



# Prevalence of body dysmorphic disorder among Swedish women: A population-based study

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## Abstract

**Background:** Body dysmorphic disorder (BDD) is characterized by a highly distressing and impairing preoccupation with nonexistent or slight defects in appearance. Patients with BDD present to both psychiatric and non-psychiatric physicians. A few studies have assessed BDD prevalence in representative samples of the general population and have demonstrated that this disorder is relatively common. Our primary objective was to assess the prevalence of BDD in the Swedish population because no data are currently available.

**Methods:** In the current cross-sectional study, 2891 randomly selected Swedish women aged 18–60 years participated. The occurrence of BDD was assessed using the Body Dysmorphic Disorder Questionnaire (BDDQ), which is a validated self-report measure derived from the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV criteria for BDD. In addition, symptoms of depression and anxiety were measured using the Hospital Anxiety and Depression Scale (HADS).

**Results:** The prevalence of BDD among Swedish women was 2.1%. The women with BDD had significantly more symptoms of depression and anxiety than the women without BDD. Depression (HADS depression score  $\geq 8$ ) and anxiety (HADS anxiety score  $\geq 8$ ) were reported by 42% and 72% of the women with BDD, respectively.

**Conclusions:** The results of the present study indicate that BDD is relatively common among Swedish women (2.1%) and that it is associated with significant morbidity.

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## 1. Introduction

Body dysmorphic disorder (BDD) is a psychiatric disorder that is defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV as a distressing and impairing preoccupation with a perceived defect in appearance that is not observable to others; if a minor physical anomaly is present, the individual's concern is markedly excessive [1]. In the new version of the DSM (DSM-5), one additional criterion is included, which describes repetitive behaviors (e.g., mirror checking, excessive grooming, skin picking) or mental acts (e.g., comparing his or her appearance with that of others) in

response to the appearance concerns [2]. The most frequent areas of concern are the face and head, and the main worries are related to problems such as acne, wrinkles, scars, the size and shape of the nose or ears, asymmetric or disproportional face, or excessive facial hair. However, there may be a concern regarding any part of the body or even more than one part of the body [3,4]. BDD is characterized by a pattern of obsessive thoughts, feelings, and compulsive behaviors. The preoccupations are very time-consuming and occur, on average, 3–8 hours per day; they are typically difficult to resist or control [5]. Thus, the condition often leads to impaired functioning in relationships, socialization, and intimacy and a decreased ability to function in work, school, or other daily activities [4]. BDD is associated with significant distress, disability, unnecessary cosmetic surgery, and suicidality [3,6–8]. According to a review by Phillips, 80% of individuals with BDD have experienced suicidal ideation during their lifetime, and 24–28% of individuals have attempted suicide [8].

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BDD has high comorbidity rates with mood disorders, anxiety disorders (most commonly social anxiety disorder and obsessive-compulsive disorder), substance use disorders, and eating disorders [9–11]. Major depression and anxiety disorders have been identified in 75–76% and 64–70% of BDD patients, respectively ( $n = 293$  [9] and  $n = 200$  [10]). BDD appears to be slightly more common among women, as indicated by a female:male incidence ratio ranging from 1:1–3:2 in previous studies [5].

Although awareness and research regarding this disorder have increased over the previous two decades, BDD remains an understudied and largely unknown disorder. Some epidemiological studies have assessed the prevalence of BDD and suggest that it is a relatively common disorder. Studies that have examined psychiatric samples have reported BDD in 2.6–16.0% of patients [12–15]. Studies of student populations have yielded prevalence rates ranging from 5 to 13% [16]. Using structured clinical interviews that examined smaller community samples in Italy and the United States, prevalence rates of 0.7% in Italy ( $n = 637$ ) and 0.7% ( $n = 976$ ) to 3% ( $n = 73$ ) in the United States have been identified [17–19]. Only three larger population-based studies using representative samples ( $n > 2000$ ) have been conducted. These studies have identified BDD prevalence rates of 1.7% [20] and 1.8% [21] in Germany and 2.4% in the United States [22]. These statistics represent self-reported symptoms using questionnaires conducted via telephone [22] or face-to-face [20,21]. Questions derived from the DSM-IV criteria for BDD were used in all three larger population-based studies; however, the questionnaires were regrettably not validated. Thus, the BDD prevalence rates vary greatly depending on the population studied and most likely because of different sample sizes and differences and limitations in the assessment methods. Therefore, further epidemiological research using representative samples is needed to study the occurrence of BDD. Currently, there are no data available on BDD prevalence rates in the Scandinavian countries.

