Prevalence of Body Dysmorphic Disorder and Its Association with Body Features and social anxiety among Female University Students

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Abstract

Body dysmorphic disorder (BDD) is characterized by significant distress or impaired thoughts. It is a common mental health disorder; however, it remains underdiagnosed in clinical settings. Therefore, this study aimed to assess the prevalence of BDD and social anxiety among female students, which is important because both conditions may adversely affect academic performance. This cross-sectional study on female students was conducted at King Abdulaziz University, Jeddah, Saudi Arabia, between January and February 2023. Data were collected using a self-administered questionnaire distributed in electronic format on university electronic platforms (blackboard). Participants were asked to fill out a questionnaire comprising three parts: 1) sociodemographic data, 2) BDD Symptomology Questionnaire, and 3) Social Interaction Anxiety Scale (SIAS). In this study, among 437 female students, most were concerned about their body parts/flaws (80.5%, n = 352). The body features of major concern included skin (32.3%, n = 141), obesity (23.6%, n = 103), teeth (21.5%, n = 94), and hair (21.3%, n = 93). In addition, our results showed a significant association between SIAS and all reported symptoms of BDD ($p < 0.001$). Notably, a significantly higher number of those with social anxiety extremely/very often experienced symptoms of BDD than those without social anxiety.

1. Introduction

Body dysmorphic disorder (BDD) is characterized by significant distress or impaired thoughts. It is a condition in which an individual is preoccupied with perceived defects or flaws in their physical appearance that are not observable by or appear slight to others (1). BDD is an obsessive-compulsive spectrum disorder because it has characteristics similar to those of obsessive-compulsive disorder (OCD) (2), including repetitive behaviors, such as mirror checking, excessive grooming, skin picking, and reassurance seeking. In addition, BDD is associated with mental activities in which individuals compare their appearance to that of others in response to appearance concerns. Individuals with BDD experience social, educational, and occupational challenges. Concerns regarding body image in patients with BDD are not primarily focused on body fat and weight, as observed in individuals with eating disorders (1). BDD is often associated with mental disorders. Two studies on individuals with BDD showed that the most common comorbid psychiatric condition associated with BDD was major depressive disorder, with a lifetime prevalence of 75%, followed by substance use disorder (approximately 48.9%), social phobia (approximately 39%), and OCD (approximately 33%) (2). Social anxiety is a significant and persistent fear of social situations or performances in which embarrassment may occur (3). Individuals with BDD may experience social anxiety, feel embarrassment, be judged when expressing their opinions in the presence of others, or find it difficult to make or keep new friends. Individuals concerned about their appearance have higher levels of social anxiety and depressive symptoms than those who are not. It is of great importance to pay attention to BDD, especially because of the significant rates of comorbidity. One in three patients with BDD exhibit violent behaviors, which they mainly attribute to BDD symptoms (such as attacking someone or damaging property). Clinical impressions suggest that violence may be fueled by rage about looking deformed, an inability to fix the defect, and delusions of reference (such as individuals

believing they are being mocked by others for the defect) (2). Studies have shown that approximately one in three individuals with BDD are delusional, indicating a greater severity of symptoms and a higher prevalence of functional impairment (4). Furthermore, the rates of suicidal ideation, attempts, and deaths were significantly elevated among individuals with BDD. Studies have shown that individuals with BDD are 2.6 times more likely to attempt suicide and four times more likely to experience suicidal ideation than those without BDD (2, 4). These concerns may appear trivial; however, they can significantly impair multiple areas of function, leading to social isolation, house-boundedness, and withdrawal from social activities, intimate relationships, or work and school engagements. In addition, unnecessary cosmetic surgeries pose a financial burden (4, 5). Considering the pronounced functional impairment, poor quality of life, and high suicide rates among patients with BDD, it is very important for BDD to be recognized and accurately diagnosed (6). BDD is a common mental health disorder; however, it remains underdiagnosed in clinical settings (2). A recent systematic review showed that a large percentage of patients with BDD visit a plastic surgery/dermatology clinic rather than seeking psychiatric help. This implies that BDD is underdiagnosed and that visiting a non-psychiatric specialty is just one factor. Notably, several studies have highlighted that the diagnosis of BDD is suboptimal, even in psychiatric settings (7). Furthermore, only a few patients with BDD feel satisfied or show improved symptoms after cosmetic interventions. This leads to significant negative outcomes for both patients and physicians (2). Therefore, this study aimed to assess the prevalence of BDD and social anxiety among female students, which is important because both conditions may adversely affect academic performance.

