as minimal or no BDD symptoms, and partial remission as meeting less than full DSM-IV criteria for at least 8 consecutive weeks. Phillips, Grant, et al. (2005) retrospectively assessed that at 1 year follow- up, 24.7% of 95 participants had achieved full remission, while another 33.1% had experienced partial remission at the 6-month and/or 12-month follow-up. After 4 years, 58.2% of subjects had reached full remission, and another 25.6% had experienced partial remission. Of those subjects who attained partial or full remission, 28.6% subsequently relapsed. Although all patients had received SSRI medication, only 21.7% had received CBT.

Phillips, Pagano, et al. (2006) conducted a prospective follow-up of 183 participants in which 9% achieved a full remission and 21% partial remission at 1-year follow-up. There was an overall average probability of relapse of .15 in the study. Although most patients had received psychotropic medication, only 16% was considered optimal and only 21.9% had received CBT, in which it was difficult to judge the quality.

Phillips, Menard, Quinn, Didie, and Stout (2013) conducted a prospective 4-year follow-up of 166 adults and adolescents with BDD. After 4 years, 20% had achieved full remission from BDD and a further 35% partial remission. Eighty-eight percent of subjects received mental health treatment during the follow-up period although only 10.2% had an optimal length of course of CBT and 34.3% received a SSRI that was considered optimal. Among partially or fully remitted subjects, the cumulative probability was 0.42 for subsequent full relapse and 0.63 for subsequent full or partial relapse. A lower likelihood of

full or partial remission was predicted by more severe BDD symptoms at intake, longer lifetime duration of BDD, and being an adult.

Lastly Bjornsson et al. (2013) conducted a naturalistic study in an anxiety disorders clinic. They measured recovery from BDD in 17 participants with current BDD and 22 with a lifetime history of BDD for up to 8 years, and found a recovery probability of 0.76. The probability of recurrence of BDD, once remitted, was low at 0.14. However, it is not known how representative this sample was.

The present study is a follow-up report of Veale, Anson, et al. (2014), who conducted a RCT to determine if CBT had greater efficacy than anxiety management (AM) in BDD. Forty-six participants were randomly allocated to either CBT or AM. The participants were fairly typical of outpatients with severe BDD, with a mean BDD-Yale Brown Obsessive Compulsive Score of 35.5 at baseline, and 83% desiring at least one cosmetic or dermatological procedure. These individuals are difficult to engage, and both the expectancy of change and credibility of CBT or AM were rated as very low. Fifty-four percent were classified as having a delusional BDD. Sixty one percent had had a previous trial of a selective serotonin reuptake inhibitor (SSRI) and 45% of participants were stabilized on a SSRI at entry. Thirty seven percent had had previous trial of CBT.

The primary end-point was at 12 weeks and the CBT group, unlike the AM group, had 4 further weekly sessions that were analysed for their added value. Both groups then completed measures at their 1-month follow-up. At 12 weeks, CBT was found to be significantly superior to AM on the BDD-YBOCS ($\beta$ = -7.19, *S.E.* ($\beta$) = 2.61, $p < .01$, *C.I.* = -12.31, -2.07, $d$= 0.99) and on the secondary outcome measures. The conclusion was that CBT was a more effective intervention than AM for individuals with BDD even for those with delusional beliefs or depression at 12 weeks. Participants who were originally randomized to receive AM and still had BDD were then offered up to 16 sessions of CBT. The current study

was exploratory and aimed to follow-up all participants who had CBT from the original sample, either as a first or second treatment, to see how their outcomes had changed over time since offered CBT. The difference to previous follow-up studies is that all participants had received CBT and about 45% had received a SSRI. We hypothesized that non-responders in the long term were more likely to have higher levels of depression and delusional beliefs at assessment. Although a previous follow-up study in BDD found only a trend for depression predicting lower remission (Phillips et al., 2013), other follow-up studies in anxiety disorders have found depression to be associated with a worse outcome, for example in CBT for post traumatic stress disorder (Johnson, 1987), obsessive compulsive disorder (Knopp, Knowles, Bee, Lovell, & Bower, 2013), social phobia (Green, 2009) and generalized anxiety disorder (Foa & Goldstein, 1978). We also hypothesized that participants recruited from a secondary care were more likely to be non-responders. This is because individuals in secondary and tertiary care are under the care of psychiatric team and have more complex needs – for example they tend to have greater comorbidity and social problems than those recruited those from primary care and the Improving Access to Psychological Therapies (IAPT) service, and who are not under any psychiatric care (Gyani, Shafran, Layard, & Clark, 2013). This is part of "stepped care" system in which the care of a patient is provided according to their need or they are stepped up to a higher level of care if they fail at a lower level.

## Method

### Participants

Participants were recruited from the original sample who all had a diagnosis of BDD according to DSM-IV (American Psychiatric Association, 1994) as their main problem, a total score of 24 or more on the Yale Brown Obsessive Compulsive Scale modified for BDD (BDD-YBOCS) (Phillips et al., 1997), were 18 years old or over, and were either not on medication or had been on a stable dose for 12 weeks. Recruitment took place using one of

three methods: (a) sending letters to the participant's home address; (b) telephoning the participant or (c); sending them an email. Recruitment took place between January 2014 and July 2014.