The primary objective of this study was to use a validated instrument to assess the prevalence of BDD in a large population-based sample of Swedish women. Furthermore, we examined the occurrence of depression and anxiety symptoms in individuals with BDD.

## 2. Materials and methods

### 2.1. Study design

The study was conducted using a cross-sectional design with a randomly selected population-based sample of Swedish women. Self-screening questionnaires were used to assess the prevalence of BDD and symptoms of depression and anxiety.

### 2.2. Measurements

#### 2.2.1. The Body Dysmorphic Disorder Questionnaire (BDDQ)

The BDDQ is a brief, self-report measure that is derived from the DSM-IV diagnostic criteria for BDD. Using closed-ended questions, it assesses whether an individual's

appearance concerns are sources of preoccupation and, if so, the degree to which they cause distress or interfere with the individual's social or occupational functioning. The questionnaire was developed as a screening instrument for BDD in psychiatric settings and has been validated in a psychiatric outpatient sample ( $n = 66$ ) with high sensitivity (100%) and specificity (89%) [23]. In a psychiatric inpatient sample ( $n = 122$ ), the sensitivity was 100% and the specificity was 93% [13]. A slightly modified version of the questionnaire was validated in a dermatology patient sample ( $n = 46$ ) and exhibited high sensitivity and specificity (100 and 92%, respectively) [24]. The Swedish translation of the BDDQ has been validated in a subsample ( $n = 88$ ) of the present community sample of Swedish women and exhibited a sensitivity of 94%, a specificity of 90%, and a likelihood ratio of 9.4 [25]. The questions of the BDDQ are presented in Fig. 1. To continue the questionnaire, positive answers to the first two questions are required. The third question is used to exclude individuals primarily concerned with not being thin enough to ensure BDD is not over-diagnosed when an eating disorder may be a more accurate diagnosis [26]. A positive answer to at least one section of the fourth question, which assesses distress and impairment caused by the preoccupation, is further required for a positive BDD screening. In the interpretation of the BDDQ, it is suggested that the time spent thinking about the perceived defect should be at least one hour per day to fulfill the BDD diagnostic criteria [26]. Thinking about the appearance flaw for at least an hour per day is also a (optional) time criterion in the diagnosis of BDD according to the Structured Clinical Interview for the DSM-IV (SCID) [27]. Therefore, positive answers to questions one, two, and four in combination with answers b) or c) to question five are required to fulfill the BDD criteria, i.e., to screen positive for BDD if a negative answer to question three is provided [25].

#### 2.2.2. The Hospital Anxiety and Depression Scale (HADS)

The HADS is a 14-item self-report screening scale that was originally developed to indicate the potential presence of anxiety and depression in the setting of a medical, non-psychiatric outpatient clinic [28]. The scale assesses symptoms of depression and anxiety during the previous week. A review from 2002 indicated that the HADS performs well in screening for anxiety disorders and depression in patients from non-psychiatric hospital clinics, as well as in individuals in the general population, general practice patients, and psychiatric patients [29]. The HADS consists of a seven-item anxiety subscale and a seven-item depression subscale; each item is scored from 0 to 3. The HADS depression subscale is assessed by summing the scores of the depression items, and the HADS anxiety subscale is assessed by summing the scores of the anxiety items. Receiver operating characteristic (ROC) curves identify a score  $\geq 8$  as an optimal cut-off score for both anxiety disorders and depression based on the ICD-9 [29]. The severity of symptoms is assessed on a four-grade scale