2. Materials and Methods

This cross-sectional questionnaire-based study was conducted using convenience sampling at King Abdulaziz University, Jeddah, Saudi Arabia, between 23 January and 5 February 2023. Responses were drawn from 325 female students at King Abdulaziz University. Data were collected using a self-administered questionnaire distributed in an electronic format on university blackboard platforms. Participation in this study was voluntary, and all participants were guaranteed privacy and confidentiality. Written informed consent was obtained from each participant at the beginning of the questionnaire. Students diagnosed with anorexia nervosa or bulimia and those with missing data were excluded. The included participants were asked to fill out a questionnaire comprising three parts: 1) sociodemographic data, including age, sex, marital status, nationality, academic performance, college, weight, and height; 2) BDD Symptomology Questionnaire. BDD symptoms vary from compulsive touching of the perceived defect to compulsive mirror checking, avoiding looking into a mirror or being photographed, comparing themselves with people around them or with those in magazines and television in terms of the perceived defect, and hiding or concealing the physical defect; 3) Social Interaction Anxiety Scale (SIAS) developed by Mattick and Clarke (8). The SIAS was used to assess the prevalence, severity, and treatment outcomes of social phobia and anxiety, and all the questions were adapted from the original SIAS without any modifications except for question 14, which was deleted for being culturally inappropriate. The possible scores range from 0 to 76. Higher scores indicate higher levels of social anxiety. The score interpretation is as follows: <36: without Social Anxiety and ≥ 36: with Social Anxiety. Data were analyzed using IBM

SPSS version 23 (IBM Corp., Armonk, NY, USA) and GraphPad Prism version 8 (GraphPad Software Inc., San Diego, CA, USA). Simple descriptive statistics were used to define sociodemographic characteristics. Categorical variables were presented as counts and percentages, whereas continuous variables were presented as means and standard deviations. Reliability analysis was performed with a model of Alpha (Cronbach) to study the properties of measurement scales and items that compose the scales and the average inter-item correlation. Regarding correlations, the chi-square test was used to assess the relationship between categorical variables. This test was performed under the assumption of a normal distribution. The dependent variables were defined as binary outcomes. A binary logistic regression model with backward conditional elimination, with enter criteria of 0.05 and elimination of 0.10, was used to determine the significant predictors of any given dependent variables with 95% confidence intervals (CIs). Statistical significance was set at $p < 0.05$. Ethical approval for the study was obtained from the King Abdulaziz University, the Faculty of Medicine Research Ethics Committee.

3. Results

This study evaluated the prevalence of BDD and its association with body features among 437 female students at King Abdulaziz University, Jeddah, Saudi Arabia. Regarding sociodemographic characteristics, the students had an average age of 22.16 ± 3.2 years (range: 18–30 years, N = 437), weight of 59.05 ± 16.7 kg (range: 30.00–157.00 kg, N = 433), height of 158.08 ± 5.9 cm (range: 11.72–69.78 cm, N = 436), and body mass index (BMI) of 23.59 ± 6.3 (range: 11.72–69.78, N = 433), as shown in Table 1. Notably, most students were single (89.5%, n = 391) or Saudi nationals (94.5%, n = 413). Approximately 50% of the students had a 4.5–5 academic grade point average (GPA) (47.4%, n = 207) and normal BMI (49.2%, n = 213). Approximately one-third were aged between 18 and 20 years (37.3%, n = 163). Regarding the current affiliated colleges, the students were mainly in the preparatory year (12.4%, n = 54), College of Arts and Humanities (13.3%, n = 58), and Faculty of Science (14.6%, n = 64).

Demographics	N	Min	Max	Mean	SD
Age	437	18	30	22.16	3.2
Weight	433	30.00	157.00	59.05	16.7
Height	436	140.00	175.00	158.08	5.9
BMI	433	11.72	69.78	23.59	6.3

Table 1. Sociodemographic characteristics of the participants (N = 437).

		Count	%
Total		437	100.0
Age	18-20	163	37.3
	21-23	165	37.8
	24-26	55	12.6
	27-30	54	12.4
Marital status	Single	391	89.5
	Married	35	8.0
	Divorced	11	2.5
Nationality	Saudi	413	94.5
	Non-Saudi	24	5.5
Academic GPA	4.5 - 5	207	47.4
	4 - 4.5	99	22.7
	3.5 - 4	87	19.9
	<3	44	10.1
BMI	Underweight	85	19.6
	Normal	213	49.2
	Overweight	76	17.6
	Obese	59	13.6
	Missing	4	