**Design**

The study was a longitudinal follow-up for a case series of between 1 to 4 years (20.23 months on average) of a sample originally recruited to a single blind randomized controlled trial. For detailed descriptions of the original study design, participants, materials and procedure please refer to the original paper (Veale, Anson, et al., 2014).

**Materials**

A range of clinician rated measures were conducted with a trained research worker. The Yale Brown Obsessive Compulsive scale modified for BDD (BDD-YBOCS) (Phillips et al., 1997) was the primary outcome measure. The scale consists of 12 questions that are rated from 0 to 4. Total scores are summed to give a range from 0 to 48. Higher scores indicate higher BDD symptomatology. Cronbach's alpha in our sample was .96. Response or "much improvement" to treatment was defined as 30% or greater decrease in the total BDD-YBOCS, which best corresponded to "much" or "very much improved" on the Clinical Global Impression (CGI) scale (Phillips, Hart, & Menard, 2014). In addition, criterion "a" of at least 2 standard deviations from the sample mean was used to calculate reliable and clinically significant change of participants' scores over time, as there are no normative data for the BDD-YBOCS in a "general" population range to determine criterion b or c (Jacobson & Truax, 1991).This equated to a decrease of 8 points on the BDD-YBOCS. The following assumptions were used for the calculation. The pre-treatment mean and standard deviation of the BDD-YBOCS for BDD sample was 34.77 (6.78). The Standard Error of measurements for the BDD-YBOCS was 3.03. The standard error of difference between the two test scores

was 4.29. The Reliable Change Index was therefore 4.29 x 1.96 = 8.41 (or 8 rounded to a whole number).

The Brown Assessment of Beliefs Scale (BABS) (Eisen et al., 1998) is a 7-item clinician rated scale, rated by a blind assessor, measuring the strength of conviction in a belief (e.g. “I am as ugly as the Elephant man”). Each item score ranges from 0 (least conviction) to 4 (most conviction). Items are summed to give a total score ranging from 0 to 24; (the final item does not contribute to the total score). Higher scores represent increasing delusionality. The Cronbach’s alpha in our sample was .92.

The Montgomery Asberg Depression Rating scale (MADRS) (Montgomery & Asberg, 1979) is a 10-item clinician scale rated by a blind assessor to measure symptoms of depression. Each item is rated on a 7-point Likert scale from 0 (indicating no difficulties) to 6 (indicating high or abnormal levels of difficulties). The item scores are summed to give a total scale score with a range from 0 to 60, with higher scores reflecting greater symptomatology. A classification of depression was made on all those with a MADRS total score ≥25. A total score ≥25 and <31 is regarded as moderate, and ≥31 as severe symptoms. The scale had good inter-rater reliability, which correlated before treatment at .89, and after treatment at .95. The Cronbach’s alpha in our sample was.90.

A series of self-report measures were also administered as detailed below. The Appearance Anxiety Inventory (AAI) (Veale, Eshkevari, et al., 2014) is a 10-item self-report questionnaire for measuring frequency of avoidance and threat-monitoring (e.g. checking) that are characteristic of a response to a distorted body image. Each item is scored from 0 (“not at all”) to 4 (“all the time”). A total score is summed to range between 0 and 40 with higher scores reflecting greater frequency of the responses. Cronbach’s alpha in our sample was .94.

The Patient Health Questionnaire (PHQ-9) (Kroenke & Spitzer, 2002) is a 9-item self-report measure of depression. Items are scored from 0 (“not at all”) to 3 (“nearly every day”). The total score ranges from 0 to 27 with higher scores reflecting greater symptomatology of depression. Cronbach’s alpha in our sample was .94.

The Generalized Anxiety Disorder **(**GAD-7) (Spitzer, Kroenke, Williams, & Löwe, 2006) is a 7-item self-report measure for symptoms of generalized anxiety. Each item is rated from 0 (“not at all”) to 3 (“nearly every day”). The total score ranges from 0 to 21, with higher scores reflecting greater symptomatology. Cronbach’s alpha in our sample was .93.

The Body Image Quality of Life Inventory (BIQLI) (Cash & Fleming, 2002) is a 19-item self-report scale that measures the impact of body image concerns on a broad range of life domains (e.g. sense of self, social functioning, sexuality, emotional well-being, exercise, grooming). The BIQLI is scored as an average numeric score of all the items from -3 (“very negative effect”) to + 3 (“very positive effect”). Cronbach’s alpha in our sample was .98.

**Procedure**

After agreeing to take part in the follow-up study and signing an informed consent form participants were either (a) sent self-report measures via post to complete and send back in a self-addressed stamped envelope, or (b) sent online links to complete each of the self-report measures on a survey website. The procedure they followed was determined by their own preference and self-report measures were completed within participants’ own time-frame. Following the completion of self-report measures, participants scheduled an appointment with the research assistant in which to complete clinician measures and the semi-structured interview. Participants could either choose to have an appointment face to face in a therapy room at our service, or to complete the interview over the telephone.