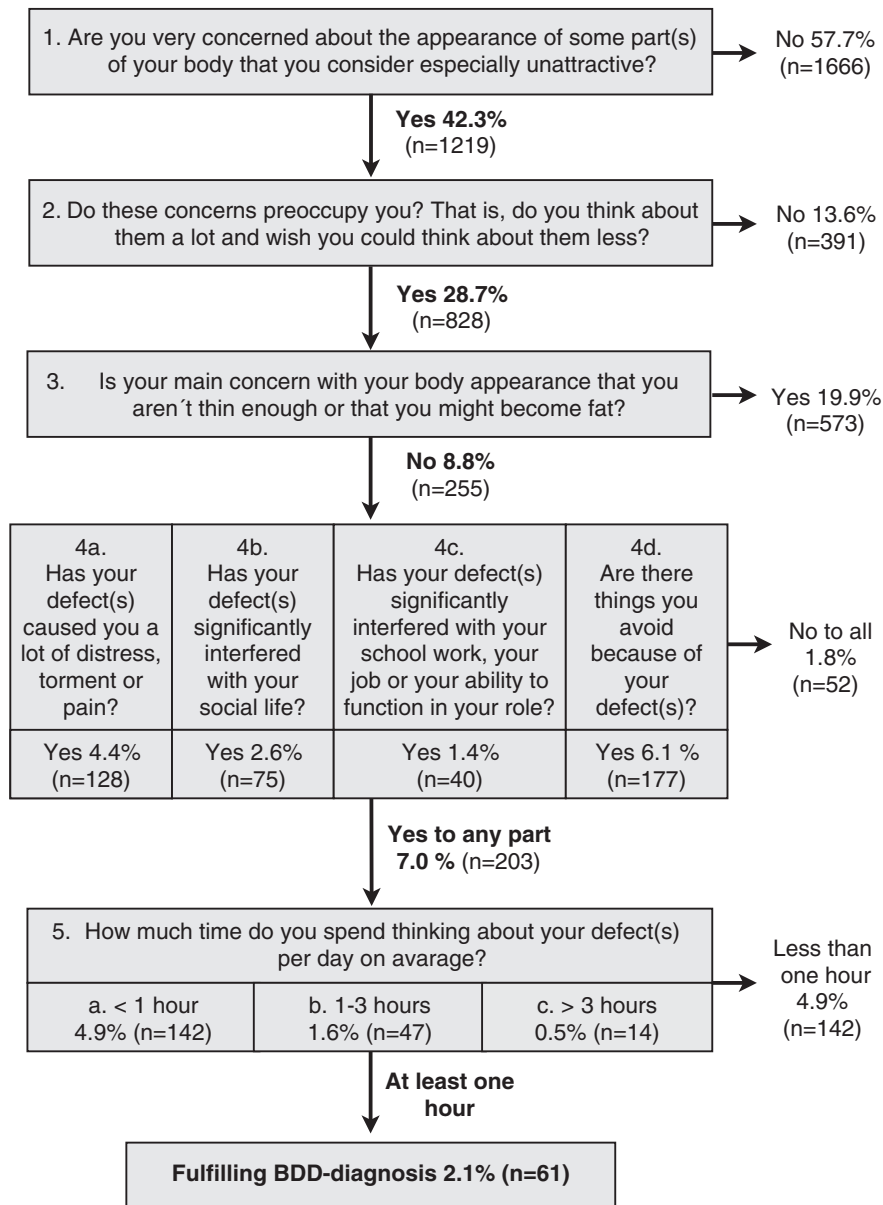


Fig. 1. Proportions of the respondents fulfilling the criteria for body dysmorphic disorder according to the Body Dysmorphic Disorder Questionnaire (BDDQ). Percentages are reported as the proportion of the total number of BDDQ respondents (n = 2885).

for depression and anxiety separately as follows: 0–7 indicates no depression/anxiety, 8–10 indicates mild depression/anxiety, 11–14 indicates moderate depression/anxiety, and 15–21 indicates severe depression/anxiety; this scoring has been used, for example, by Hansson et al. [30].

