



Original Article

Magnitude and determinants of body dysmorphic disorder among female students in Saudi public secondary schools

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Received 21 May 2019; revised 27 August 2019; accepted 28 August 2019; Available online 15 October 2019



الخلاصة

الأهداف: التقديرات الحديثة عن معدل إنتشار اضطراب التشوه الجسدي هي ١.٩٪ في المجتمع بشكل عام، ولكنه يتراوح بين ٥.٨٪ و ٧.٤٪ في أوساط المرضى النفسيين. هذه الدراسة تهدف إلى قياس معدل و محدندات إنتشار هذا الاضطراب بين الطالبات في جدة بالمملكة العربية السعودية.

طرق البحث: أجريت هذه الدراسة المقطعية العرضية بين الطالبات في المدارس الحكومية الثانوية في مدينة جدة. تم استثناء الطالبات اللواتي لديهن أمراض نفسية من الدراسة. واستخدمت العينة المتعددة الطبقات لاختيار عينة الدراسة وعددها ٤٩٥ طالبة. وتم جمع البيانات بواسطة استبانة معتمدة.

النتائج: وجد أن متوسط عمر الطالبات ١٦.٧٨ (١.١١) عاما. وكان معدل انتشار الاضطراب ١٢.٣٪ (مدي ثقة ٩٥٪: ٩.٦ إلى ١٥.٥٪). وكانت أكثر أعضاء الجسد التي تسبب القلق هي الجلد (١٨.٤٪)، والشعر (١٠.٧٪)، والأسنان (٩.٩٪)، والأنف (٩.٥٪). وسبب تقييم التأثير النفسي للاهتمام بمظهر الجسد الحزن في ٥٢.٣٪ (٢٠.٦٪ من الإجمالي)، وتجنب التفاعل الاجتماعي في ٤٤.٦٪ (١٧.٦٪ من الإجمالي)، والتأثير على العلاقات الاجتماعية في ٢١.٥٪ (٨.٥٪ من الإجمالي)، وحدثت مشاكل في المدرسة والعمل والنشاطات الأخرى في ٩.٧٪ (٣.٨٪ من الإجمالي). وكانت أعضاء الجسم التي صاحبها خطر أكبر هي الجلد (خطورة نسبية = ٨.٣٣)، يليها تأثير دهون الجسم (خطورة نسبية = ٨.١٧) والأنف (خطورة نسبية = ٧.٣٥).

الاستنتاجات: اضطراب التشوه الجسدي هو اضطراب شائع ويصعب التعرف عليه، بمعدل انتشار يساوي طالبة لكل ٨ طالبات في السعودية. هذا الاضطراب يصاحبه تأثيرات على التفاعل الاجتماعي، والثقة بالنفس، وجودة الحياة لدى الطالبات.

الكلمات المفتاحية: اضطراب التشوه الجسدي؛ انتشار؛ المراهقين؛ الإناث؛ المملكة العربية السعودية

Abstract

Objectives: Recent estimates have indicated that the weighted community prevalence of body dysmorphic disorder (BDD) is rising. This study aimed to identify the prevalence and determinants of BDD among female adolescents in Jeddah, KSA.

Methods: A cross-sectional study was conducted among female students in governmental secondary schools. Students presenting with abnormal health conditions were excluded. A multi-stage stratified sampling technique was used to select the target number of students (N = 495). BDD screening was performed using a BDD questionnaire.

Results: The students' mean (standard deviation) age was 16.78 (1.11) years, and the prevalence of BDD was 12.3% (95% confidence interval: 9.6–15.5%). The body parts associated with the most concern were the skin (18.4%), hair (10.7%), teeth (9.9%), and nose (9.5%). Psychosocial assessment showed that the body part of concern was associated with sadness in 20.6%, avoidance reactions in 17.6%, and problems in school, work, or other activities in 3.8% while playing a role in social relationships in 21.5%. The aspects associated with the highest risk included the skin (odds ratio (OR) = 8.33, p < 0.001), followed by body fat (OR = 8.17, p < 0.001) and the nose (OR = 7.35, p < 0.001). With the number of affected body parts, the prevalence of BDD increased from 21.7% (one body part) to 60%.

Conclusions: In this study, BDD was a common, difficult-to-recognise disorder with a prevalence of one in eight female Saudi adolescents. It was associated with marked changes in social interactions, self-esteem, and quality of life.