**Statistical Analysis**

The analysis of long-term efficacy of CBT was "intention-to-treat" analyses. Therefore, data were analysed from all those who completed baseline measures regardless of whether or not they completed the long-term follow-up measures. This was done to control for attrition bias. Inserting an average score for questionnaires was used where only one item of data was missing. Kolmonogorov-Smirnov, skew and kurtosis tests indicated that outcome data were non-parametric and therefore statistical tests run were non-parametric where necessary. Last Observation Carried Forward (LOCF) was used where participants had dropped out of completing the long-term follow-up stage to the study (non-completers) as alternatives such as Multiple Imputation requires parametric data. Descriptive demographic statistics for the sample were calculated and compared to those who did not complete the long-term follow-up. Wilcoxon signed rank tests were used to determine the change in participants' outcome scores across each of the data collection periods; baseline, week 16 (treatment end) and long-term follow-up. Scores for completers were also compared to scores carried forward for non-completers at long-term follow-up. Percentages and frequencies of the following were calculated and where possible compared across time using Exact McNemar tests:

(1) Those who had a 30% decrease in their BDD-YBOCS scores, which was considered "very much improved" on the basis that it is significantly correlated with response of BDD symptoms measured using the Clinical Global Impressions scale (CGI) (Phillips et al., 1997).

(2) Those with reliable and clinically significant change in BDD-YBOCS scores, which was an 8-point decrease on the BDD-YBOCS.

(3) Those with "continuous BDD", which was defined here as having a total BDD-YBOCS score of 24 or more across all of the data collection points.

(4) Those who achieved “partial remission”, which was defined here as starting the trial with a BDD-YBOCS score of 24 or above and then reached a score below 24 but above 12 at a subsequent measurement.

(5) Those who achieved “full remission”, which was defined here as reaching a score of less than 12 on the BDD-YBOCS at post-treatment or follow-up.

(6) Those who relapsed, which was defined here as going back to a BDD-YBOCS score of 24 or above after having reached partial or full remission.

Comparisons were then made between participants at baseline who did and did not achieve a 30% improvement on their BDD-YBOCS score at follow-up for depression, delusionality and setting.

## Results

Figure 1 is a CONSORT flowchart of the numbers of participants that were recruited, and from which follow-up data were collected and analysed. In total, 39 (84.8%) of the original sample received CBT. Of those, 30 (76.9%) agreed to take part in the long-term follow-up. This total was made up of 14 (66.7%) from the original CBT group and 16/25 (64.0%) from those who crossed over into receiving CBT after anxiety management.

For 9 (23.1%) participants, LOCF was used for all outcome measures, and for one participant this was used for clinician measures only. The most common reasons for not taking part in the follow-up were in order of prevalence (a) because participants were unreachable ($n$ = 6, 66.7%) and (b) because participants did not wish to be involved ($n$ = 3, 33.3%). Of the 10 participants to receive CBT who did not complete long-term follow-up measures, 5 were also those who dropped-out of their original treatment early. Thirteen (33.3%) participants were followed up between 1-2 years after finishing therapy, 12 (30.8%) were followed up between 2 and 3 years after, 4 (10.3%) were followed up between 3 and 4 years after therapy and 1 (2.5%) participant had finished therapy 4 years ago.

**Demographic Findings**

Demographic characteristics of the sample collected at baseline are presented in Table 1. The 29 participants who completed all measures for the long-term follow-up did not significantly differ from the 10 who did not complete follow-up measures in terms of any characteristics shown in Table 1.

**Appearance Concerns**

On average, participants had chronic problems and had been concerned with their appearance for a mean of 13.96 years (see Table 1). The most common features of concern were in order of prevalence: skin (*n* = 6, 15.4%); the face in general (*n* = 5, 12.8%); the nose (*n* = 5, 12.8%); body hair (*n* = 3, 7.7%); and legs (*n* = 2, 5.5%). All other concerns (*n* = 18, 46.2%) were with the bottom, chin or jaw, eyes, facial hair, facial skin, hairline, lips, muscles, penis, stomach, teeth, thighs or thorax. Of all participants, 31 (79.5%) reported having multiple concerns. Thirty (76.9%) desired some form of cosmetic surgery, of whom 7 (23.3%) wanted surgery for their main feature of concern. Five participants (12.8%) had undergone a cosmetic procedure in the past.

**Self-Reported Changes over Time from Semi-structured Interviews**

At long-term follow-up, 4 participants reported that they were now not only concerned with the physical feature of appearance that they had originally sought treatment for, but that they were now excessively preoccupied with an additional feature (2 relating to the stomach, 1 to aging and 1 undisclosed). Six participants (15.4%) who had been in a relationship when receiving CBT were now single, and 3 participants (7.7%) who had been single at the time were now in a relationship. Since finishing treatment, 17 participants (43.6%) reported an occupational change. Seven (17.9%) had begun working, 3 (7.7%) had stopped working, and 1 (2.6%) had reduced their hours at work.

At the long-term follow-up, 12 (30.8%) participants were taking SSRI medication. Of these, 1 had started taking medication, 4 had changed from one SSRI to another, 3 had increased the dosage of their SSRI, 1 had decreased the dosage of their SSRI, 2 had changed their SSRI and decreased the dosage, 1 had stayed on the same SSRI and dose and 1 had stopped taking medication altogether. No other change in psychotropic medication was reported.

