

# Prevalence of Body Dysmorphic Disorder Among Dermatology and Plastic Surgery Patients in Saudi Arabia and its Association with Cosmetic Procedures

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**Objective:** To estimate the prevalence of body Dysmorphic disorder (BDD) among patients visiting dermatology or plastic clinics and comparing the prevalence between male and female patients in Riyadh. Besides, the study aimed to identify the association between the number and type of previous cosmetic procedures among BDD patients. This study will compare the number of previous cosmetic procedures among between BDD patients with non-BDD patients.

**Design:** Cross-Sectional study.

**Methods:** A cross-sectional design was adopted for this study conducted between January and March 2020 on 250 patients at outpatient dermatology and plastic clinics at King Khalid University Hospital [KKUH]. Patients were asked about their demographics and were asked to complete the dermatology version Body Dysmorphic Disorder Questionnaire (BDDQ-DV). Last part of the questionnaire was about the number and type of cosmetic procedures among them. Data processing was performed using the Statistical Package for Social Sciences (v 26.0 IBM Corporation).

**Results:** The findings of the study revealed that out of 250 patient 100 (40%) reported concerned about the appearance of some parts of their body and half (50%) of these 100 patients screened positive for BDD. There were significant link between BDD and patient age mean age at 34.14( $\pm$ 9.60) with a p-value of 0.049. The most frequent cosmetic procedure done was filler injection followed by Botox injection (36.2 %),(33.3 %) respectively they were mostly done by females. No significant association between number and type of cosmetic procedure and screening positive for BDD in our sample was found. **Conclusion:** Body Dysmorphic disorder was reported in 50% of patients reported in concerns about their appearance. No association was detected between screening positive for BDD and having cosmetic procedures.

**Keywords:** Body Dysmorphic Disorder, Dermatology, Plastic Surgery, King Saud Medical City

## INTRODUCTION

Body dimorphic disorder (BDD) previously known as dysmorphophobia and was originally described by psychiatrist Morselli in 1886. In 1987, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) included the BDD as a disorder with diagnostic criteria<sup>1</sup>. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V), body dysmorphic disorder (BDD) is a common, chronic and disabling disorder that is often under-recognized and misdiagnosed<sup>2</sup>. The definition of BDD is a psychiatry disorder related to body image. Individual is always preoccupied with perceived physical appearance defect that which is normal or near normal to others. Patients always facing difficulties in their preoccupation appearance as it is very difficult to resist or control and it can take 3 to 8 hours per day<sup>3</sup>. BDD is not related to any other mental or eating disorder for example anorexia nervosa or bulimia<sup>4</sup>. Although body dimorphic disorder patients usually diagnosed in adulthood the onset of the disorder begin in childhood or adolescent with average age of 12-13 years. Before the individuals present with full criteria of the disorder they will experience sub-clinical symptoms several years before the diagnosis. Studies reported that BDD onset is early and gradual; the severity of BDD symptoms is associated with attempted suicide and co morbidities including eating disorders, substance use, and anxiety and personality disorders<sup>2</sup>. The characteristics of BDD are distressing repetitive time-consuming behaviors, for example enormous

mirror checking, camouflaging, frequent body part measuring, seeking reassurance looking for ways to improve appearance or mental act like comparing self to others<sup>5</sup>. This disorder has an impact in patients suffering from it from many aspects for example psychological, social, educational and financial<sup>4</sup>. Recent prospective study published in 2006 confirmed the high rates of suicidal ideation and attempts. They reported that 57.8% had a suicidal ideation per year and 2.6% attempted suicide per year<sup>6</sup>. Many studies suggested that BDD consider to be an obsessive-compulsive disorder (OCD) as they share the same pathogenic pathway and they are similar in demographics, course, comorbidities and management response. For instance, the rate of comorbidity in BDD and OCD is the same reaching 30%<sup>5</sup>. Studies from recent years showed difference between the prevalence of BDD between genders, with higher rates among female than male. The reason behind this difference is females have greater dissatisfaction and anxiety about general appearance as well as the social media pressure on body weight and body figure because they want to be more attractive in the society<sup>7</sup>. Previous studies estimated the prevalence of BDD to be 1.8%-2.4% among general population, but the rate in patients visiting dermatology and plastic surgery clinics<sup>8</sup>. Although BDD is a psychiatric condition patient present more to the dermatologist or plastic surgeons more than psychiatrist looking for solutions<sup>9</sup>.