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Peer review under responsibility of Taibah University.



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Keywords: Adolescent; Body dysmorphic disorder; Female; KSA; Prevalence

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Introduction

Body dysmorphic disorder (BDD) has received considerable empirical attention in the past two decades. According to the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV),¹ BDD includes a preoccupation with an imagined or slight defect in appearance. In case of the latter, the concern is excessive. The second diagnostic criterion for BDD is the consequent significant stress or emotional suffering, including depression, sadness, worry, anxiety, and other negative thoughts or feelings. Finally, the patient's preoccupation should not be accounted for by another mental illness, such as the dissatisfaction with body shape implied in anorexia nervosa (AN).^{1,2} In the DSM-V, published in 2013,³ BDD was classified among obsessive-compulsive disorder (OCD) and related disorders, with the addition of the diagnostic criterion of repetitive behaviours such as excessive grooming, reassurance seeking, and mirror checking, or mental acts, including comparisons of the physical defect with that of other people.^{4,5}

Recent estimates have indicated that the weighted prevalence of BDD among community samples is 1.9%, while it ranges between 5.8% and 7.4% among psychiatric patients. This highlights the clinical significance of BDD.⁶ More specifically, comparable rates of 1.7–2.2% and 6.7–14.3% have been reported in adolescent samples of community and psychiatric patients, respectively.^{6,7} Intriguingly, younger age groups (aged less than 12 years) have not been investigated so far, and thus the patterns of BDD in such populations remain poorly elucidated.⁸

The body parts people with BDD are most commonly concerned about include the nose, ears, breasts, and mouth. They usually feel poorly understood and do not reveal their symptoms as they think that they will be seen as narcissistic or vain.⁹ Avoidance behaviours such as non-participation in social activities and evading mirrors may also be frequent.¹⁰ Generally, people with BDD experience relatively similar symptoms as those with OCD, except for the lack of self-recognition of the mental illness and poorer insight.¹¹

Furthermore, people with BDD have higher scores of depression, anxiety, anger-hostility, and somatisation compared to normal individuals.¹² The quality of life of people with BDD is significantly affected and they experience high rates of hospitalisation (48%), suicide attempts (22–24%), and suicidal ideation (45–82%).¹² In the United States, the annual rate of completed suicide in people with BDD is 0.35%, which is markedly higher than the rate reported in normal individuals and patients with mental illnesses.¹³

The majority of studies concerned with BDD have been conducted in Europe and North America, and it is still

unclear whether there is a difference in the prevalence rates in other regions. Additionally, BDD usually goes undiagnosed and underreported, as there are indications that a subclinical form of BDD is commonly exhibited in females.⁷ To the best of our knowledge, few studies in KSA have investigated BDD, and there have been no previous studies among adolescents or in the Jeddah region. Our field observations during clinical rotations in dermatology and ENT clinics revealed some female patients who repeatedly presented with imagined or minor physical defects.

Thus, we aimed to evaluate the magnitude and determinants of BDD among female students in governmental secondary schools in Jeddah.

Materials and Methods

This cross-sectional study was conducted in governmental secondary schools in Jeddah, KSA using both qualitative and quantitative methods. The inclusion criteria were female students of all nationalities in first (S1), second (S2), or third (S3) year who were regularly registered and attending a governmental secondary school in Jeddah during the 2018 academic year. The study excluded students presenting with one of the following conditions: apparent congenital defects such as cleft palate, scoliosis, and dwarfism; acquired deformity caused by trauma, illness, burns, and scars; motor or mental handicap; or any condition that effectively affects physical appearance. Additionally, cases of extreme obesity or extremely low body mass index were excluded.

Jeddah has approximately 42,049 students distributed across 122 governmental secondary schools. Not having a backup prevalence of BDD among adolescents in Jeddah, the target sample size was calculated to detect 50% of BDD with 5% error, 95% confidence interval (CI), and 80% statistical power among a finite population of 42,049 individuals. The sample was calculated as 382 students, which was increased to 420 after adding 10% compensation for eventual dropouts.