Total		437	100.0
What is your current college?	Preparatory year	54	12.4
	College of Arts and Humanities	58	13.3
	Faculty of Science	64	14.6
	College of Engineering	3	0.7
	Faculty of Medicine	28	6.4
	College of Applied Medical Sciences	6	1.4
	College of Marine Sciences	2	0.5
	Applied College	14	3.2
	Faculty of Dentistry	5	1.1
	College of Pharmacy	3	0.7
	Faculty of Tourism	10	2.3
	College of Human Sciences and Designs	18	4.1
	College of Educational Graduate Studies	11	2.5
	College of Computers and Information Technology	33	7.6
	College of Communication and Media	30	6.9
	College of Economics and Administration	41	9.4
	College of Nursing	8	1.8
	Faculty of Medical Rehabilitation Sciences	2	0.5
	Faculty of Law	32	7.3
	Faculty of Medicine in Rabigh	2	0.5
	College of Computers and Information Technology in Rabigh	2	0.5
	College of Business in Rabigh	11	2.5

Table 2 shows the physical characteristics of concerns among the participants (N = 437), with most worried about their body parts/flaws (80.5%, n = 352). The body features of major concern included skin (32.3%, n = 141), obesity (23.6%, n = 103), teeth (21.5%, n = 94), and hair (21.3%, n = 93).

Table 2. Physical features of concern among the participants (N = 437).		Count	%
Variables		Count	%
Total		437	100.0
Are there any body parts/flaws that you are worried about?	Yes	352	80.5
	No	85	19.5
Which aspect/feature:	Weight	64	14.6
	Body	71	16.2
	Hair	93	21.3
	Skin	141	32.3
	Face	21	4.8
	Teeth	94	21.5
	Nose	59	13.5
	Obesity	103	23.6
	Epidermis	33	7.6
	Thin	23	5.3
	Fat	5	1.1
	Eyes	5	1.1
	Slim	3	0.7
	Height	8	1.8
	Lips	5	1.1
	None	50	11.4

The frequency of BDD symptoms among the participants was measured. Notably, most students occasionally had the habit of compulsive mirror checking or glancing at their image on reflective surfaces (such as windows and doors) (55.1%, n = 241). Approximately 50% of the students also occasionally (a) measured their physical "defect" against the status of people around them (39.6%, n = 173) and (b) compared themselves with people in magazines or on television in terms of their physical "defect" (39.6%, n = 173). Furthermore, approximately 50% of the students reported that the concerns about their physical "defects" never made them avoid doing certain things (such as looking into a mirror, getting photographed, and avoiding social gatherings) (46.0%, n = 201). The distribution of the frequency of BDD symptoms among students is shown in Figure 1.

Furthermore, our results revealed that most students were never diagnosed with BDD symptoms (92.0%, n = 402). The level of social interaction anxiety among the students was analyzed, and most patients slightly or did not experience many of the SIAS items, including (a) being nervous when speaking with someone in authority (52.4%, n = 229), (b) having difficulty making eye contact with others (59.5%, n = 260), (c) finding it difficult to mix comfortably with the people they work with (53.1%, n = 232), (d) being tensed up if they meet an acquaintance in the street (61.1%, n = 267), (e) not being uncomfortable when mixing socially (55.0%, n = 240), (f) feeling tensed if alone with just one other person (55.9%, n = 244), (g) feeling at ease meeting people at parties (50.1%, n = 219), (h) having difficulty talking with other people (60.0%, n = 262), (i) finding it easy to think of things to talk about (55.0%, n = 240), (j) finding it difficult to disagree with another's perspective (61.1%, n = 267), (k) feeling the urge to say something embarrassing when talking (53.5%, n = 234), (l) worrying about being ignored when mixing in a group of people (48.3%, n = 211), (m) feeling tensed mixing in a group (53.7%, n = 235), and (n) being unsure whether to greet someone they know only slightly (54.9%, n = 240). Regarding social interaction anxiety, the highest mean score of 2.46 ± 1.2 (range 0–4, N = 437) was observed for the "finding it easy to think of things to talk about (reversed)" item, whereas the lowest mean score of 1.30 ± 1.2 (range: 0–4, N = 437) was observed for the "finding it difficult to disagree with another's perspective" item. The overall mean social interaction anxiety scores and scales are presented in Table 3. The results showed a mean value of 33.71 ± 18.5 (range: 0–73, N+ 437) for the SIAS in <50% of students. Furthermore, the results revealed that most students had no social anxiety (53.5%, n = 234).

Table 3. Overall mean score and scale of social interaction anxiety among the participants (N = 437).

Variables	N		Min	Max	Mean	SD
Social Interaction Anxiety Scale	437		0	73	33.71	18.5
			Count		%	
Total			437		100.0	
Social Interaction Anxiety Scale	Without Social Anxiety		234		53.5	
	With Social Anxiety		203		46.5	

The reliability statistics showed a favorable Cronbach's alpha value of 0.948 (N = 19) for the SIAS, as shown in Table 4.