The challenge in making the diagnosis is usually patients are embarrassed from their concerns and symptoms for this reason they do

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not declare them unless to the physicians without specifically asked<sup>8</sup>. Recently the number of patients looking for cosmetic procedures increases dramatically. In 2015 the number of cosmetic procedures done worldwide was 21 million, including 15.9 million in the United States. During 2002 United Kingdom reported the increase percentage of cosmetic procedures to 300 %<sup>10</sup>. BDD consider to be a will known contraindication to perform cosmetic surgeries and procedures, instead patients should be evaluated and treated psychologically. Physicians will be in dangerous or deadly sequel in case of angry and dissatisfied patients. Two published studies reported that plastic surgeons have been physically threatened by patients with BDD with percentage of 2% and 40% consequently<sup>10</sup>. Treatment of BDD is usually under psychiatrist approaching the patient with a combination of selective serotonin reuptake inhibitors (SSRIs) and cognitive behavioral therapy (CBT) for example behavioral experiments, exposure, and response prevention with goals of improving quality of life<sup>11</sup>. There are limited available data to determine the prevalence of body Dysmorphic disorder among Saudi population in general Saudi Arabia. After reviewing the literature, we found two studies discussing the BDD in Saudi Arabia, the first one among female medical students published in 2016 with “prevalence of BDD in all the academic years was 4.4%”. (1 The second study was conducted in Qassim region in Saudi Arabia in 2017 among patients attending dermatology clinics the prevalence was 18.6 %<sup>3</sup>. In Saudi Arabia as well as the Mediterranean region, there is a significant lack of data about the prevalence of BDD and its association with number and type of cosmetic and plastic surgeries. The main objective of the current study we aim at filling the literature gap by screening the patient attending dermatology or plastic surgery clinic for BDD providing a current estimate of its prevalence, investigating the difference between genders with BDD finally investigating the number and type of cosmetic procedures or plastic surgeries done among the selected patients.

**METHOD**

**Study Design:** A cross-sectional design was adopted in this study. The study was performed in January to March/2020 at outpatient dermatology and plastic surgery clinics in two tertiary healthcare settings, namely, they are: King Saud University hospitals, (King Khalid University Hospital [KKUH], King Abdelaziz University Hospital [KAUH]). In addition, 5 privet specialized dermatology and plastic surgery clinics, Kingdom of Saudi Arabia.

**Study Sample:** Taking in consideration a body Dysmorphic disorder prevalence rate of 18.6% among Saudi population, using a confidence level of 0.95, and accepting a difference up to (5%), the study needed to have 227 subjects. The following equation can be applied:

$$n = Z^2 \alpha P(1-P) / d^2 = 1.96^2 * 0.186 * (1-0.186) / 0.05^2 = 227$$

To avoid being a multicenter study, 10% were added and the final sample size reached up to 250 patients. A simple random sampling procedure through the recruitment of patients attending the clinics on Sundays, Tuesdays, and Thursdays from January 2020 to March 2020, was adopted.

**Inclusion Criteria:** Patients of both genders attending dermatology or plastic clinics at KKUH.

**Exclusion Criteria:** Patients younger than 18 years old.

**Data Collection Methods:** A modified self-administrated Body Dysmorphic Disorder Questionnaire-Dermatology Version (BDDQ-DV) used to screen the patients. The questionnaire is subdivided into 3 sections, namely: demographics, BDD and previous cosmetic or plastic procedures. The first part included socio-demographic data: age, nationality, gender, marital status, occupation and educational level. The second part included the (BDDQ-DV) questionnaire which

is modified version of the Body Dysmorphic Disorder Questionnaire (BDDQ), that is validated for use only in the psychiatric context. This instrument was designed by Dufresne et al. and Phillips et al on the basis of the “definition of BDD provided in the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV)”. To screen BDD positivity, “patients must report the presence of preoccupation as well as at least moderate (score of 3 or higher) distress or impairment in functioning”. This BDDQ-DV has a sensitivity of (100 percent) and specificity of (94.7 percent) comparing to (sensitivity 100 percent, specificity 89 percent) in BDDQ<sup>12</sup>. Last part was about number, and type of previous cosmetic procedures received to each patient.

**Data Analysis:** Data was gathered and coded prior to data entry through the SPSS software. Descriptive statistics (frequencies, percentages, mean, standard deviation,) was used to describe the categorical and quantitative variables. Chi square test and odds ratio used to quantify the association between two categorical variables. A p-value ≤ 0.05 and 95% confidence intervals used to report the statistical significance and precision of results.

**RESULTS**

The socio-demographic characteristics of the current study participants are shown in Table 1. A total of 250 subjects participated, the majority of them were females (89.6%) , with a mean age of 33.24(±11.36), and the vast majority of them were Saudis(94%). Most of the participants were married (47.6%), and 62.4%were highly educated.