A multi-stage stratified sampling technique was used to include participants. In stage one, one female secondary school was randomly selected out of each of the four administrative divisions (strata) of Jeddah including North, South, East, and Middle. In stage two, systematic random sampling was used to include classrooms until the target number of students from each stratum had been achieved ($N = 420/4 = 105$) with respect to equal distribution across the three grades (S1, S2, S3). However, so as to avoid offending the sensibility of students, classrooms with one or more students with any of the exclusion criteria (apparent deformity) were excluded beforehand.

The psychometric data were collected using four main questions from which multiple questions emerged. These main questions were: 1) Are you worried about how you look? 2) Is your main concern with your appearance that you are not thin enough or that you might get too fat? 3) How has this problem with your appearance affected your life? and 4) On an average, how much time in a day do you usually spend thinking about how you look (a: 1 h, b: 1–3 h, c: >3 h)? Further, the questionnaire assessed the associated level of this preoccupation, if applicable, and requested the

participants to list the body parts of concern (hair, teeth, nose, skin, other). Finally, it assessed the interference of this preoccupation with four psychosocial dimensions including mood, social relationships, school, and work and other activities, and investigated the avoidance reaction.

The questionnaire has previously been validated by several authors, notably Brohedet al.,¹⁴ who assessed the validity of its Swedish version and reported 95% sensitivity, 90% specificity, 71% positive predictive value, and 98% negative predictive value in detecting BDD with reference to DSM-IV criteria.¹⁴ The questionnaire was translated into Arabic by a certified translator using a translation-retranslation method, and some terms that were likely to be inappropriate in the cultural context were deleted. The translated version of the questionnaire was assessed for content conformity by another bilingual translator, who made slight modifications. Additionally, data for age and grade were collected; while no identifying information was collected for absolute anonymity.

Given the sensitivity of the topic and to reduce response subjectivity, the researchers opted for self-administration of the questionnaire; however, respondents were provided with short guidelines regarding how to correctly fill the questionnaire. The study protocol and questionnaire received approval from the Directorate of Education Affairs, Ministry of Education, Jeddah, and the Joint Program of Family Medicine Ethical Committee, Ministry of Education that supervised the research project.

Statistical analysis was performed with SPSS version 21.0 for Windows (SPSS Inc., Chicago, IL, USA). The prevalence of BDD was calculated as the percentage of participants who achieved a score of 4; and was presented with 95% confidence interval (95%CI). Inferential statistics were used to analyse the association of the percentage of positive BDD screening with grade, body part of concern, and the number of body parts of concern by using the chi-square test or Fisher's exact test, as appropriate. The results are presented as frequency and percentage, with odds ratios (ORs) for the body parts of concern. Further, the independent t-test was used to analyse the association of BDD with age; these results are presented as mean \pm standard deviation (SD). A *p*-value of <0.05 was considered to reject the null hypothesis.

Results

A total of 495 female students with a mean (SD) age of 16.78 (1.11) years were included; 24.6% were in grade S1, 36.2% were in S2, and 39.2% in S3. Participants were equally distributed by strata (administrative divisions) (Table 1).

Table 2 presents the pattern of responding to all BDDQ items. Of the 495 respondents, 211 (42.6%) indicated that they were worried about their appearance (Q1.a), and the remaining 284 (57.4%) indicated that they had no such worries and discontinued the questionnaire at this stage. Of the 211 who stated that they had appearance-related concerns, 204 (41.2%) expressed concerns with at least one body part. The most frequently mentioned body parts were the skin (18.4%), hair (10.7%), teeth (9.9%), and nose (9.5%). However, only 195/495 (39.4%) admitted to thinking about their appearance problems a lot (Q1.b). The other 300 respondents discontinued the questionnaire at this stage.

Table 1: Participants' demographic and clinical characteristics (N = 495).

Parameter	Category	Frequency	Percentage
Age (years)	Mean(SD); range = 14, 21	16.78	1.11
Grade	S1	122	24.6
	S2	179	36.2
	S3	194	39.2
Area (in Jeddah)	Middle	135	27.3
	North	121	24.4
	East	117	23.6
	South	122	24.6

SD: Standard deviation.

Psychosocial assessment showed that the body part of concern was associated with sadness in 52.3% of the 195 participants who admitted to thinking about their appearance problems a lot (20.6% of the total population), avoidance reactions in 44.6% (17.6% of the total population), social relationships in 21.5% (8.5% of the total population), and problems in school, work, or other activities in 9.7% (3.8% of the total population).

