ORIGINAL REPORT

# Body Dysmorphic Disorder and Self-esteem in Adolescents and Young Adults with Acne Vulgaris

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**Body dysmorphic disorder is a mental health disorder characterized by a preoccupation with a perceived flaw, which is commonly seen among dermatology patients. The objective of this study was to determine the frequency of body dysmorphic disorder and assess self-esteem among a clinical sample of adolescents and young adults being managed for acne vulgaris. A total of 105 patients, age range 13–24 years, receiving acne treatment at 1 of 2 dermatology outpatient clinic were included. A self-report questionnaire was used, which included a body dysmorphic disorder screening tool (based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) diagnostic criteria) and the Rosenberg Self-Esteem Scale (RSES). Acne was graded with the Cook's acne grading scale. Out of 105 adolescents and young adults visiting a dermatologist due to acne, 13 (12.4%) screened positive for body dysmorphic disorder (95% confidence interval (95% CI) 6.8–20.2%). Patients with body dysmorphic disorder were more likely to have female gender ($p = 0.020$) and had lower self-esteem (RSES 15.8 vs 20.5, respectively, $p = 0.013$) compared with patients without body dysmorphic disorder. No differences were found in the frequency of body dysmorphic disorder with DSM-IV or DSM-5 criteria. This is the first study to report on the frequency of body dysmorphic disorder and self-esteem in adolescents and young adults with acne. Ultimately, more awareness of body dysmorphic disorder among adolescents and young adults presenting with dermatological disorders could lead to more rapid recognition and referral to psychiatric units.**

*Key words:* acne; body dysmorphic disorder; self-esteem.

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## SIGNIFICANCE

Body dysmorphic disorder is commonly seen within adult dermatological settings, although research on adolescents and young adults with skin conditions and body dysmorphic disorder is sparse. The current study shows that approximately 1 in 8 patients between 13 and 24 years of age seeking dermatological care due to acne screen positive for this mental health disorder. This finding is relevant, as recognizing body dysmorphic disorder can be challenging, and often invasive and unwarranted treatments, such as oral isotretinoin therapy, are prescribed (which are unlikely to significantly reduce body dysmorphic disorder symptom severity). More awareness of mental health symptoms among adolescents and young adults with skin conditions could help dermatologists make more rapid diagnoses and improve long-term outcomes for these patients.

Body dysmorphic disorder (BDD) is a mental health disorder diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria (1). The DSM-5 defines BDD as a preoccupation with a perceived defect in physical appearance that appears non-existent or slight to others, which is associated with the presence of repetitive behaviours (e.g. excessive grooming, mirror checking, skin-picking) and causes clinically significant distress or impairment in social, occupational or other areas of functioning (2). Comorbid psychiatric disorders are commonly seen, with depression, (social) anxiety and personality disorders among the most frequent (3, 4). Suicidality is also a common feature, with suicidal ideation seen in 80% and suicide attempts in 25% of patients during the course of BDD (5). Treatment consists of a combination of cognitive behavioural therapy and pharmacotherapy (typically a high-dosed, selective serotonin reuptake inhibitor) leading to similar response rates of 50–80% for adolescent and (young) adult patients (6, 7).

BDD typically manifests during adolescence, with a mean age of onset of 16 years, but identifying this condition in adolescents and young adults can be difficult, as worrying about appearance is often regarded as normal adolescent and young adult behaviour (8). Recognizing an abnormal or disproportionate obsession with appeaance, however, is important, as recent studies show adolescents and young adults might have a more severe form of BDD than adults (9). Adolescents and young adults with BDD demonstrate less insight, more appearance-related delusions, and higher rates of therapy resistance and suicide attempts (10). Measures of psychosocial functioning are often reduced, with poor performance in school and an increased risk of dropout (11).

The skin is one of the most common areas of concern in BDD, and it is estimated that approximately 12.5–15.0% of all dermatology and plastic surgery patients in fact

screen positive for BDD (12). Approximately half of patients with BDD have visited a dermatologist at least once in their life, rendering dermatologists one of the most sought-out doctors by patients with BDD (12). Patients present to dermatology outpatient units or cosmetic clinics with a variety of dermatological conditions, with vascular lesions, (de)pigmentations and acne vulgaris being among the most common (13). It has been estimated that between 8.6% and 14.1% of adult patients presenting to a dermatologist due to acne vulgaris, screen positive for BDD (14). Often patients will demand invasive and unwarranted treatments, such as oral isotretinoin therapy and laser abrasion, which are unlikely to significantly reduce symptom severity (15). Expectations about treatment options are usually unrealistic, leading to non-compliance with drug therapy and disappointment and frustration on both sides of the doctor-patient relationship (16). It is noteworthy that most studies on BDD and dermatological conditions focus primarily on adults, and research among young adults seems sparse.