Table 4. Reliability statistics of the social interaction anxiety scale.

Reliability Statistics	Cronbach's Alpha	N of Items
Social Interaction Anxiety Scale	0.948	19

Notably, the association between the SIAS and participants' sociodemographic characteristics was assessed (Table 5). A significant association was observed between the SIAS and age (p < 0.001), marital

status (p = 0.046), and academic GPA (p = 0.004). Notably, the proportion of students without social anxiety was significantly higher than that of those with social anxiety, regardless of age or marital status. In addition, the number of students with academic GPA ranging from four to five (53.5−61.4%) who had no social anxiety was significantly higher than that of those with social anxiety (38.6−46.5%). Notably, the proportion of students with an academic GPA of ≤4 who had social anxiety (57.5−61.4%) was significantly higher than that of those without social anxiety (38.6−42.5%).

Table 5. Association between the social interaction anxiety scale and sociodemographic characteristics of the participants (N = 437).

Demographics		Total	Social Interaction Anxiety Scale		p-value
			Without Social Anxiety	With Social Anxiety	
Total		437	234(53.5%)	203(46.5%)	-
Age	18-20	163	76(46.6%)	87(53.4%)	<0.001[a]
	21-23	165	86(52.1%)	79(47.9%)	
	24-26	55	29(52.7%)	26(47.3%)	
	27-30	54	43(79.6%)	11(20.4%)	
Marital status	Single	391	202(51.7%)	189(48.3%)	0.046[a]
	Married	35	23(65.7%)	12(34.3%)	
	Divorced	11	9(81.8%)	2(18.2%)	
Nationality	Saudi	413	219(53.0%)	194(47.0%)	0.366
	Non-Saudi	24	15(62.5%)	9(37.5%)	
Academic GPA	4.5 - 5	207	127(61.4%)	80(38.6%)	0.004[a]
	4 - 4.5	99	53(53.5%)	46(46.5%)	
	3.5 - 4	87	37(42.5%)	50(57.5%)	
	<3	44	17(38.6%)	27(61.4%)	
BMI	Underweight	85	42(49.4%)	43(50.6%)	0.098
	Normal	213	123(57.7%)	90(42.3%)	
	Overweight	76	43(56.6%)	33(43.4%)	
	Obese	59	24(40.7%)	35(59.3%)	

[a]-significant using Chi-Square Test at <0.05 level.

Table 6 shows the association between the SIAS and physical flaws and diagnoses of the participants. The results revealed a significant association between the SIAS and insecurity about body features in students (P < 0.001). Notably, the proportion of students without any concern about their body parts who had no social anxiety (74.1%, n = 63) was significantly higher than that of those with social anxiety (25.9%).

Table 6. Association between the social interaction anxiety scale and physical flaws and diagnoses of the participants (N = 437).

Variables		Total	Social Interaction Anxiety Scale		p-value
			Without Social Anxiety	With Social Anxiety	
Total		437	234(53.5%)	203(46.5%)	-
Are there any body parts/flaws that you are worried about?	Yes	352	171(48.6%)	181(51.4%)	<0.001[a]
	No	85	63(74.1%)	22(25.9%)	
Have you been diagnosed with anorexia nervosa or bulimia?	Yes	35	15(42.9%)	20(57.1%)	0.186
	No	402	219(54.5%)	183(45.5%)	

[a]-significant using Chi-Square Test at <0.05 level.

The association between the SIAS and BDD symptoms in participants was also determined (Table 7). The results showed a significant association between the SIAS and all reported BDD symptoms (p < 0.001) according to the chi-square test analysis at p < 0.05. Notably, a significantly higher number of those with social anxiety (61.7 − 80.2%) extremely/very often experienced BDD symptoms than those without social anxiety (19.8−38.3%).

Table 7. Association between the social interaction anxiety scale and symptoms of body dysmorphic disorder in the participants (N = 437).