2.3. Participants

The eligibility criteria included all women aged 18–60 years in the County of Östergötland, who were registered with an accessible address in the national population register. The County of Östergötland, in the southeast of Sweden, has an urban–rural distribution similar to most of Sweden’s 20 other counties. We assumed that our study population was representative of Swedish women in general,

considering the values of looks/appearance, ethnicity, socio-economic factors, and possible comorbid conditions. A sampling randomization was performed based on the social security numbers in the national register using the Statistical Package for Social Sciences (SPSS) version 18.0. Questionnaires were sent via mail to 7000 randomly selected women on October 1, 2009. A return envelope and a letter were also included, which explained that by returning a completed questionnaire, consent to participation would be assumed. A follow-up reminder with a second copy of the questionnaire was sent to the 4700 women who had not responded after four weeks. The final study sample comprised 2891 women. The project was approved by the Regional Ethical Review Board (D no M103-09).

## 2.4. Statistical methods

The demographic characteristics of the women with BDD were compared with those of the women without BDD using Pearson's chi-squared analysis or, where indicated, Fisher's exact test. The symptoms of depression and anxiety in the women with BDD were estimated from the HADS scores and compared with those of the women without BDD using Pearson's chi-squared analysis. Odds ratios were calculated between the different levels of depression/anxiety compared with no depression/anxiety. IBM SPSS Statistics version 20.0 was used for the statistical analyses.

## 3. Results

### 3.1. Sample representativeness

A total of 2891 women participated in the study. After the exclusion of the 80 women whose questionnaires were returned because the addresses were unknown, the response rate was 42%. Because the response rate was low, an analysis of the representativeness of the sample was performed. The study sample ( $n = 2891$ ) was compared with the general female population using the demographic data available from the respondents and the corresponding data on age, degree of education completed, employment status, and profession available from existing Swedish population statistics. Table 1 shows the distribution of the demographic data as percentages within the general population compared with the study sample. The general population consisted of women aged 18–60 years in the County of Östergötland at the time of the study, with the exception of the population used to assess employment status, which consisted of all Swedish women aged 18–64 years because no data were available from the County of Östergötland (Statistics Sweden, 2011). Although some differences were identified, the distribution of the demographic parameters was reasonably similar between the study sample and the general female population.

### 3.2. Prevalence of BDD

The non-response rate on the items required for BDD diagnosis was low; 2885 women completed the BDDQ. The responses to the questions of the BDDQ are presented in Fig. 1. Overall, 42% ( $n = 1219$ ) of the women reported being very concerned with some part(s) of their body that they considered especially unattractive, and 29% ( $n = 828$ ) of the women acknowledged being preoccupied by these concerns. Of the 29% of women with preoccupations with appearance concerns, more than two-thirds of the women reported primary concerns of not being thin enough or a fear of becoming fat.

A total of 2.1% ( $n = 61$ ) of the respondents fulfilled the BDD diagnostic criteria [95% confidence interval 1.7–2.7%]. An age group analysis yielded the following BDD prevalence rates: 3.4% ( $n = 28$ ) among 18–30-year-olds,

Table 1

Demographic data of the sample compared with the general female population.

	Population, % ( $n = 115,101^a$ )	Total sample, % ( $n = 2891$ )
Age (years)		
18–30	30.6	29.2
31–45	35.4	36.4
46–60	34.1	34.4
Education (highest completed)		
Elementary school	11.6	8.9
High school	46.8	45.0
University	36.2	39.0
Other	5.4	7.1
Employment status		
Employed	60.0	67.8
Leave of absence (sick leave, parental leave)	13.7	6.9
Unemployed	5.8	5.9
Not in the labor force (e.g., students, housewives, individuals with a disability pension)	20.5	19.4
Profession		
Legislators, senior officials, managers	2.4	2.6
Professionals	13.4	19.4
Technicians and associated professionals	15.2	19.9
Clerks	7.5	6.7
Service workers and shop sale workers	22.8	22.6
Skilled agricultural and fishery workers	0.4	1.0
Craft and related trade workers	0.6	0.9
Plant and machine operators and assemblers	2.2	2.3
Elementary occupations	4.6	2.6
Armed forces	0.02	0.03
Unknown	30.8	21.9

<sup>a</sup> Population statistics represent women aged 18–60 years in the County of Östergötland ( $n = 115,101$ ), with the exception of the population used to assess employment status, which consisted of all Swedish women aged 20–64 years ( $n = 2,816,200$ ) in 2009.