Self-esteem plays a pivotal role in adolescent and young adult health and development (17). Low self-esteem in adolescents and young adults has been consistently linked to earlier initiation of substance abuse and sexual activity (17). It has even been connected to negative long-term outcomes, such as unemployment, financial difficulties and mental health issues, as an adult (18). Acne vulgaris has been shown to have a negative effect on self-esteem, similar to that of a chronic disorder, such as diabetes or asthma. Higher rates of failure to thrive at school, anxiety and even suicide have also been reported among youth with acne vulgaris (19). Mental health problems can also further affect self-esteem, with studies illustrating that individuals with BDD, depression and anxiety generally report lower measures of self-esteem (20, 21).

The aim of this study is to determine the frequency of self-reported BDD among adolescents and young adults being managed for acne vulgaris, by using rephrased DSM-5 diagnostic criteria as screening questions. The authors hypothesized that the frequency of self-reported BDD would be higher, and lower measures of self-esteem would be more common in young adults being managed for acne vulgaris compared with non-clinical community samples. As many individuals with BDD avoid mental health services and instead seek cosmetic or dermatological treatment for their perceived skin defects, dermatologists are provided with an important opportunity to intervene (22). A more rapid diagnosis is relevant, as a longer duration of symptoms is associated with more treatment-resistance and an increased risk of suicide (23). Ultimately, more awareness of body dissatisfaction among young adults could help implement more adequate screening strategies, perhaps preventing psychological symptoms formed during adolescence from becoming more chronic and disabling in adulthood.

## MATERIALS AND METHODS

### *Population and design*

A total of 105 dermatology outpatients (74 female gender, 30 male gender and 1 non-binary patient) were included in this cross-sectional, double-centre study between June 2019 and December 2021. Patients between 13 and 24 years of age, currently receiving treatment for acne vulgaris, were asked by their consultant dermatologist to participate in the study. Written informed consent was subsequently obtained by a researcher (including parental permission if patients were younger than 16 years), after which patients completed an online 38-item questionnaire (Appendix S1) containing the RSES and self-report DSM-5-based screening questions for BDD. In case of intellectual or language disabilities, participants were not included in the study. The study was approved by the medical research ethics committee of both the Amsterdam University Medical Center, location AMC and the Dijklander hospital in Purmerend.

### *Measures*

To determine the likelihood of a BDD diagnosis, DSM-5 criteria have been rephrased into 11 Dutch true-or-false screening questions (24). The first criterion (preoccupation with a perceived flaw) was assessed with 3 questions that required positive answers. The second criterion referred to repetitive behaviours and was covered by 4 questions, of which at least 1 question required a positive answer. The third criterion (clinically significant distress) was assessed with 4 different screening questions and required 1 positive answer. The fourth criterion was aimed at differentiating from an eating disorder.

### *Rosenberg Self-Esteem Scale*

Self-esteem was measured with the Rosenberg Self-Esteem Scale, a widely used and validated 10-item self-report questionnaire (25). Answers are given on a Likert scale, ranging from completely agree to completely disagree. The total scores ranged from 0 to 30, with higher scores representing greater self-esteem. The cut-off value for low-self-esteem was 18 points. Several questions are reverse scored to reduce bias.

### *Cook's acne grading scale*

The severity of acne was graded by a trained researcher, using the Cook's acne grading scale, which is one of the most well-known and validated acne grading methods (26). This method uses a 0–8 scale and offers 5 photographic standards that illustrate the individual categories. In accordance with the Cook's acne grading scale, mild acne was defined as grade 0 or 2. Moderate acne was defined as grade 4 or 6, and severe acne as grade 8. The distinction between mild, moderate and severe was imperative for this study, as positive screening results for BDD are only clinically relevant if the severity of acne is mild. When the severity of acne was uncertain, a consultant dermatologist was asked to assist in grading.