**Table 1: Frequencies and percentages of the study participants’ demographic characteristics**

	Frequency (%)
<b>Total number of sample</b>	250 (100 %)
<b>Age group</b>	
≤ 20 y	27 (10.8 %)
21 – 30 y	99 (39.6 %)
31 – 40 y	57 (22.8 %)
41 – 50 y	47 (18.8 %)
>50 y	20 (8.0 %)
Mean ±SD	33.244 ± 11.36
Min. – Max.	15.0 – 62.0
<b>Gender</b>	
Male	26 (10.4 %)
Female	224 (89.6 %)
<b>Nationality</b>	
Saudi	235 (94.0 %)
Non-Saudi	15 (6.0 %)
<b>Marital Status</b>	
Single	114 (45.6 %)
Married	119 (47.6 %)
Widow	4 (1.6 %)
Divorced	13 (5.2 %)
<b>Educational level</b>	
PhD	8 (3.2 %)
Master	15 (6.0 %)
B.Sc.	133 (53.2 %)
Diploma	20 (8.0 %)
Higher school	61 (24.4 %)
Intermedia school	10 (4.0 %)
Elementary school	3 (1.2 %)
<b>Education levels</b>	
High educated	156 (62.4 %)
Low educated	94 (37.6 %)

The results of the current study revealed that 40% of the participants were concerned about the appearance of some parts of their body,

the differences between those who were concerned and others who were not concerned are shown in Table 2. Overall, the two groups differed significantly in gender, where a statistically significant higher percentage of females were concerned than males at 42.9% vs.19.2%, respectively, with a P-value of 0.022, and an OR of 3.09, indicating that females are three times more concerned than males. On the other hand, the two groups did not differ significantly by age, nationality, marital status, or educational level. The highest concern level was shown from the age group of 31-40 years at 50.9%, and it was equal between the Saudi and non-Saudi at 40% for each. The highest prevalence of concern was among divorced individuals(69.2%) followed by widowed (50%). Highly educated respondents showed a higher concern with a prevalence of 42.9% compared to 35.1% of low educated ones.

**Table 2: Participants’ responses for concerning about the appearance of some parts of the body based on the demographic characteristics**

	Are you concerned about the appearance of some part of your body, which you consider especially unattractive?		P-value
	Yes (n = 100)	No (n = 150)	
Age (mean ± SD)	32.22 ± 9.782	33.927 ± 12.288	0.224
<b>Age group</b>			
≤ 20 y	11 (40.7 %)	16 (59.3 %)	0.168
21 – 30 y	39 (39.4 %)	60 (60.6 %)	
31 – 40 y	29 (50.9 %)	28 (49.1 %)	
41 – 50 y	17 (36.2 %)	30 (63.8 %)	
>50 y	4 (20.0 %)	16 (80.0 %)	
<b>Gender</b>			
Male	5 (19.2 %)	21 (80.8 %)	0.022
Female	95 (42.4 %)	129 (57.6 %)	
<b>Nationality</b>			
Saudi	94 (40.0 %)	141 (60.0 %)	0.999
Non – Saudi	6 (40.0 %)	9 (60.0 %)	
<b>Marital status</b>			
Single	42 (36.8 %)	72 (63.2 %)	0.152
Married	47 (39.5 %)	72 (60.5 %)	
Widow	2 (50.0 %)	2 (50.0 %)	
Divorced	9 (69.2 %)	4 (30.8 %)	
<b>Educational levels</b>			
Elementary school	1 (33.3 %)	2 (66.7 %)	0.370
Intermediate Sch.	3 (30.0 %)	7 (70.0 %)	
High school	18 (29.5 %)	43 (70.5 %)	
Diploma	11 (55.0 %)	9 (45.0 %)	
Bachelor	59 (44.4 %)	74 (55.6 %)	
Master	5 (33.3 %)	10 (66.7 %)	
PhD	3 (37.5 %)	5 (62.5 %)	
<b>Education levels</b>			
Low educated	33 (35.1 %)	61 (64.9 %)	0.220
High educated	67 (42.9 %)	89 (57.1 %)	

Half (50%) of these 100 participants who reported having concern about the appearance of some parts of their body, screened positive for body dysmorphic disorders (BDD). Table 3 compares those who have BDD and others without BDD. Participants with BDD have a statistically significant higher mean age at 34.14(±9.60) years compared to 30.3(±9.67) years for those without BDD, with a p-value of 0.049. For other variables including age, gender, and nationality, the two groups (with, and without BDD) did not differ significantly. However, the BDD prevalence was the highest among the age group

of 31-40 years at 58.6%, 50.5% of the BDD group were females and 51.3% of them were Saudis. The prevalence of BDD among divorced participants was 77%, and when compared with single participants, the OR was 6.30(1.158-34.262). also, married participants showed two folds risk of BDD compared to singles, with an OR of 2.43(1.032-5.720).