Body dysmorphic disorder symptomology		Total	Social Interaction Anxiety Scale		p-value
			Without Social Anxiety	With Social Anxiety	
Total		437	234(53.5%)	203(46.5%)	-
Do you have a habit of compulsive mirror checking or glancing at your image in reflective surfaces?	Never	117	73(62.4%)	44(37.6%)	<0.001[a]
	Occasionally/moderately often	241	134(55.6%)	107(44.4%)	
	Very/Extremely often	79	27(34.2%)	52(65.8%)	
Do you compulsively touch your physical "defect"?	Never	201	135(67.2%)	66(32.8%)	<0.001[a]
	Occasionally/moderately often	191	89(46.6%)	102(53.4%)	
	Very/Extremely often	45	10(22.2%)	35(77.8%)	
Have you tried to conceal/hide your physical "defect"?	Never	135	84(62.2%)	51(37.8%)	<0.001[a]
	Occasionally/moderately often	153	93(60.8%)	60(39.2%)	
	Very/Extremely often	149	57(38.3%)	92(61.7%)	
Have you ever measured your physical "defect" against the status of people around you?	Never	105	69(65.7%)	36(34.3%)	<0.001[a]
	Occasionally/moderately often	173	111(64.2%)	62(35.8%)	
	Very/Extremely often	159	54(34.0%)	105(66.0%)	
Have you ever compared yourself with people in magazines or on television in terms of your physical "defect"?	Never	138	88(63.8%)	50(36.2%)	<0.001[a]
	Occasionally/moderately often	173	104(60.1%)	69(39.9%)	
	Very/Extremely often	126	42(33.3%)	84(66.7%)	
Do these concerns about your physical "defect" make you avoid doing certain things?	Never	201	144(71.6%)	57(28.4%)	<0.001[a]
	Occasionally/moderately often	130	69(53.1%)	61(46.9%)	
	Very/Extremely often	106	21(19.8%)	85(80.2%)	

[a]-significant using Chi-Square Test at <0.05 level.

Table 8 shows the association between the SIAS and physical features of concern among the students. Significant associations were observed between the SIAS and specific body features of concern, such as body (p = 0.037), hair (p = 0.011), teeth (p = 0.016), nose (p < 0.001), obesity (p = 0.001), and height (p = 0.019). Notably, a significantly higher proportion of students with social anxiety (57.4–87.5%) were concerned about these features than those without social anxiety (12.5–42.6%).

Table 8. Association between the social interaction anxiety scale and physical features of concern among the students (N = 437).

Variables		Total	Social Interaction Anxiety Scale		p-value
			Without Social Anxiety	With Social Anxiety	
Total		437	234(53.5%)	203(46.5%)	-
Which aspect/feature:	Weight	64	35(54.7%)	29(45.3%)	0.843
	Body	71	30(42.3%)	41(57.7%)	0.037[a]
	Hair	93	39(41.9%)	54(58.1%)	0.011[a]
	Skin	141	67(47.5%)	74(52.5%)	0.081
	Face	21	8(38.1%)	13(61.9%)	0.146
	Teeth	94	40(42.6%)	54(57.4%)	0.016[a]
	Nose	59	16(27.1%)	43(72.9%)	<0.001[a]
	Obesity	103	41(39.8%)	62(60.2%)	0.001[a]
	Epidermis	33	20(60.6%)	13(39.4%)	0.398
	Thin	23	10(43.5%)	13(56.5%)	0.320
	Fat	5	3(60.0%)	2(40.0%)	0.771
	Eyes	5	1(20.0%)	4(80.0%)	0.130
	Slim	3	2(66.7%)	1(33.3%)	0.648
	Height	8	1(12.5%)	7(87.5%)	0.019[a]
	Lips	5	1(20.0%)	4(80.0%)	0.130

[a]-significant using Chi-Square Test at <0.05 level.

Further analysis revealed the sociodemographic and academic predictors of BDD among the participants. Results showed that the age of 18–20 years was the most significant positive predictor of BDD (p = 0.001, B = 1.289, standard error [SE] = 0.384, Exp (B) = 3.629, 95% CI = 1.709–7.707),

suggesting that students aged 18–20 years have a 1.289 chance of BDD being triggered. Other positive predictors were the age of 24–26 years (p = 0.006, B = 1.1191, SE = 0.436, Exp (B) = 3.289, 95% CI = 1.400–7.725) and 21–23 years (p = 0.002, B = 1.146, SE = 0.378, Exp (B) = 3.145, 95% CI = 1.499–6.598). In contrast, an academic GPA of 4.5–5 was a significant negative predictor of BDD (p = 0.037, B = -0.735, SE = 0.353, Exp (B) = 0.480, 95% CI = 0.240–0.957), suggesting that students with an academic GPA of 4.5–5 have a 0.735 chance of not exhibiting BDD.