### *Statistical analysis*

Data were analysed with IBM SPSS statistics version 26 (IBM SPSS Statistics for Windows, Version 26.0. Chicago, USA) and a 0.05 level of significance was maintained for all tests. When the assumption of normality was met, independent samples *t*-tests were used to determine differences in continuous variables, such as age, duration of symptoms and Rosenberg Self-Esteem Scale between groups with positive and negative screening results. When the assumption of normality was not met, medians and ranges were used to describe the data and non-parametric tests were used for analysis. Differences between these groups were calculated with

contingency tables and the $\chi^2$ test. The Fisher's exact test was used when cell counts were low. The Mann–Whitney *U* test was used to analyse continuous variables, such as age, duration of symptoms and the Rosenberg Self-Esteem Scale score.

## RESULTS

### *Demographic and clinical characteristics*

A total of 117 acne patients were recruited for inclusion, of which 10 (8.1%) declined to participate. Two patients were excluded due to not completing the questionnaire in full, ultimately resulting in a sample of 105 patients, with an age range between 13–24 years. We used self-reported gender data; 74 individuals identified as female, 30 as male and 1 as non-binary. Demographic and clinical characteristics for both groups are shown in **Table I**. The mean (standard deviation; SD) age for all individuals was 19.6 (3.2) years. Facial acne was most commonly reported among 96.2% of the sample. Chest acne (36.2%) and back acne (48.6%) were less commonly reported. Approximately half of the sample reported currently using isotretinoin or having used isotretinoin in the past. Of all respondents 21.9% were having or have had laser therapy, light therapy or chemical peelings for their acne.

### *Patients presenting with mild acne and frequency of body dysmorphic disorder*

Of all 105 patients, 16 met the DSM-5 criteria for BDD; however, only patients presenting with mild acne ($n=13$), screened positive for BDD, resulting in a frequency of BDD of 12.4% (95% CI 6.8–20.2%). Patients presenting with mild acne and BDD had a mean (SD) age of 20.6 (2.8) years and all reported female gender ($p=0.020$). The mean (SD) duration of acne was 6.4 (3.8) years and 61.5% reported using, or having used, isotretinoin in the past. With regard to repetitive behaviour, patients with mild acne, with BDD, were statistically significantly more likely to perform excessive mirror checking (92.3%) and ask for reassurance (69.2%) compared with patients without BDD (who scored 44.6% and 15.2%, respectively). No significant differences were found between the 2 groups with regard to skin-picking and comparing appearance.

**Table I. Baseline characteristics ($n=105$)**

| Sociodemographic and clinical characteristics | Total |
|---|---|
| Age, *n* (%) | |
| Adolescent | 49 (46.7) |
| Young adult | 56 (53.3) |
| Gender, *n* (%) | |
| Female | 74 (70.5) |
| Male | 30 (28.6) |
| Other (non-binary) | 1 (1) |
| Educational level, *n* (%) | |
| Primary school | 9 (8.6) |
| Secondary school | 42 (40.0) |
| Vocational education | 37 (35.2) |
| University | 17 (16.2) |
| Duration acne, years, mean (SD) | 5.3 (3.2) |
| Severity acne: Cook's acne grading scale | |
| 0–2 | 74 (70.5) |
| 4–6 | 30 (28.6) |
| 8 | 1 (1,0) |
| Localization acne, *n* (%) | |
| Face | 101 (96.2) |
| Chest | 38 (36.2) |
| Shoulders/back | 51 (48.6) |
| (Previous) treatment, *n* (%) | |
| No treatment | 40 (38.1) |
| Isotretinoin | 54 (51.4) |
| Laser, light or chemical peeling | 23 (21.9) |
| Self-esteem, Rosenberg Self-Esteem Scale, mean (SD) | 19.9 (5.9) |
| Focus on presence: h per day, *n* (%) | |
| <1 | 50 (47.6) |
| 1–3 | 41 (39.0) |
| >3 | 14 (13.3) |

SD: standard deviation.

### *Comparing sociodemographic and clinical features*

**Table II** shows the differences in sociodemographic and clinical features for patients with and without BDD. Patients with BDD demonstrated significantly lower self-esteem scores, as measured with the RSES, compared with patients without BDD (RSES 15.8 vs 20.5 respectively). No statistically significant differences were found in other clinical or sociodemographic correlates, such as age, education, duration and/or localization of acne.

## DISCUSSION

To our knowledge, this is the first study to determine the rate of BDD among adolescents and young adults with acne vulgaris with mild acne at 2 dermatology outpatient clinics, using rephrased DSM-5 diagnostic criteria.