Further, 72 participants (14.5% of the total population) reported spending 1 h or more thinking about how they look per day. Of the 195 who admitted to thinking about appearance-related problems a lot, 114 (58.5%) declared that their primary concern with how they look was that they were not thin enough or might be too fat. However, on direct assessment of these 114 students by the researcher, none revealed signs of AN.

Calculated score with respect to BDDQ items among the study population (N = 495) showed the following distribution: 0 (57.4%), 1 (3.2%), 2 (10.1%), 3 (17.0%), and 4 (12.3%). Thus, considering the positively screened cases, the prevalence (95% CI) of BDD was 12.3% (9.6%, 15.5%) (results not presented in tables).

Among the positively screened participants, 43 replied 'yes' to Q2 (Is your main concern with your appearance that you are not thin enough or that you might get too fat?), which represents 8.7% of the total participants. However, case-by-case assessment of these participants revealed no signs of AN—notably, no low body mass (BMI) index; thus, these were included in the BDD cases.

Analysis by age showed no association with BDD, with mean (SD) age = 16.75 (1.08) years versus 16.98 (1.27) years among negatively versus positively screened participants, respectively (*p* = 0.122, independent t-test); the results are not presented in tables. Similarly, no association with school grade was found (*p* = 0.621). The aspects that were associated with the highest risk of BDD included the skin (OR = 8.33, *p* < 0.001), followed by obesity/overweight (OR = 8.17, *p* < 0.001) and the nose (OR = 7.35, *p* < 0.001). Further, the prevalence of BDD increased with the number of body parts of concern from 21.7% among respondents who mentioned only one to 60% among those who mentioned four or more (*p* < 0.001) (Table 3, Figure 1).

Table 4 presents the percentage of respondents who replied positively to items 3.a-d of the BDDQ by body part. This analysis provides a picture of the psychosocial

Table 2: Response patterns to Body Dysmorphic Disorder Questionnaire items.

Item	Answer	Freq. %		
		Total (N = 495)	Subpop.1 (n = 195)	
1.a) Are you worried about how you look?	No	284	57.4	—
	Yes	211	42.6	—
⇒ 1.b) If yes: Do you think about your appearance problems a lot and wish you could think about them less?	No	300	60.6	—
	Yes	195	39.4	—
⇒ If yes, the aspects of your body you don't like				
Skin	Yes	91	18.4	
Hair	Yes	53	10.7	
Nose	Yes	47	9.5	
Teeth	Yes	49	9.9	
Other:	Yes	75	15.2	
Body shape		46	9.3	
Overweight/obesity		18	3.6	
Eyes		2	0.4	
Whole body		2	0.4	
Hirsutism		1	0.2	
Jaw		1	0.2	
Knee		1	0.2	
hyperpigmentation				
Mouth/lips		1	0.2	
Not specified		3	0.6	
2) Is your main concern with your appearance that you are not thin enough or that you might get too fat?	No	81	16.4	41.5
	Yes	114	23.0	58.5
3) How has this problem with your appearance affected your life?				
3.a. Has it often upset you a lot?	No	93	18.8	47.7
	Yes	102	20.6	52.3
3.b. Has it often got in the way of doing things with friends, your relationships with people, or your social activities?	No	153	30.9	78.5
	Yes	42	8.5	21.5
3.c. Has it caused you any problems with school, work, or other activities?	No	176	35.6	90.3
	Yes	19	3.8	9.7
3.d. Are there things you avoid because of how you look?	No	108	21.8	55.4
	Yes	87	17.6	44.6
4) On an average, how much time in a day do you usually spend thinking about how you look?	<1 h	123	24.8	63.1
	1–3 h	43	8.7	22.1
	>3 h	29	5.9	14.9

role of appearance-related concerns by specific body parts. Regarding the psychosocial aspect, concerns with body shape displayed the most significant figures as shown by the percentage of respondents who reported feeling upset (69.8% vs. 47.4%, $p = 0.009$), interference with social relationships

Table 3: Association of body dysmorphic disorder screening with school grade and body parts of concern (N = 495).