Ten participants (25.6%) reported having had further psychological treatment after finishing their CBT. Of these, 2 had had another course of CBT, 3 had further CBT from a private therapist, and 4 were having a different form of therapy (these included counselling, group therapy, occupational therapy, and humanistic therapy). The remaining participant had started psychodynamic therapy for borderline personality disorder. Seventeen participants (43.6%) were seeking further treatment at the point of long-term follow-up, of whom 3 (17.6%) had already had further treatment since completing treatment.

**Change over Time according to Standardized Outcome Measures**

Table 2 shows the means and standard deviations, as well as Wilcoxon's rank comparisons for outcome measure scores over time. From pre-treatment to the end of treatment, as well as long-term follow-up, body image quality of life significantly increased and symptomatology on all other measures significantly decreased. No significant differences were observed between the end of treatment and follow-up stages, besides BIQLI scores slightly decreasing between week 16 and the long-term follow-up.

**Previous CBT or subsequent treatment**

There was no significant difference in scores on the BDD-YBOCS at baseline, week 16 or at long-term follow-up between those who had received previous CBT ($n$=11) and those who had not ($n$= 28) (Table 3). There was also no significant difference in scores on the BDD-YBOCS at baseline, week 16 or at long-term follow-up between those who

received psychotherapy or CBT at the end of the trial (*n*=10) and those who had not (*n*= 29). There were also no significant differences between those who had received a SSRI or increase in dose (*n*=12) compared to those who had not (*n*=27) (Table 3).

**"Much Improvement", Reliable Clinical Change, Remission and Relapse**

Table 4 shows how many participants made much improvement (a 30% decrease in BDD-YBOCS scores over time), reliable clinical change, remission, or relapse over time. There was a slight deterioration from *n*=20 (51.3%) to *n*=18 (46.2%) who met 30% improvement criteria for remission. Eleven (28.2%) were in full remission at long-term follow-up and 22 (56.4%) were in partial remission (or 84.6% combined in either full or partial remission). Relapse probabilities for the participants who had a score of 24 or more on the BDD-YBOCS at baseline and then reached full or partial remission are also shown in Table 4. Relapse was examined by combining those who had reached either full or partial remission. Across follow-up the probability of relapse remained relatively low at *n* = 4 (13.3%). Exact McNemar comparisons of frequencies over time indicate that no significant differences in patterns of change occurred over the post-treatment follow-up periods alone (week 16 to long-term follow-up) for any of the measures.

We compared participants on baseline measures for setting recruited, depression (MADRS and PHQ9), delusionality (BABS) between those whose BDD-YBOCS scores improved by 30% or more at long-term follow-up and those whose scores had not (table 5). The findings show that those who did not reach 30% improvement were more likely to have been referred to the treatment from a secondary or tertiary care setting, and scored significantly higher on the MADRS depression rating scale at baseline (but just failed to reached significance on the PHQ9). There was no difference in delusionality on the BABS between the groups.

**Duration of follow-up**

The average duration of time between finishing treatment and completing the current long-term follow-up measures was 26.30 months (excluding those lost to follow-up). In a multiple regression analysis of the participants who were followed up in the long term, duration of follow-up did not predict the difference in baseline and long term BDD-YBOCS scores ($B$ = -.071, $S.E.$ $B$ = .246, $\beta$ = -.052, $P$ = .776) (Supplementary Table 6).

## Discussion

This is the first study to examine a naturalistic outcome of CBT for BDD of a cohort of participants ($n$=39) in the long-term after 1-4 years. Mean observer rated and self-report ratings decreased over time from baseline to long-term follow-up and were maintained from 16-week follow-up. The categorical data and pattern of change showed participants who made significant gains after 16 weeks of CBT generally maintained it. However, about 50% made only limited gains with CBT, and continued to have a chronic condition. The only differences between those who had a 30% improvement at long-term follow-up and those who did not is that the latter were more depressed and were likely to have been recruited from a secondary care setting. The finding that symptoms of depression may be a predictor of treatment outcome contrasts with Phillips et al. (2013) who did not find major depressive disorder to be a predictor of course, or to be significantly associated with rates of remission or relapse. However, their finding was based on the categorical dimension of a diagnosis of major depressive disorder, whereas our analysis was based on a continuous variable on an observer rating scale. It may be that depression may affect the motivation to engage in CBT or in relapse prevention. Of note however, is that delusionality does not predict outcome, and therefore should not determine suitability for CBT. This is in keeping with Phillips et al. (2013) who did not find it a predictor of outcome.

Further breakdown revealed that 28% of participants were in full remission at follow-up and that 56% were in partial remission. It is difficult to compare our findings to other

naturalistic follow-ups – the rates of full remission in our study are similar compared to previous studies who reported 9-25% at 1-2 years and higher than the rate of partial remission reported as 21-33% (Fontenelle et al., 2006; Phillips, Grant, et al., 2005; Phillips et al., 2013; Phillips, Pagano, et al., 2006). However, Phillips, Grant, et al. (2005) reported that at 4 years, 58.2% of subjects had now reached full remission, and another 25.6% had experienced partial remission. However, there are significant variations in the design between the studies, the length of follow-up, the number of participants, and the numbers who received optimal CBT or SSRI management.