The results show that 16 out of 105 adolescents and young adults screened positive for BDD. Of these 16

**Table II. Sociodemographic and clinical characteristics between patients with positive and negative screening results for body dysmorphic disorder (BDD)**

| Sociodemographic and clinical characteristics | BDD $n=13$ | No BDD $n=92$ | *p*-value |
|---|---|---|---|
| Age, years, mean (SD) | 20.6 (2.8) | 19.4 (3.3) | n.s.[a] |
| Adolescents | 5 (38.5%) | 44 (47.8%) | n.s.[b] |
| Young adults | 8 (61.5%) | 48 (52.2%) | n.s.[b] |
| Gender, *n* (%) | | | 0.020[b] |
| Female | 13 (100) | 61 (66.3) | |
| Male | 0 (0) | 30 (32.6) | |
| Other (non-binary) | 0 (0) | 1 (1.1) | |
| Duration acne, years, mean (SD) | 6.4 (3.8) | 5.1 (3.1) | n.s.[a] |
| Localization acne, *n* (%) | | | |
| Face | 13 (100) | 88 (95.7) | n.s.[b] |
| Chest | 3 (23.1) | 35 (38.0) | n.s.[b] |
| Shoulders/back | 5 (38.5) | 46 (50,0) | n.s.[b] |
| (Previous) treatment, *n* (%) | | 46 (50.1) | n.s.[b] |
| Isotretinoin | 8 (61.5) | 18 (19.6) | n.s.[b] |
| Laser, light or peeling | 5 (38.5) | | |
| Self-esteem, RSES, mean (SD) | 15.8 (6.5) | 20.5 (5.6) | 0.003[c] |
| Focus on appearance, h/day | | | n.s.[b] |
| <1 | 4 (30.8) | 46 (50.0) | |
| 1–3 | 5 (38.5) | 36 (39.1) | |
| >3 | 4 (30.8) | 10 (10.9) | |

[a]Mann–Whitney *U* test; [b]Fishers exact test; [c]Independent samples *t*-test.
RSES: Rosenberg Self-Esteem Scale; CAGS: Cook's acne grading scale; SD: standard deviation; n.s.: not significant.

adolescents and young adults, 3 with moderate or severe acne were excluded, as a BDD diagnosis is only valid if the acne appears non-existent or slight according to the trained researcher. Therefore, it was concluded that 13 out of 105 adolescents and young adults screened positive for BDD; a frequency of 12.4% (95% CI 6.8–20.2%).

There is no prior research on the frequency of BDD among adolescents and young adults with dermatological conditions as a comparison; however, healthy adolescent community-based studies have found frequency rates of 2.2% (27). These numbers indicate that adolescents seeking help for perceived skin problems are an at-risk group for BDD and low self-esteem. Prior research in adults with acne vulgaris in dermatology outpatient healthcare facilities, have found frequency rates for BDD of 11.1% and 12.6% (12, 27). These findings imply that adolescents and adults being treated for acne appear to be equally at risk for BDD.

In the current study, all of the patients with BDD identified as female. Prior research on sex ratio in BDD has yielded mixed results, with different settings being associated with different ratios. Within a healthy community-based sample, a 2.58:1 female:male sex ratio was reported by the authors; however, within a specialized mental healthcare facility for patients with BDD, the sex ratio appeared equal (28). In a multicentre trial by Marron et al. (29) 43 out of 406 adult patients with acne screened positive for BDD, of which 79.1% reported female sex. This tendency in prior literature towards female sex, could be related to women generally experiencing greater self-consciousness of appearance, possibly due to greater social pressure (30). The current findings should be interpreted with caution, however, as there was an overrepresentation of female gender patients in our study sample. This might be explained by the fact that female dermatology patients have been reported to more actively pursue treatment for their skin problems than male patients (31).

Self-esteem was significantly lower in adolescents and young adults with BDD compared to those without BDD (RSES 15.8 vs 20.5, respectively). The negative relationship between BDD and self-esteem is in line with prior research in adults. A meta-analysis by Kuck et al. (20) demonstrated lower levels of self-esteem in adult patients with BDD. When interpreting these results, the overrepresentation of female gender patients in the study sample should be taken into account, as the female gender patients in general displayed significantly lower levels of self-esteem, than the male gender patients (RSES 18.7 vs 23.1; $p<0.001$). This is in keeping with prior research; women with acne generally report lower levels of self-esteem than men with acne (possibly reflecting differences in societal expectations) although research on this topic has yielded mixed results (31).