Factor	Level	n	BDD-positive screening		p-value
			Freq.	% OR	
School grade	S1	122	12	9.8	(ref) 0.621
	S2	179	23	12.8	1.35
	S3	194	26	13.4	1.42
Skin concern	No	404	27	6.7	— <0.001*
	Yes	91	34	37.4	8.33
Hair concern	No	442	48	10.9	— 0.004*
	Yes	53	13	24.5	2.67
Nose concern	No	448	41	9.2	— <0.001*
	Yes	47	20	42.6	7.35
Teeth concern	No	446	46	10.3	— <0.001*
	Yes	49	15	30.6	3.84
Body shape concern	No	449	48	10.7	— 0.001*
	Yes	46	13	28.3	3.29
Obesity/overweight concern	No	477	52	10.9	— <0.001*
	Yes	18	9	50.0	8.17
Other concern	No	484	58	12.0	— 0.143F
	Yes	11	3	27.3	2.75
No. of aspects of concern	0	291	0	0.0	NC <0.001*
	1	115	25	21.7	NC
	2	72	29	40.3	NC
	3	12	4	33.3	NC
	4+	5	3	60.0	NC

S1: 1st year secondary school; OR: odds ratio; NC: not calculated.

(44.2% vs. 15.1%, $p < 0.001$), and avoidance behaviours (67.4% vs. 38.2%, $p = 0.001$) among those who mentioned this bodily concern versus those who did not mention it, respectively. The second most significant figures were related to concerns of obesity/overweight, associated with 77.8% vs. 49.7% of respondents feeling upset and 27.8% vs. 7.9% reporting problems at school, work, or in other activities because of their physical appearance, compared to respondents who did not report this concern. Remarkably, hair, nose, and teeth-related concerns were associated with none of the four investigated psychosocial dimensions. However, we observed the likelihood of an increase in the psychosocial role of appearance-related concerns with the number of body parts of concern, although this did not achieve statistical significance in any of the four dimensions ($p > 0.05$). In the participants who screened positive, the most significant aspects of concern were the skin, body fat, and nose. They showed marked changes in their social interactions, self-esteem, quality of life, and suicidal ideation.

The following statements are part of the reported aspects of the psychosocial role of appearance-related concerns experienced by the 61 students who screened positive for BDD. These statements were formulated in response to Q3 of the questionnaire 'How has this problem with your appearance affected your life?' and its sub-question: *Has it often got in the way of doing things with friends, your relationships with people, or your social activities? If yes, describe how:*

Response patterns varied. Remarkably, six among the 61 reported experiencing 'negative comments', 'bullying', and 'ridicule' by people, notably within the family and friend