The main limitations of the study are the lack of a comparison condition and retrospective design. Thus we cannot be sure that maintenance of symptoms was due to CBT. Some also had additional treatments during the follow-up. Most participants probably had sub-optimal treatment of 16 sessions of CBT and that 24 or more sessions are more likely to be required for optimal treatment. It is also possible that a matched number of Anxiety Management sessions would benefit some participants. There was also no specific modules for treatment of depression which may require additional sessions (Wilhelm et al., 2014). In addition there was no active medication management after the trial, for example maximizing the dose of a SSRI for 1 to 2 years after treatment. However, the aim of the original study was to determine if CBT was more effective than anxiety management after 12 weeks, and in our service patients are normally discharged after treatment to their family doctor or community mental health team. Another limitation is that the overall numbers followed up were relatively small, and we were unable to recruit all the participants from the RCT for the follow-up. This meant that we had to estimate the follow-up mean using LOCF and this may bias the data towards a better outcome. Small numbers also meant that we might have a Type 2 error when exploring sub-analyses (for example those who received further therapy after the trial against those who did not). We did not use the Psychiatric Status Rating Scale or the

-itudinal Interval Follow-Up Evaluation (LIFE), a semi-structured interview and rating system that assesses the longitudinal course of mental disorders (Keller, Lavori, Friedman, & Nielsen, 1987), as an additional criterion for determining the rates of remission or relapse. Instead we used cut-offs on the BDD-YBOCS, so we cannot make adequate comparisons of remission rates with previous naturalistic follow-up studies. We also did not measure frequency or type of personality disorder to determine if they moderated outcome. We identified that severity of depression differentiated a group who made improvements compared to those who did not. However, we did not conduct a formal statistical test for moderation, as the numbers are relatively small.

For the half who made partial remission, a future research question is whether their outcomes can be optimized further with either a longer out-patient or residential unit treatment with modules such as behavioral activation for depression (Dimidjian et al., 2006) combined with a maximum tolerated dose of SSRI medication. The long-term outcomes might also benefit from a maintenance program and closer follow-up in the first 6 months (McKay, 1999). Further research is required to determine whether their outcomes can also be improved by adding modules such as compassion focussed therapy for body shame (Veale & Gilbert, 2014). BDD may be a condition that requires greater investment in both the treatment and maintenance compared to other common emotional disorders.

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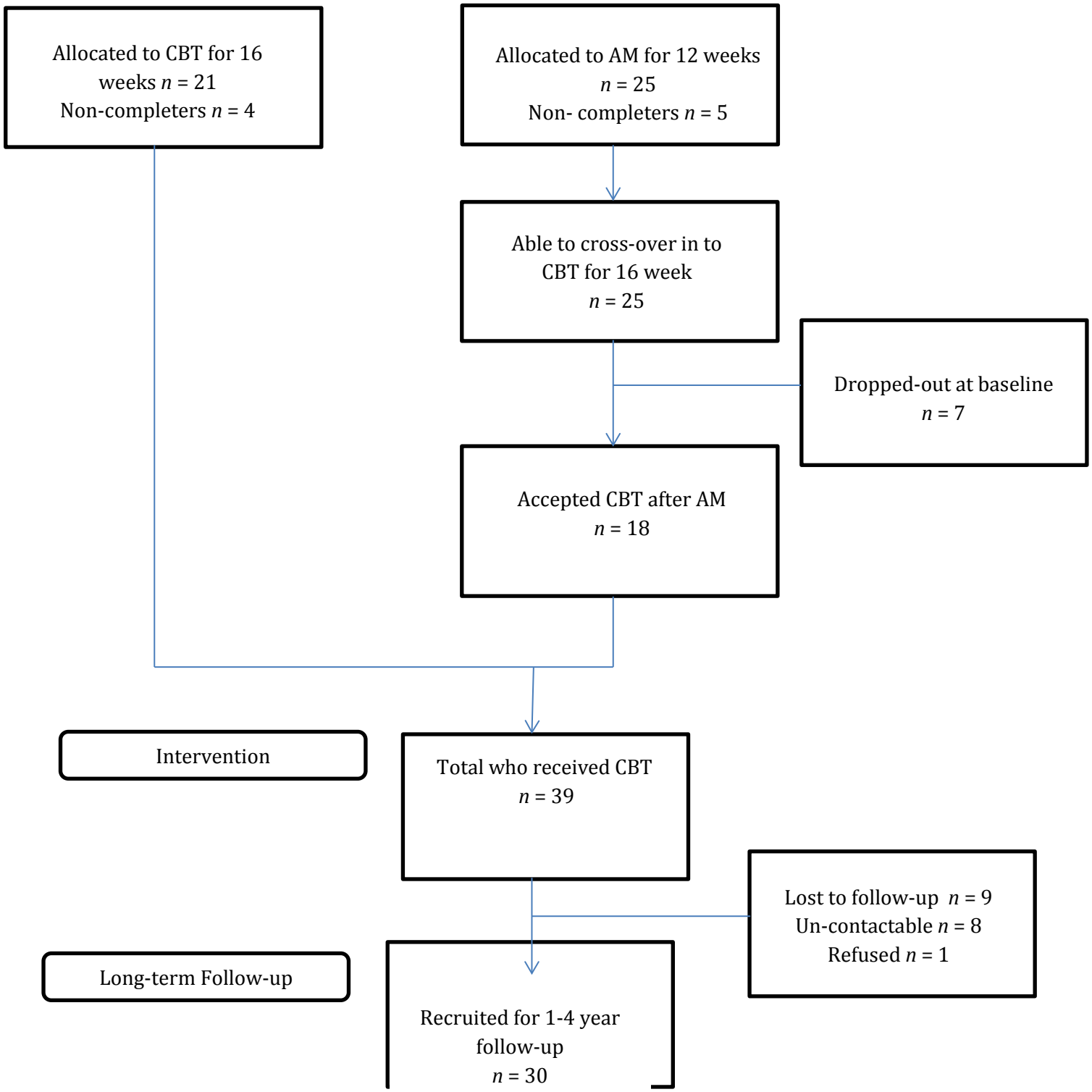
Allocated to CBT for 16 weeks *n* = 21
Non-completers *n* = 4
Allocated to AM for 12 weeks *n* = 25
Non- completers *n* = 5
Able to cross-over in to CBT for 16 week *n* = 25
Dropped-out at baseline *n* = 7
Accepted CBT after AM *n* = 18
Intervention
Total who received CBT *n* = 39
Lost to follow-up *n* = 9
Un-contactable *n* = 8
Refused *n* = 1
Long-term Follow-up
Recruited for 1-4 year follow-up *n* = 30