The frequency of behavioral predictors of BDD among the participants was also examined (Table 9). The most significant negative predictors were BDDS6 (Never) (p < 0.001, B = -1.986, SE = 0.325, Exp (B) = 0.137, 95% CI = 0.073–0.260), BDDS6 (occasionally/moderately often) (p < 0.001, B = -1.322, SE = 0.311, Exp (B) = 0.267, 95% CI = 0.145–0.491), BDDS2 (Never) (p = 0.004, B = -1.254, SE = 0.430, Exp (B) = 0.285, 95% CI = 0.123–0.663), and BDDS4 (occasionally/moderately often) (p = 0.009, B = -0.673, SE = 0.259, Exp (B) = 0.510, 95% CI = 0.307–0.846).

Table 9. Frequency of behavioral predictors of body dysmorphic disorder among the participants.

Variables in the Equation	B	SE	Exp (B)	95% CI for EXP (B)		p-value
				Lower	Upper	
First Step[a] BDDS1						0.134
BDDS1(Never)	-0.699	0.359	0.497	0.246	1.004	0.051
BDDS1(Occasionally/moderately often)	-0.517	0.310	0.596	0.325	1.095	0.096
BDDS2						0.033[b]
BDDS2(Never)	-1.124	0.460	0.325	0.132	0.800	0.015[b]
BDDS2(Occasionally/moderately often)	-0.696	0.440	0.499	0.210	1.181	0.114
BDDS3						0.736
BDDS3(Never)	0.121	0.348	1.129	0.571	2.231	0.728
BDDS3(Occasionally/moderately often)	-0.108	0.291	0.898	0.508	1.587	0.711
BDDS4						0.152
BDDS4(Never)	-0.296	0.410	0.744	0.333	1.662	0.471
BDDS4(Occasionally/moderately often)	-0.575	0.305	0.563	0.310	1.022	0.059
BDDS5						0.221
BDDS5(Never)	0.227	0.393	1.254	0.580	2.711	0.564
BDDS5(Occasionally/moderately often)	-0.282	0.313	0.754	0.409	1.392	0.367
BDDS6						<0.001[b]
BDDS6(Never)	-2.068	0.341	0.126	0.065	0.247	<0.001[b]
BDDS6(Occasionally/moderately often)	-1.364	0.321	0.256	0.136	0.479	<0.001[b]
Constant	2.874	0.502	17.708			<0.001[b]
Last Step[a] BDDS2						0.009[b]
BDDS2(Never)	-1.254	0.430	0.285	0.123	0.663	0.004[b]
BDDS2(Occasionally/moderately	-0.803	0.419	0.448	0.197	1.018	0.055

often)

	B	S.E.	Exp(B)	95% CI Lower	95% CI Upper	Sig.
BDDS4						0.021[b]
BDDS4(Never)	-0.152	0.327	0.859	0.453	1.632	0.643
BDDS4(Occasionally/moderately often)	-0.673	0.259	0.510	0.307	0.846	0.009[b]
BDDS6						<0.001[b]
BDDS6(Never)	-1.986	0.325	0.137	0.073	0.260	<0.001[b]
BDDS6(Occasionally/moderately often)	-1.322	0.311	0.267	0.145	0.491	<0.001[b]
Constant	2.421	0.442	11.259			<0.001[b]

[a]-Variable(s) entered in step 1: BDDS1 = Do you have a habit of compulsive mirror checking or glancing at your image in reflective surfaces?, BDDS2 = Do you compulsively touch your physical "defect"?, BDDS3 = Have you tried to conceal/hide your physical "defect"?, BDDS4 = Have you ever measured your physical "defect" against the status of people around you?, BDDS5 = Have you ever compared yourself with people in magazines or on television in terms of your physical "defect"?, BDDS6 = Do these concerns about your physical "defect" make you avoid doing certain things?.

[b]-Significant using Binary Logistic Regression Model with Backward Conditional Elimination, with Enter Criteria of 0.05 and Elimination of 0.10.

Finally, the physical feature predictors of BDD among participants were determined (Table 10). Results showed that the nose was the most significant positive body feature predictor of BDD ($p = 0.001$, B = 1.094, SE = 0.319, Exp (B) = 2.987, 95% CI = 1.597–5.586), suggesting that students insecure about their noses have a 1.094 chance of BDD being triggered. Another positive predictor was obesity ($p = 0.030$, B = 0.526, SE = 0.242, Exp (B) = 1.691, 95% CI = 1.052–2.718).

Table 10. Physical feature predictors of body dysmorphic disorders among the participants.