With regard to the separate diagnostic DSM-5 criteria of BDD, the current study found that 18.1% of all included patients met the first criterion (preoccupation). A healthy German population-based study yielded similar results ($n=2{,}129$; age range 18–65 years) and reported that 16% met the first criterion (28). A self-report study by Mollmann et al., based on 308 healthy, German adolescents and young adults (age range 15–21 years) reported that 50.3% of their sample met the first criterion, which implies that adolescents and young adults might be more inclined towards preoccupation by perceived skin defects than adults (32). However, this difference could also be explained by the fact that Mollmann et al. (32) used just 1 question to ascertain the first criterion, contrary to the current study questionnaire, which comprised 3 screening questions. The second criterion (repetitive behaviours and mental acts), which was introduced in the DSM-5, was met by 84.8% ($n=89$) of the study sample. Adolescents and young adults with BDD were more likely to perform excessive mirror checking and asking peers for reassurance, than those without BDD ($p=0.001$). Skin-picking and comparing appearance were not significantly different between groups. Perhaps this reflects that these behaviours are pathognomonic for all patients with acne vulgaris, and not just for patients with BDD *per se*. Interestingly, no patients in the current study screened negative on the basis of not fulfilling the second criterion (i.e. not performing at least 1 form of repetitive behaviour). Thus, this newly added DSM-5 criterion does not seem to influence the frequency of BDD found in the current study. Schieber et al. (28) assessed the frequency of BDD in the German general population and compared the DSM-IV and DSM-5 criteria and also found no differences in frequency rates.

The current study did not include a time-requirement, as the DSM-5 criteria do not provide a description of the daily time that needs to be spent on appearance. Questionnaires using DSM-IV criteria require more than 1 h per day to be spent on appearance in order to make a diagnosis of BDD (28). Almost one-third of patients with BDD in the current study sample reported spending less than 1 h per day on their appearance. Including a time-requirement would therefore have significantly reduced the found frequency of BDD.

The current study has some limitations that need to be addressed. First of all, 1 of the main limitations was the small sample size, which affected the generalizability of the results and the comparison of characteristics between those with and without BDD. Secondly, rephrased DSM-5 criteria were used to assess BDD, as there are no validated self-report screening measures for BDD in adolescents and young adults according to the latest DSM-5 criteria. Furthermore, using self-report questionnaires might have led to an overestimation of the frequency of BDD; therefore, confirming the diagnosis with a structured interview might have provided a different frequency.

In conclusion, this study adds to a growing body of evidence that adolescents and young adults with der-

matological disorders are at risk of experiencing low self-esteem and mental health problems, such as BDD. Larger studies on BDD in adolescents and young adults with dermatological conditions are needed to ensure more rapid referral to psychiatric units and better long-term health outcomes.