Figure 1 *Flow diagram of study participants*

Table 1.
*Demographic and clinical characteristics of participants at baseline.*

| Measure | | Total group at baseline | Completers at baseline | Non-completers at baseline | Comparison |
|---|---|---|---|---|---|
| *N* | | 39 | 29 | 10 | - |
| Age in years, *mean* (*SD*) | | 32.23 (9.35) | 31.28 (8.54) | 35.00 (11.42) | $U = 120.50$, $Z = -.789$, $p = .437$, $d = 0.25$ |
| Sex, *n* (*%*) | Male | 16 (41.0) | 13 (44.8) | 3 (30.0) | Fisher's exact test $p = .480$ |
| | Female | 23 (59.0) | 16 (55.2) | 7 (70.0) | |
| Marital Status, *n* (*%)* | Single | 25 (64.1) | 18 (62.1) | 7 (70.0) | Fisher's exact test $p = 1.00$ |
| | Married or Cohabiting | 12 (30.8) | 2 (6.9) | 3 (30.0) | |
| | Separated or Divorced | 2 (5.1) | 9 (31.0) | 0 (0) | |
| Long-term Relationship, *n* (*%*) | Yes | 16 (41.0) | 11 (37.0) | 5 (50.0) | Fisher's exact test $p = .711$ |
| | No | 23 (59.0) | 18 (62.1) | 5 (50.0) | |
| Ethnicity, *n* (*%*) | White | 30 (76.9) | 22 (75.9) | 8 (80.0) | Fisher's exact test $p = 1.00$ |
| | Black | 3 (7.7) | 2 (6.9) | 1 (10.0) | |
| | Mixed Black and White | 2 (5.1) | 2 (6.9) | 0 (0) | |
| | Other | 4 (10.3) | 3 (10.3) | 1 (10.0) | |

| | | | | | |
|---|---|---|---|---|---|
| Employment, *n* (%) | Unemployed | 10 (25.6) | 6 (20.7) | 4 (40.0) | |
| | Long-term Sick Leave | 2 (5.1) | 2 (6.9) | 0 (0) | |
| | Employed or Self-Employed | 21 (53.8) | 16 (55.2) | 5 (50.0) | Fisher's exact test $p = .803$ |
| | Student (full time) | 4 (10.3) | 3 (10.3) | 1 (10.0) | |
| | Homemaker | 2 (5.1) | 2 (6.9) | 0 (0) | |
| Current SSRI, *n* (%) | Yes | 16 (41.0) | 9 (31.0) | 7 (70.0) | Fisher's exact test $p = .062$ |
| | No | 23 (59.0) | 20 (69.0) | 3 (30.0) | |
| Previous CBT, *n* (%) | Yes | 11(28.2) | 6 (20.7) | 5 (50.0) | Fisher's exact test $p = .109$ |
| | No | 28 (71.8) | 23 (79.3) | 5 (50.0) | |
| Referral, *n* (%) | Local Primary Care | 31 (79.5) | 22 (75.9) | 9 (90.0) | Fisher's exact test $p = .653$ |
| | Secondary Care | 8 (20.5) | 7 (24.1) | 1 (10.0) | |
| Duration of problem in years, *mean (SD)* | | 13.96 (9.30) | 13.71 (8.74) | 14.70 (11.26) | $U = 143.50$, $Z = -.048$, $p = .962$, $d = 0.02$ |
| Comorbid DSM-IV diagnosis, *n* (%) | Yes | 23 (59.0) | 19 (65.5) | 4 (40.0) | |
| | Delusional BDD | 23 (59.0) | 15 (51.7) | 8 (80.0) | |
| | Depression | 17 (43.6) | 14 | 3 | |
| | Social Phobia | 5 (12.8) | 3 | 2 | Fisher's exact test $p = .264$ |
| | Eating Disorder | 3 (7.7) | 1 | 2 | |
| | OCD | 1 (2.6) | 1 | 0 | |
| | GAD | 2 (5.1) | 2 | 0 | |
| | Panic Disorder | 1 (2.6) | 2 | 0 | |
| | Alcoholism | 2 (5.1) | 1 | 0 | |