Variables in the Equation		B	SE	Exp(B)	95% CI for EXP(B)		p-value
					Lower	Upper	
First Step[a]	Are there any body parts/flaws that you are worried about? (Yes)	0.654	0.288	1.923	1.093	3.382	0.023[b]
	Which aspect/feature						
	Body(Yes)	0.470	0.281	1.600	0.922	2.777	0.094
	Hair(Yes)	0.417	0.251	1.518	0.928	2.483	0.096
	Teeth(Yes)	0.247	0.255	1.281	0.777	2.111	0.332
	Nose(Yes)	1.052	0.323	2.862	1.520	5.390	0.001[b]
	Obesity(Yes)	0.576	0.246	1.780	1.099	2.883	0.019[b]
	Height(Yes)	2.083	1.091	8.026	0.946	68.056	0.056
	Constant	-1.198	0.254	0.302			<0.001[b]
Last Step[a]	Are there any body parts/flaws that you are worried about? (Yes)	0.774	0.280	2.167	1.251	3.756	0.006[b]
	Which aspect/feature						
	Hair(Yes)	0.437	0.249	1.549	0.951	2.521	0.078
	Nose(Yes)	1.094	0.319	2.987	1.597	5.586	0.001[b]
	Obesity(Yes)	0.526	0.242	1.691	1.052	2.718	0.030[b]
	Height(Yes)	2.089	1.086	8.077	0.961	67.862	0.054
	Constant	-1.165	0.253	0.312			<0.001[b]

[a]-Variable(s) entered in step 1: Are there any body parts/flaws that you are worried about? (Body, Hair, Teeth, Nose, Obesity, or Height).

[b]-Significant using Binary Logistic Regression Model with Backward Conditional Elimination, with Enter Criteria of 0.05 and Elimination of 0.10.

4. Discussion

The present study's results showed that 46.5% of the participants experienced symptoms of social anxiety, as indicated by the SIAS. This finding is inconsistent with that of a similar study conducted in

Riyadh, Saudi Arabia, in which only 25% of participants exhibited symptoms of social anxiety (3). Further analysis revealed a significant association between sociodemographic characteristics and SIAS scores in the present study. Notably, the incidence of social anxiety was associated with age ($p < 0.001$), marital status ($p = 0.046$), and academic GPA ($p = 0.004$). Younger individuals aged 18–23 years were more likely to experience social anxiety than those aged 24–30 years, possibly due to the fact that most of our study participants were within the age range of 18–23 years old. Furthermore, regarding marital status (48.3%), single individuals exhibited symptoms of social anxiety, whereas the others (51.7%) did not. A study by Moutier and Stein (1999) suggests that individuals with social anxiety are less likely to be married than those without social anxiety (9).

In the present study, there was a significant association between social anxiety and lower academic GPA, as participants with a GPA of 4–5 (53.5–61.4%) had no social anxiety, whereas those with a GPA of ≤ 4 (57.5–61.4%) exhibited social anxiety. One possible reason for this could be that individuals with social anxiety struggle to perform well in academic tasks requiring public speaking, such as presentations, debates, class discussions, and other similar forms of social interaction. This finding is supported by those of a study by Fang and Hofmann, which indicates that individuals with social anxiety are less likely to be well-educated than their peers without the condition (10).

Regarding BDD symptoms, our results showed a significant association between social anxiety and all reported symptoms of BDD ($p < 0.001$). Consistent with the present study, a previous study indicated that students who were concerned about their appearance (including those who did not test positive for BDD) had higher levels of social anxiety and depressive symptoms than those who were not. In addition, students who were concerned about the appearance of parts of their body unrelated to weight had higher SIAS scores ($P < 0.001$) (11). Furthermore, in the present study, a higher proportion of the students concerned about their body, hair, teeth, nose, obesity, and height experienced social anxiety. A previous study reported a 19% rate of dissatisfaction with body image, with the most common concerns being not thin enough, not attractive enough, and feeling dissatisfied with body shape, hair, and face. This could be due to the effect of social media, as these students tended to check social media more frequently. In addition, individuals who followed celebrities and checked social media more frequently were more likely to experience depressive symptoms and social anxiety (12).

All symptoms of BDD among the participants in the present study were common. Over half of the students (55.1%) moderately often had the habit of compulsive mirror checking or glancing at their image on reflective surfaces, whereas 18.1% of them extremely often checked out the way they looked compulsively. A study on medical students in Pakistan reported that out of the 156 participants, 57.1% were female, whereas 42.9% were male. Notably, 78.8% of the students were dissatisfied with a few aspects of their looks and appearance, and 5.8% met the Diagnostic and Statistical Manual of Mental Disorders, fourth edition criteria for BDD. Among the patients with BDD, the male-to-female ratio was 1.7. In both the present and the Pakistani studies, over half of the students reported that these concerns made them avoid performing certain activities (13). In the present study, the physical features of major concern were skin (32.3%) and obesity (23.6%), consistent with findings of a previous study on female medical