1.6% ( $n = 17$ ) among 31–45-year-olds, and 1.3% ( $n = 13$ ) among 46–60-year-olds.

The most common consequence of the preoccupation, which was assessed by question four in the BDDQ, was avoidance, which was reported by 92% (56/61) of the individuals who fulfilled the BDD diagnostic criteria. Significant distress was reported by 79% (48/61), social impairment by 51% (31/61), and occupational impairment by 41% (25/61) of the respondents because of their appearance concerns.

Some differences were identified between the BDD and non-BDD groups regarding demographics (Table 2). The individuals with BDD were younger, with 48% belonging to the youngest age group, 18–30-year-olds, compared with 29% of the individuals without BDD ( $p = 0.005$ ). Twenty-eight percent of the BDD group was single, compared with 17% of the non-BDD group ( $p = 0.031$ ). Following adjustments for age, the difference in marital status remained significant only in the oldest age group, i.e., the 46–60-year-olds (Fisher's exact test,  $p = 0.036$ ). Differences were identified in employment status, namely, the women with BDD were more commonly unemployed or on sick leave

Table 2  
Demographic data of individuals with BDD compared with individuals without BDD.

	Individuals with BDD, % (n = 61)	Individuals without BDD, % (n = 2824)	P-value
Age (years)			0.005*
18–30	48.3	28.9	
31–45	29.3	36.6	
46–60	22.5	34.5	
Education (highest completed)			0.013*
Elementary school	19.7	8.7	
High school	47.5	45.1	
University	26.2	39.5	
Other	6.6	6.7	
Marital status			0.031*
Single	27.9	17.2	
In a relationship	72.1	82.7	
Employment status			0.002* <sup>a</sup>
Employed/student	71.7	87.0	
Unemployed	13.3	6.7	
Sick leave/disability support	15.0	6.2	
Household income (Swedish crowns per month)			<0.001*
<10,000	22.0	10.1	
10,000–29,999	44.1	28.6	
30,000–49,999	23.7	34.3	
>50,000	10.2	27.0	

\* Significant difference in the chi-square analysis.

<sup>a</sup> Significant p-value; however, 33% of the cells had an expected count of less than 5.

compared with the women without BDD ( $p = 0.002$ , but with the qualification that the expected frequencies were too low). The BDD group reported a lower degree of education completed ( $p = 0.013$ ) and a lower household income ( $p < 0.001$ ); however, the significance of these differences could not be confirmed in the different age groups because the groups were too small.

### 3.3. Symptoms of depression and anxiety

The respondents with BDD substantially differed from the individuals without BDD with respect to symptoms of depression and anxiety. Depression (HADS depression score  $\geq 8$ ) was reported by 41.7% ( $n = 24$ ) of the BDD group, compared with 9.5% ( $n = 263$ ) of the non-BDD group ( $p < 0.001$ ). Anxiety (HADS anxiety score  $\geq 8$ ) was reported by 72.1% ( $n = 44$ ) of the BDD group, compared with 31.8% ( $n = 883$ ) of the non-BDD group ( $p < 0.001$ ). Therefore, symptoms of depression were greater than four-fold more common and symptoms of anxiety were more than twice as common among the women with BDD. Depression and anxiety were also analyzed separately for the three different age groups, and the differences remained significant for both depression and anxiety in all groups. In Table 3, the BDD and non-BDD groups are compared with respect to depression/anxiety symptom severity, namely, mild, moderate, and severe. The odds ratios indicate significantly higher

risks for all levels of depression/anxiety in the BDD group, with the exception of severe depression, where only one individual with BDD scored.

## 4. Discussion

This is the first study to assess the prevalence of BDD in Sweden. It is the fourth study to report the prevalence rates among representative samples of the general population and is the largest of these studies. We identified a BDD prevalence of 2.1% [95% confidence interval 1.7–2.6%] among Swedish women. Similar results were obtained in the three previous population studies in Germany and the United States, with prevalence rates in women of 1.9% [20], 2.0% [21], and 2.5% [22]. Furthermore, our study indicates that concern regarding appearance is a general phenomenon among Swedish women, as more than 40% of women reported being very worried about one or more body part(s) that they perceived as unattractive, and almost 30% of women were preoccupied by these concerns.