Table 2.
*Comparisons of standardized outcome measure scores over time (using all 39 participants with LOCF).*

| Measure | Point of measurement | | | | | |
|---|---|---|---|---|---|---|
| | Baseline | Week 16 | Long-term follow-up | Baseline – Week 16 | Baseline – Long-term follow-up | Week 16 - Long-term follow-up |
| | *Mean (SD)* | *Mean (SD)* | *Mean (SD)* | *Z, p, d* | *Z, p, d* | *Z, p, d* |
| BDD-YBOCS | 34.77 (6.78) | 22.14 (12.20) | 21.79 (14.55) | $Z$ = -5.21, $p$ < .001, $d$ = 3.03 | $Z$ = -4.89, $p$ < .001, $d$ = 2.52 | $Z$ = -.049, $p$ =.964, $d$ = 0.02 |
| MADRS | 27.84 (11.52) | 19.26 (12.92) | 18.08 (14.39) | $Z$ = -3.61, $p$ < .001, $d$ = 1.42 | $Z$ = -3.84, $p$ < .001, $d$ = 1.56 | $Z$ = -.430, $p$ = .674, $d$ = 0.14 |
| BABS | 18.33 (5.22) | 11.49 (7.39) | 11.59 (7.63) | $Z$ = -4.76, $p$ < .001, $d$ = 2.35 | $Z$ = -4.30, $p$ < .001, $d$ = 1.90 | $Z$ = -.429, $p$ = .675, $d$ = 0.14 |
| AAI | 24.64 (7.88) | 14.46 (9.23) | 11.87 (18.82) | $Z$ = -4.93, $p$ < .001, $d$ = 2.57 | $Z$ = -4.70, $p$ < .001, $d$ = 2.29 | $Z$ = -.824, $p$ = .417, $d$ = 0.27 |
| PHQ-9 | 13.69 (6.47) | 9.21 (7.33) | 9.41 (7.63) | $Z$ = -3.26, $p$ = .001, $d$ = 1.22 | $Z$ = -3.04, $p$ = .002, $d$ = 1.11 | $Z$ = -.123, $p$ = .906, $d$ = 0.04 |
| GAD-7 | 12.15 (6.05) | 7.59 (6.05) | 7.87 (6.00) | $Z$ = -3.57, $p$ < .001, $d$ = 1.39 | $Z$ = -3.74, $p$ < .001, $d$ = 1.50 | $Z$ = -.049, $p$ = .965, $d$ = 0.02 |
| BIQLI | -1.96 (0.64) | -1.31 (1.12) | -2.36 (9.32) | $Z$ = -2.60, $p$ = .009, $d$ = 0.92 | $Z$ = -3.53, $p$ < .001, $d$ = 1.37 | $Z$ = -2.41, $p$ = .015, $d$ = 0.84 |

Table 3.
*BDD-YBOCs scores in those with or without previous CBT, additional psychotherapy or medication after end of trial*

| Time | | Baseline | | Week 16 | | Long-term follow-up | |
|---|---|---|---|---|---|---|---|
| Subgroup | *N (%)* | *Mean (SD)* | Statistics | *Mean (SD)* | Statistics | *Mean (SD)* | Statistics |
| Previous CBT | 11 (28.2) | 35.36 (5.99) | *U* =148.50 | 24.82 (11.80) | *U* = 127.50, | 24.00 (16.99) | *U* = 138.00, |
| | | | *Z* = -.172, | | *Z* = -.828, | | *Z* = -.500, |
| No previous CBT | 28 (71.8) | 34.54 (7.15) | *p* = .866 | 21.11 (12.40) | *p* = .414 | 20.93 (13.73) | *p* = .633 |
| | | | *d* = 0.06 | | *d* = 0.27 | | *d* = 0.16 |
| Additional psychotherapy post-RCT | 10 (25.6) | 34.60 (4.14) | *U* = 100.50 | 25.90 (8.29) | *U* = 127.00, | 20.90 (13.04) | *U* = 140.00, |
| | | | *Z* = .253 | | *Z* = 1.47, | | *Z* = -.459, |
| No additional psychotherapy post-RCT | 29 (74.4) | 33.68 (7.41) | *p* = .804, | 19.11 (11.17) | *p* = .151 | 22.63 (13.53) | *p* = .668 |
| | | | *d* = 0.08 | | *d* = 0.49 | | *d* = 0.15 |
| Medication change post-RCT | 12 (30.8) | 36.33 (5.19) | *U* = 135.00 | 24.67 (10.21) | *U* = 129.50 | 25.67 (13.56) | *U* = 75.50 |
| | | | *Z* = -.823 | | *Z* = -.990 | | *Z* = -1.175 |
| No Medication change post-RCT | 27 (69.2) | 34.07 (7.35) | *p* = .411 | 21.04 (13.00) | *p* = .322 | 19.47 (12.63) | *p* = .240 |
| | | | *d* = 0.34 | | *d* = 0.31 | | *d* = 0.49 |