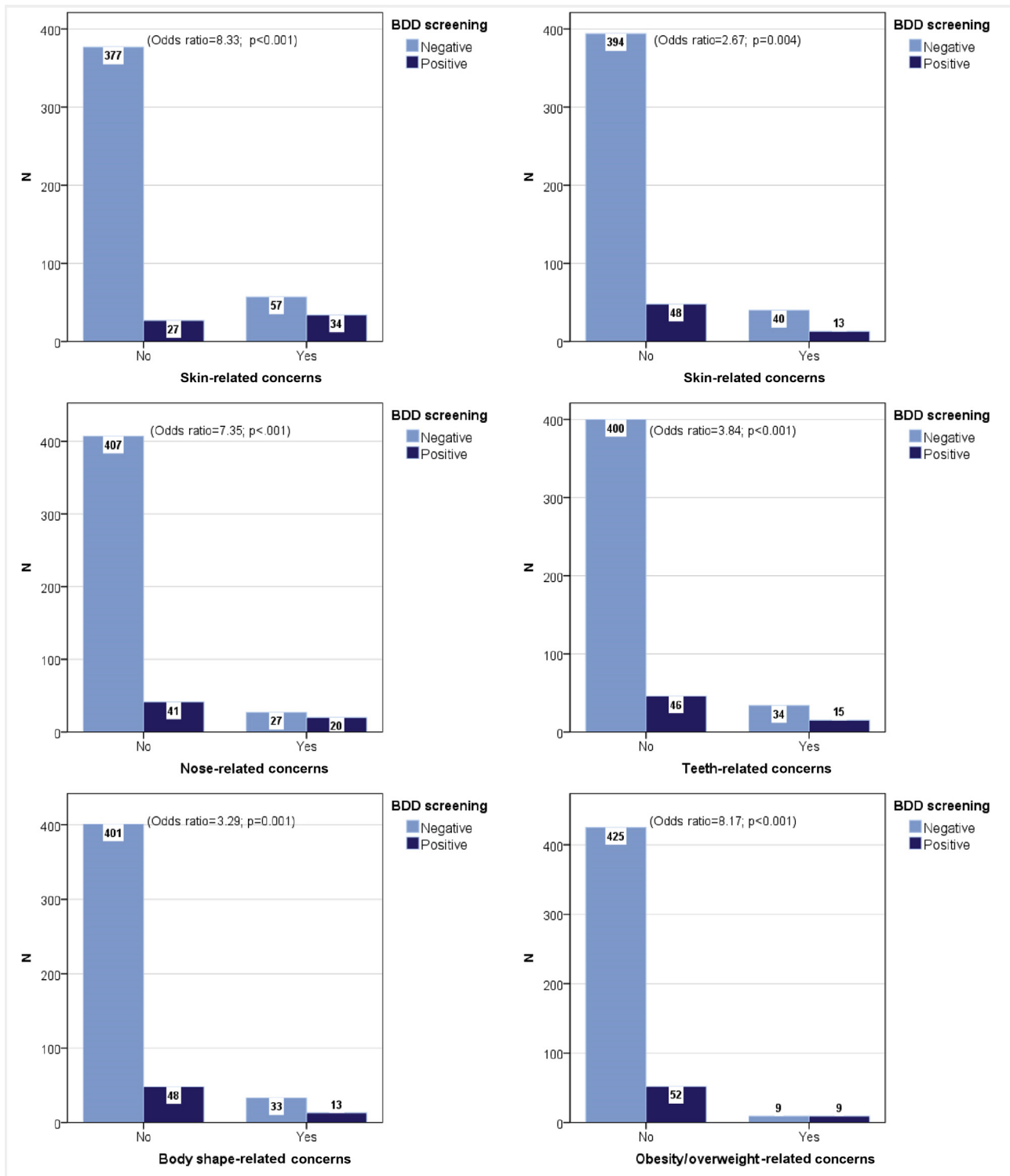


Figure 1: Association of BDD with specific body parts (N = 495).

circles. Other respondents (n = 4) complained of decreased self-confidence and/or excessive shyness resulting in social withdrawal, a phobia of meeting people, or the fear of not being accepted in society because of their appearance. As a result, a number of respondents declared having ‘much difficulty in getting in touch with people’ and experiencing ‘social isolation’. Importantly, two of the students reported

experiencing depressed mood and one of the two reported suicidal ideation.

To the sub-question: *Has it caused you any problems with school, work, or other activities? If yes, describe how:*

Only six out of the 61 concerned students responded to this question. Five of the six reported being bullied and ridiculed by other girls, which sometimes inhibited them

Table 4: Psychosocial aspect by body parts of concern among students who indicated being worried about their appearance and thinking a lot about it (n = 195).

Aspect	Concern	Often upset (3.a)		Social relationships affected (3.b)		School, work problems (3.c)		Avoidance reactions (3.d)	
		%	p-value	%	p-value	%	p-value	%	p-value
Skin	No	58.1	0.081	28.6	0.010*	11.4	0.391	45.7	0.739
	Yes	45.6		13.3		7.8		43.3	
Hair	No	52.5	0.958	23.8	0.207	11.9	0.108 ^F	44.1	0.794
	Yes	51.9		15.4		3.8		46.2	
Nose	No	51.0	0.513	21.5	0.970	10.1	1.000 ^F	48.3	0.061
	Yes	56.5		21.7		8.7		32.6	
Teeth	No	51.7	0.746	20.5	0.526	10.6	0.574 ^F	45.7	0.574
	Yes	54.5		25.0		6.8		40.9	
Body shape	No	47.4	0.009*	15.1	<0.001*	7.9	0.102	38.2	0.001*
	Yes	69.8		44.2		16.3		67.4	
Obesity/overweight	No	49.7	0.027* ^F	21.5	1.000 ^F	7.9	0.019* ^F	43.5	0.327
	Yes	77.8		22.2		27.8		55.6	
Other	No	52.2	1.000 ^F	20.1	0.061 ^F	8.2	0.014* ^F	43.5	0.223 ^F
	Yes	54.5		45.5		36.4		63.6	
No. of aspects of concern	1	46.7	0.268	20.6	0.728	8.4	0.808	41.1	0.247
	2	58.3		20.8		11.1		45.8	
	3	54.5		27.3		9.1		72.7	
	4+	80.0		40.0		20.0		40.0	

^F significance level calculated using Fisher's exact test; otherwise, the Chi-square test was used.

from performing activities such as exercise, while one complained of limited relationships in school.