Consistent with previous studies, symptoms of depression and anxiety were more common among the Swedish women with BDD compared with the women without BDD. Depression and anxiety were operationalized as a HADS score  $\geq 8$  on the corresponding subscale, in accordance with previous research [29]. Using this definition, we identified depression and anxiety in 42% and 72% of the respondents with BDD, respectively. Depression was greater than four-fold more common and anxiety was more than twice as common in the women with BDD compared with the women without BDD. Additionally, when the severity of symptoms was compared, the BDD women had higher scores for mild, moderate, and severe depression/anxiety than those of the women without BDD. Because of the small number of BDD women in each category, these results should be interpreted with caution. The high levels of depression and anxiety symptoms support the findings of previous comorbidity studies. Among 200 BDD patients, mood disorders were identified in 88% of the sample, with major depressive disorder found to be the most frequent (75%) disorder, whereas anxiety disorders were identified in 73% of the sample [10]. When women and men were analyzed separately, major depressive disorder and anxiety disorders were identified in 76% and 70% of the 137 women with BDD, respectively [31]. In these studies, depression was thus even more common than in our sample; however, the rates represented the lifetime occurrence of comorbid disorders, whereas in our study, we assessed current symptoms of depression and anxiety. In another study of 293 BDD patients, 58% of individuals had current major depression and 55% of individuals had a current anxiety disorder [9]. Veale et al. demonstrated that 28% of 50 BDD patients had (current) depression according to the Montgomery and Åsberg Depression Scale (MADRS) [32]. For depression, our results fall within the range of earlier findings of current

Table 3

Symptoms of depression and anxiety in individuals with body dysmorphic disorder (BDD) compared with those of individuals without BDD according to the Hospital Anxiety and Depression Scale (HADS).

	HADS Depression													
	None		Mild (8–10)				Moderate (11–14)				Severe (≥15)			
	n	%	n	%	OR <sup>a</sup>	95% CI	n	%	OR <sup>a</sup>	95% CI	n	%	OR <sup>a</sup>	95% CI
No BDD (n = 2775)	2512	90.5	174	6.3	1.0	-	70	2.5	1	-	19	0.7	1	-
BDD (n = 60)	35	58.3	15	25.0	6.2	3.3–11.5	9	15.0	9.2	4.3–19.9	1	1.7	3.8	0.5–29.0
	HADS Anxiety													
	None		Mild (8–10)				Moderate (11–14)				Severe (≥15)			
	n	%	n	%	OR <sup>b</sup>	95% CI	n	%	OR <sup>b</sup>	95% CI	n	%	OR <sup>b</sup>	95% CI
No BDD (n = 2778)	1895	68.2	448	16.1	1.0	-	299	10.8	1.0	-	136	4.9	1.0	-
BDD (n = 61)	17	27.9	18	29.5	4.5	2.3–8.8	17	27.9	6.3	3.2–12.6	9	14.8	7.4	3.2–16.9

<sup>a</sup> Odds ratio of the level of depression compared with no depression.

<sup>b</sup> Odds ratio of the level of anxiety compared with no anxiety.

comorbidity, whereas for anxiety, our results are more similar to earlier findings of lifetime comorbidity.

When the demographics of the BDD and non-BDD women were compared, we identified differences, indicating the potential consequences of BDD morbidity. The women with BDD were more likely to be single at the age of 46–60 years, which is consistent with the impaired functioning in relationships and social isolation that are associated with the disorder [4]. In our sample, the women with BDD were also more often unemployed or on sick leave compared with the non-BDD women; however, the lower degree of education completed and the lower household income among the women with BDD must be interpreted with caution because these differences can be explained by the fact that the women with BDD were younger (as the results were not significant when adjusted for age). These potential consequences of BDD morbidity and our findings of comorbidity with depression and anxiety further emphasize the suffering endured by individuals with BDD.