Table 4.
*Within group frequency comparisons of change over time for participants.*

| Measure | Change over time | | | | | |
|---|---|---|---|---|---|---|
| | Week 16 | Long-term follow-up | | Baseline to | Baseline to long | Week 16 to long |
| | *n (%)* | *n (%)* | | week 16 | term follow-up | term follow-up |
| Improved (> 30% decrease in BDD-YBOCS) | 20 (51.3) | 18 (46.2) | Maintained improvement | - | - | 14 (35.9) |
| | | | Remained no improvement | - | - | 15 (38.5) |
| Not improved(< 30% decrease in BDD-YBOCS) | 19 (48.7) | 21 (53.8) | Became 30% improved or more | - | - | 4 (10.3) |
| | | | Became < 30% improved | - | - | 6 (15.4) |
| | | | McNemar comparison *p* | - | - | .754 |
| Reliable Clinical Change (RCC) | 25 (64.1) | 19 (48.7) | Maintained RCC | - | - | 16 (41.0) |
| | | | Remained non-RCC | - | - | 11 (28.2) |
| Not meeting RCC | 14 (35.9) | 20 (51.3) | Became RCC | - | - | 3 (7.7) |
| | | | Became non-RCC | - | - | 9 (23.1) |
| | | | McNemar comparison *p* | | | .146 |

| | | | | | |
|---|---|---|---|---|---|
| In full remission | 9 (23.1) | 11 (28.2) | Maintained full remission | 0 (0) | 0 (0) | 7 (17.9) |
| Not in full remission | 30 (76.9) | 28 (71.8) | Remained BDD-YBOCS > 12 | 30 (76.9) | 28 (71.8) | 26 (66.7) |
| | | | Became in remission | 9 (23.1) | 11 (28.2) | 4 (10.3) |
| | | | Became symptomatic | 0 (0) | 0 (0) | 2 (5.1) |
| | | | McNemar comparison *p* | .004 | .001 | .687 |
| In partial remission | 21 (53.8) | 22 (56.4) | Maintained partial remission | 0 (0) | 0 (0) | 18 (46.2) |
| Not in partial remission | 18 (46.2) | 17 (43.6) | Remained BDD-YBOCS ≥ 24 | 18 (46.2) | 17 (43.6) | 14 (35.9) |
| | | | Became in partial remission | 21 (53.8) | 22 (56.4) | 4 (10.3) |
| | | | Became symptomatic | 0 (0) | 0 (0) | 3 (7.7) |
| | | | McNemar comparison *p* | <.001 | <.001 | 1.00 |
| Relapsed | | 5 (15.2) | Maintained relapse | - | - | 0 (0) |
| Not relapsed | | 28 (84.8) | Remained in remission | - | - | 17 (56.7) |
| | | | Became relapsed | - | - | 4 (13.3) |
| | | | Became in remission | - | - | 0 (0) |
| | | | McNemar comparison *p* | - | - | .125 |

Table 5.
*Comparisons between participants at baseline who did or did not improve by a 30% BDD-YBOCS score decrease between baseline and long-term follow-up.*

| | | Improved with 30% decrease in BDD-YBOCS score ($n$=18) | Did not improve (30% BDD-YBOCS ($n$=21) | Comparison |
|---|---|---|---|---|
| Referral, *n (%)* | Local Primary Care | 17 (94.4) | 14 (66.7) | Fisher's exact test $p$ = .049 |
| | Secondary or Tertiary Care | 1 (5.6) | 7 (33.3) | |
| Baseline measure, *mean (SD)* | MADRS | 23.67 (11.32) | 31.43 (10.68) | $U$ = 113.50, $Z$ = -2.13, $p$ = .003, $d$ = 0.73 |
| | BABS | 18.83 (5.68) | 17.90 (4.89) | $U$ = 157.00, $Z$ = -.906, $p$ = .373 |
| | PHQ-9 | 11.89 (7.31) | 15.24 (5.36) | $U$ = 128.00, $Z$ = -1.72, $p$ = .087 |

Supplementary Table 6.

*Multiple regression of analysis of the participants who were followed up in the long term*

| Long term follow up outcome variable | Predictor variable | *B* | *SE B* | *β* | *p* | $R^2$ |
|---|---|---|---|---|---|---|
| BDD-YBOCS | Constant | -10.82 | 12.86 | - | .408 | |
| | Baseline BDD-YBOCS | .997 | .389 | .467 | .016 | .204 |
| | Duration of follow-up | -.071 | .246 | -.052 | .776 | |

*Note* SE B = Standard error of B