To the sub-question: *Are there things you avoid because of how you look? If yes, describe how:*

Among the things that respondents reported avoiding were leisure activities and entertainment such as playing, dancing, and attending events like weddings or parties. Other respondents reported avoiding using make-up, notably at events, while others reported concerns about wearing fit clothes. A relatively high number of respondents reported avoiding eating specific foods for various reasons such as fear of skin problems or obesity. Interestingly, one student reported avoiding smiling and contacting people because of her perception of her teeth.

Discussion

Beauty is an essential pillar of the female gender role stereotype, and physical unattractiveness can be considered a greater social liability in females than males.¹⁵ The need to be physically attractive increases when it impacts the value attributed to an individual, and this increases vulnerability to body image concerns. Thus, females are more likely to develop BDD as body concerns represent a greater proportion of their foci of interest. Therefore, we performed our cross-sectional investigation on a representative sample of female students in KSA. We identified probable BDD based on DSM-IV criteria in 12.3% of the participants (95% CI: 9.6%, 15.5%).

BDD prevalence in the current study was remarkably higher than that reported in the literature. Focusing on adolescents and students, data from European countries indicated that BDD prevalence was 4.8% among female nursing students in Turkey¹⁶ and 5.1% among students in Germany¹⁷ as

assessed by the BDDQ and confirmed via the BDD-Structured Clinical Interview (SCID) for the DSM-IV. In the United States, studies reported BDD in 2.2–4.9% of college students as indicated by either the BDDQ or BDDE-Self Report (SR).^{17–20} However, these estimations were not associated with subsequent reassurance interviews. Notably, African American adolescents have been found to be the least dissatisfied with their bodies when compared to adolescents from other ethnic backgrounds.^{20,21} Other parts of the world showed consistent results, with BDD apparent in 1.7–2.3%^{7,22} among Australian adolescents and 3.3–5.1% in South Africa.^{23,24} As with our study, the latter estimates were based on the DSM-IV criteria and the participants' data were extracted using a relevant questionnaire without diagnostic ascertainment via specific psychiatric tests.

Regionally, a surprising higher BDD prevalence (15.2%) than ours was reported among Egyptian school students, including prep, middle, and secondary students, when they were assessed via the SCID interviews.²⁵ Taqui et al.²⁶ revealed a lower estimate among Pakistani medical college students (5.8%) using the Body Image Disturbance Questionnaire, which assesses body image disturbance (which essentially causes marked emotional distress) rather than mere body image dissatisfaction.²⁷

On the national level, only one study has investigated the patterns of BDD among female medical students. Among 365 participants from King Saud University, Riyadh, Shaffi Ahamed et al.²⁸ found that 4.4% (CI: 2.54, 7.04) were BDD positive. The higher BDD prevalence in our study should be cautiously interpreted, especially because of the difference in age categories studied; our results are specific to the characteristics of the adolescent population. Further, this discrepancy in results may denote important inter-generational dissimilarities such as those associated with the advent of new social media applications such as Snapchat,

which are based on networking feedback regarding pictures of oneself, magnifying potential appearance concerns.

Further, this relatively high prevalence of BDD could be explained by poor satisfaction with body weight, as perceived by about three quarters of Saudi women.^{29,30} Interestingly, in a cross-sectional study among female medical students in Taibah University,³⁰ being too fat or too thin was expressed by 55% and 18.6% of the participants, respectively, while 44.1% of the female university students in Abha showed a desire to become thinner than their perceived body shape.²⁹ The possible risk factors for bodily dissatisfaction included family influence, friends' criticism, and having disproportional body parts.³⁰ Moreover, in the Saudi context, the effect of mass media, social media, and digital technologies on body image perceptions is worth noting. The psychological internalisation of the thin body ideal for the female gender is strengthened by the socially defined models of physical attractiveness in females.^{31,32} Importantly, with the extensive use of the internet and mobile phones, there is evidence that taking selfies is associated with higher rates of undergoing cosmetic surgeries while girls who spend more time on Facebook have concerns about their physical self-image.³³ Therefore, the role of technology in triggering and maintaining BDD symptoms is apparent.