The results of the present study provide additional evidence that BDD is a common problem in the general population. However, BDD is often unrecognized by dermatologists, plastic surgeons, and other physicians, whom these patients primarily approach [8]. Several studies indicate that appearance-enhancing treatments, such as cosmetic surgery or various dermatological treatments, do not typically (in 72–91% of cases) result in a decrease in BDD symptom severity. In contrast, individuals with BDD are often dissatisfied with the results of the cosmetic treatments; some individuals develop new appearance concerns, and symptom exacerbation is not uncommon [33,6]. The large number of women with BDD in the population is alarming, as help-seeking patients may not receive effective treatment. Therefore, it is important to increase the knowledge regarding BDD among health-care providers and to offer adequate treatment. Effective treatments for BDD include serotonin-reuptake inhibitors [34] and cognitive behavioral therapy [35,36].

A weakness of the present study was the response rate of 42%, which was lower than expected and lower than the response rates obtained in the previous large prevalence studies of BDD, i.e., 56% [22], 61% [20], and 60% [21]. The higher rates may be explained, in part, by the choice of the survey modes used in the previous studies, namely, telephone and face-to-face approaches. Our results are regrettably consistent with the trend of declining response rates in surveys in general [37–39]. Nevertheless, our sample is, to our knowledge, the largest sample used to date to examine the prevalence of BDD. Random sampling was used to increase the representativeness of the results. A representativeness analysis was conducted, which indicated a similar distribution between the study sample and the general population with respect to the demographic data provided by the respondents (age, level of education completed, employment status, and profession).

The use of a self-administered questionnaire makes it possible to study large samples, and the BDDQ has shown good sensitivity and specificity in previous validation studies in psychiatric and dermatological settings [13,23,24], as well as when validated in a subsample in the present study [25]. The DSM-IV criterion C, that the symptoms are not better accounted for by another disorder, is difficult to assess with a self-report measure. In the development of the BDDQ, Phillips stated that when screening for BDD, a positive answer to question 3 indicates the presence of an eating disorder [26]. This is the reason for the exclusion of all women who provided positive answers to this question from the BDD diagnosis in our study. Thus, we avoided the over-diagnosis of BDD when an eating disorder may have been a more accurate diagnosis. Rief et al. also excluded all individuals who reported their body weight as the primary cause of their appearance concerns from the group diagnosed with BDD [20]. Similarly, in the other large German population study, individuals with eating disorders were excluded [21]. However, eating disorders and BDD can be comorbid conditions, in which case both disorders should be

diagnosed [39]. Phillips et al. [10] demonstrated that 33% (42% in women) of 200 BDD patients met the criteria for a lifetime comorbid eating disorder; correspondingly, in patients with an eating disorder, 39% [40] and 45% [41] also met the criteria for BDD. The exclusion of all women who were primarily concerned with not being thin enough or who were afraid of becoming fat from the BDD diagnosis creates an obvious risk of under-diagnosis of BDD, which indicates that the actual prevalence of BDD may be higher than we have identified in the present study. Undoubtedly, further research is necessary regarding this problem with the screening for BDD.

The recently added criterion in the DSM-5 states that at some point during the course of BDD, the individual should have performed repetitive behaviors or mental acts in response to the appearance concerns [2]. Because the BDDQ is derived from the DSM-IV criteria for BDD, these symptoms are not specifically assessed by the questionnaire; however, question five measures how much time is spent thinking about the perceived defect, which can represent mental acts. In light of the new criterion, one hour per day may not be a sufficient amount of time to fulfill the BDD diagnosis because, according to previous research, BDD preoccupations occur, on average, 3–8 hours per day [5]. In future studies, the assessment of repetitive behaviors should be included in the diagnosis of BDD.

## 5. Conclusion

The prevalence of BDD among Swedish women was 2.1% when the diagnosis was based on the DSM-IV criteria. Symptoms of depression and anxiety were significantly over-represented in women with BDD. Further research on BDD is needed. In Sweden, the prevalence rate for men has yet to be assessed, and further exploration is needed regarding the morbidity, suicidality, and health care requirements of individuals with BDD. If possible, prevalence studies based on diagnostic interviews should be performed to verify our results. The problem of differentiating between BDD and eating disorders in light of the comorbidity of the conditions may thus be better addressed.

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