*The authors have no conflicts of interest to declare.*

## REFERENCES


1. Veale D. Body dysmorphic disorder. Postgrad Med J 2004; 80: 67–71.
2. Battle DE. Diagnostic and Statistical Manual of Mental Disorders (DSM). Codas 2013; 25: 191–192.
3. Phillips KA. Body dysmorphic disorder: clinical features, Uptodate, 2022. [Accessed June 1, 2022] Available from: https://www.uptodate.com/contents/body-dysmorphic-disorder-clinical-features.
4. Schneider SC, Turner CM, Storch EA, Hudson JL. Body dysmorphic disorder symptoms and quality of life: the role of clinical and demographic variables. J Obsessive Compuls Relat Disord 2019; 21: 1–5.
5. Phillips KA. Suicidality in body dysmorphic disorder. Prim psychiatry 2007; 14: 58–66.
6. Hong K, Nezgovorova V, Uzunova G, Schlussel D, and Hollander E. Pharmacological treatment of body dysmorphic disorder. Curr Neuropharmacol 2019; 17: 697–702.
7. Rautio D, Gumpert M, Jassi A, Krebs G, Flygare O, Andren P, et al. Effectiveness of multimodal treatment for young people with body dysmorphic disorder in two specialist clinics. Behav Ther 2022; 53: 1037–1049.
8. Phillips KA, Didie ER, Menard W. Clinical features and correlates of major depressive disorder in individuals with body dysmorphic disorder,. J Affect Disord 2007; 97: 129–135.
9. Dennin MH, Lee MS. Body dysmorphic disorder in pediatric dermatology. Pediatr Dermatol 2018; 35: 868–874.
10. Bjornsson AS, Didie ER, Phillips KA. Body dysmorphic disorder. Dialogues Clin Neurosci 2010; 12: 221–232.
11. Angelakis I, Gooding PA, Panagioti M. Suicidality in body dysmorphic disorder (BDD): a systematic review with meta-analysis. Clin Psychol Rev 2016; 49: 55–66.
12. Ribeiro RVE. Frequency of body dysmorphic disorder in plastic surgery and dermatology patients: a systematic review with meta-analysis. Aesthetic Plast Surg 2017; 41: 964–970.
13. Castle DJ, Phillips KA, Dufresne RG. Body dysmorphic disorder and cosmetic dermatology: more than skin deep. J Cosmet Dermatol 2004; 3: 99–103.
14. Marron SE, Gracia-Cazaña T, Miranda-Sivelo A, Lamas-Diaz S, Tomas-Aragones L. Screening for body dysmorphic disorders in acne patients: a pilot study. Actas Dermosifiliogr 2019; 110: 28–32.
15. Cotterill JA. Body dysmorphic disorder. Dermatol Clin 1996; 14: 457–463.
16. Higgins S, Wysong A. Cosmetic surgery and body dysmorphic disorder – an update. Int J Womens Dermatol 2018; 4: 43–48.
17. McClure AC, Tanski SE, Kingsbury J, Gerrard M, Sargent SD. Characteristics associated with low self-esteem among US adolescents. Acad Pediatr 2010; 10: 238–244.
18. Wang F, Veugelers PJ. Self-esteem and cognitive development in the era of the childhood obesity epidemic. Obes Rev 2008; 9: 615–623.
19. Gallitano SM, Berson DS. How acne bumps cause the blues: the influence of acne vulgaris on self-esteem. Int J Womens Dermatol 2018; 4: 12–17.
20. Kuck N, Cafitz L, Burkner PC, Hoppen L, Wilhelm S, Buhlmann U. Body dysmorphic disorder and self-esteem: a meta-analysis. BMC Psychiatry 2021; 21: 310.
21. Cerea S, Bottesi G, Grisham JR, Ghisi M. Body dysmorphic disorder and its associated psychological and psychopathological features in an Italian community sample. Int J Psychiatry Clin Pract 2018; 22: 206–214.
22. Marques LC, Bürkner L. The relationship between perceived social support and severity of body dysmorphic disorder symptoms: the role of gender. Rev Bras Psiquiatr 2011; 33: 238–244.
23. Hartmann AS, Lyons N. Body dysmorphic disorder. Wiley Handb Obs Compuls Disord 2017; 8: 774–789.
24. Rood van Y, Wijk N. Validation of the Body Dysmorphic Screener of DSM-5 criteria (BDDS-5) 2019. Available from: https://studenttheses.uu.nl/bitstream/handle/20.500.12932/35704/Wyk,%20van%20(4121309)%20thesis.pdf?sequence=1.
25. Rosenberg M. Rosenberg Self-Esteem Scale (RSES). APA PsycTests 1965.
26. Cook CH, Centner RL, Michaels SE. An acne grading method using photographic standards. Arch Dermatol 1979; 115: 571–575.
27. Veale D, Gledhill LJ, Christodoulou P, Hodsoll J. Body dysmorphic disorder in different settings: a systematic review and estimated weighted frequency. Body Image 2016; 18: 168–186.
28. Schieber K, Kollei I, de Zwaan M, Martin A. Classification of body dysmorphic disorder – what is the advantage of the new DSM-5 criteria? J Psychosom Res 2015; 78: 223–227.
29. Marron SE et al. Body dysmorphic disorder in patients with acne: a multicentre study. J Eur Acad Dermatol Venereol 2020; 34: 370–376.
30. Hassan J, Grogan S, Clark-Carter D, Richards H, Yates VM. The individual health burden of acne: appearance-related distress in male and female adolescents and adults with back, chest and facial acne. J Health Psychol 2009; 14: 1105–1118.
31. Franzke N, Zimmer L, Schafer I, Radermacher C, Kresken J, Augustin M. Quality of medical care of patients with acne vulgaris in Germany-nationwide survey of pharmacy clients. J Dtsch Dermatol Ges 2009; 7: 1060–1063.
32. Mollmann A, Dietel F, Hunger A, Buhlmann U, Frequency of body dysmorphic disorder and associated features in German adolescents: a self-report survey. Psychiatry Res 2017; 254: 263–267.