In addition to obesity/overweight, concerns related to the skin and nose were the most frequently reported among female adolescents in the current study. Female medical students in Riyadh reported consistent findings, with the skin and fat accounting for 75% and 68.8% of bodily concern, respectively.²⁸ This was also relatively in agreement with the concerns of Pakistani medical students, where body weight, skin, and teeth represented the main concerns in the participants with BDD.²⁶ However, in a study conducted in the United States,²⁷ female college students were heavily concerned with their legs, thighs, and breasts, while these parts of the body were not significant concerns in our study. This could be attributable to the fact that, in KSA's conservative Muslim socio-cultural context, these are considered taboo subjects that students could be hesitant to declare their preoccupation with. The increased rates of skin concerns might be related to acne vulgaris in a large proportion of adolescent populations.³⁴ However, confirmatory dermatological assessment was not performed as it was beyond the scope of our study. It is also possible that having dark skin might be linked to negative stereotypes owing to the effect of cultural beauty ideals.

Surprisingly, there were no reported cases of AN in our study based on the lack of participants with low BMI values. It was previously reported that about one-third of people with BDD had a lifetime comorbid eating disorder and that BDD symptoms could be found in 25% of patients with AN.^{35,36} Additionally, Schneider et al.³⁷ showed that BDD was strongly associated with eating disorders in female adolescents, while it was moderately associated with affective disorders in both genders. Seemingly, absolute and relative weight status in patients with AN are indicators of disease severity and prognosis rather than being a diagnostic or confirmatory parameter.³⁸ As such, the validity of Q2 with regard to ruling out AN diagnosis is questionable and needs more supportive evidence.

The psychological role of BDD was apparent in our investigation. Social isolation as a result of decreased self-

esteem has been elucidated by Phillips et al.,³⁹ in whose study a clinical sample of patients with BDD showed significantly lower Rosenberg Self-Esteem Scale scores as compared to their non-clinical counterparts, and this was largely mediated by BDD severity and the presence of depressive symptoms. Consistent with our findings, patients with BDD had poor social functioning, poor quality of life, and a lack of involvement in a primary social relationship.⁴⁰

The present study is not without limitations. The use of self-reported data cannot preclude the possibility of response bias. Additionally, we were unable to explore a number of potential confounders of BDD such as socio-demographic factors, educational attainment, socio-cultural environment, and so on.

Conclusion

The present study provides insight into the current state of BDD among the most vulnerable category in the general population. Within the scope of the study, we showed that BDD is a common but difficult-to-recognise disorder that is prevalent in 12.3% of female Saudi adolescents.

This pattern of BDD highlights the diagnostic challenges in this age category, particularly in light of the culturally conservative atmosphere in KSA. The challenge is augmented by the existence of multiple ill-defined comorbidities, such as OCD, AN, mood changes, and anxiety, especially with frequently associated somatic symptoms.

Recommendations

Given that people with BDD often seek cosmetic rather than mental health treatment, which can increase disease burden, it is necessary to conduct studies to investigate BDD prevalence in dermatology and cosmetic surgery settings to detect this potentially hidden entity. More reliable studies with large sample sizes and longitudinal designs are required to investigate the confounding factors. From another perspective, adequate counselling and guidance are needed to control this problem. It is also crucial to conduct awareness campaigns in schools and universities to detect BDD early enough that it is manageable.

Source of funding

Authors declared having received no funding for this study.

Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

There are no Ethical or Financial issues.

Authors contributions

AAA is the principal investigator who prepared and proposed the research idea and designed the study, collected data, contributed in analysis and interpretation of the data,

and drafted the manuscript. YMM supervised the preparation of the study proposal, revised the manuscript critically for important intellectual content. Both authors approved the final version of the manuscript. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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How to cite this article: Alomari AA, Makhdoom YM. Magnitude and determinants of body dysmorphic disorder among female students in Saudi public secondary schools. *J Taibah Univ Med Sc* 2019;14(5):439–447.