students in Riyadh, in which the areas of major concern were skin (75%) and fat (68.8%) (3). Notably, most were concerned about their skin, possibly due to its visibility and role in shaping their overall appearance. Furthermore, according to previous studies, this may be the reason for the remarkably greater prevalence of BDD among dermatological patients (14, 15). They were more frequently concerned about acne, skin color, and hair loss than the rest of the population. Social media can significantly impact individuals' body image and how they perceive themselves (16). It often presents curated and idealized versions of people's lives and appearances. In addition, the availability of filters and photo-editing tools on social media distorts reality and creates unrealistic beauty standards, as individuals may start believing that the heavily edited images they see are representative of real-life beauty. People with BDD may feel pressured to meet these standards, leading to heightened distress and dissatisfaction with their own appearance by unfavorably comparing themselves to others, thus exacerbating their preoccupation with their perceived flaws (17).

This study had some limitations. First, we targeted female students from one university, and we relied on convenient sampling, which may lead to selection bias; therefore, our results may lack external validity. Second, data were collected through self-administered questionnaires; therefore, they may not be accurate because of recall bias.

5. Conclusions

Our results showed a significant association between social anxiety and all reported symptoms of BDD (p < 0.001), and a higher proportion of students concerned about their body, hair, teeth, nose, obesity, and height exhibited social anxiety. In this study, the physical features of major concern were skin (32.3%) and obesity (23.6%), which could be due to social media and its impact on body image and how individuals perceive themselves. The availability of filters and photo-editing tools on social media creates unrealistic beauty standards, thus increasing the rate of body dissatisfaction among students.

Abbreviations

BDD	Body Dysmorphic Disorder
SIAS	Social Interaction Anxiety Scale
OCD	Obsessive-Compulsive Disorder
BMI	Body Mass Index
GPA	Grade Point Average

Declarations

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Unit of Biomedical Ethics, Research Ethics Committee of King Abdulaziz

University, Faculty of Medicine (Reference No 542-22) (November 24, 2022)

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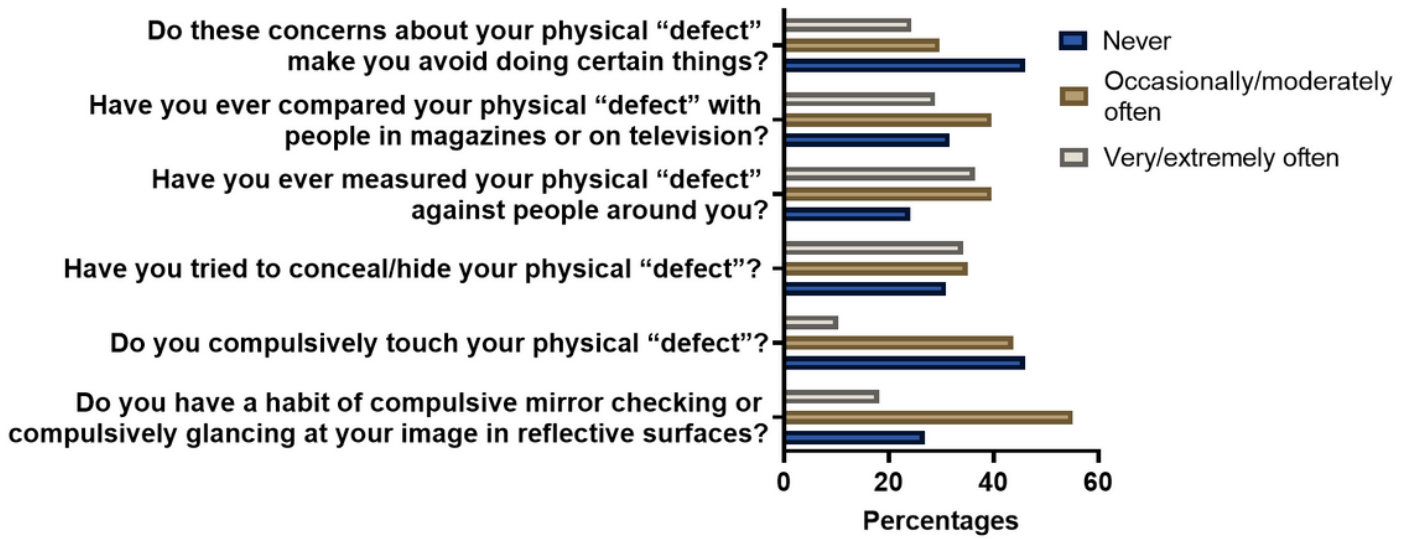
Figures

Figure 1

Distribution of the frequency of body dysmorphic disorder symptoms among the participants (N = 437).