**Table 3: The participants’ responses for being concerned about the appearance with reference to their demographic characteristics**

	Concerned about the appearance		P-value
	+ve (n = 50)	-ve (n = 50)	
Age (mean ± SD)	34.14 ± 9.60	30.3 ± 9.67	0.049
<b>Age group</b>			
≤ 20 y	3 (27.3 %)	8 (72.7 %)	0.522
21 – 30 y	19 (48.7 %)	20 (51.3 %)	
31 – 40 y	17 (58.6 %)	12 (41.4 %)	
41 – 50 y	9 (52.9 %)	8 (47.1 %)	
>50 y	2 (50.0 %)	2 (50.0 %)	
<b>Gender</b>			
Male	2 (40 %)	3 (60 %)	0.50
Female	48 (50.5 %)	47 (49.5 %)	
<b>Nationality</b>			
Saudi	48 (51.1 %)	46 (48.9 %)	0.339
Non – Saudi	2 (33.3 %)	4 (66.7 %)	
<b>Marital status</b>			
Single	15 (35.7 %)	27 (64.3 %)	0.064
Married	27 (57.4 %)	20 (42.6 %)	
Widow	1 (50.0 %)	1 (50.0 %)	
Divorced	7 (77.8 %)	2 (22.2 %)	
<b>Educational levels</b>			
Elementary school	0 (0.0 %)	1 (100 %)	0.909
Intermediate Sch.	1 (33.3 %)	2 (66.7 %)	
High school	9 (50.0 %)	9 (50.0 %)	
Diploma	5(45.5 %)	6 (54.5 %)	
Bachelor	31 (52.5 %)	28 (47.5 %)	
Master	2 (40.0 %)	3 (60.0 %)	
PhD	2 (66.7 %)	1 (33.3 %)	
<b>Education levels</b>			
Low educated	15 (45.5 %)	18 (54.5 %)	0.523
High educated	35 (52.2 %)	32 (47.8 %)	

Table 4 shows the types of plastic procedures and descriptive of numbers of different operations (procedures). Fillers injection were the most frequent plastic procedure done (36.2 %) with a mean (±SD) of 2.56(±2.31), followed by botox injection (33.3 %) with a mean of 2.78(±3.20), and liposuction (8.7 %) with a mean of 1.67(±0.51). While breast augmentation, breast lift, and facelift were the lowest frequent procedures done (1.45 %) for each procedure .

A statistically significant higher percentage (74%) of subjects having BDD reported that their concerns preoccupy them, and they think about it a lot compared to 36% of those without BDD, P-value of <0.0001. Similarly, a higher percentage (34.7%) of the BDD group think that their defects significantly interfere with their social life, while only 10% of the other group reported so, (P-value 0.003). Additionally, 44.9% of BDD participants reported avoiding things because of their defects compared to 18.4% of those without BDD ( P-value of 0.005). On the other hand, a non-statistically significant lower percentage of participants without BDD said that their defect significantly interferes with their school work, job, or ability to function at 4% vs 14.3% in the BDD group, and P-value 0.075 Table 5 .

**Table 4: Types of plastic procedures and descriptive of numbers of different operations (procedures).**

	Frequency (%)	Range		Mean	Std. Deviation
		Minimum	Maximum		
Blepharoplasty	0 (0 %)	0	0	0.0	0.0
Breast augmentation	1 (1.45 %)	1.0	1.0	1.0	0.0
Breast Lift	1 (1.45 %)	1.0	1.0	1.0	0.0
Facelift	1 (1.45 %)	1.0	1.0	1.0	0.0
Rhinoplasty	2 (2.9 %)	1.0	1.0	1.0	0.0
Breast Reduction	2 (2.9 %)	1.0	1.0	1.0	0.0
Abdominoplasty	4 (5.8 %)	1.0	1.0	1.0	0.0
Buttock lift	4 (5.8 %)	1.0	3.0	1.75	0.957
Liposuction	6 (8.7 %)	1.0	2.0	1.67	0.516
Botox injection	23 (33.3 %)	1.0	13.0	2.78	3.20
Fillers injection	25 (36.2 %)	1.0	10.0	2.56	2.31

**Table 5: Frequencies and percentages of concerning about parts of the body**

	Concerned about the appearance		P-value
	+ve (n = 50)	-ve (n = 50)	
<b>Do these concerns preoccupy you? That is you think about them a lot and they are hard to stop thinking about?</b>			
Yes	37 (74.0 %)	18 (36.0 %)	< 0.0001
No	13 (26.0 %)	32 (64.0 %)	
<b>Has your defect often significantly interfere with your social life?</b>			
Yes	17 (34.7 %)	5 (10.0 %)	0.003
No	32 (65.3 %)	45 (90.0 %)	
<b>Has your defect often significantly interfered with your school work, your job, or your ability to function in your role?</b>			
Yes	7 (14.3 %)	2 (4.0 %)	0.075
No	42 (85.7 %)	48 (96.0 %)	
<b>Are there things you avoid because of your defect?</b>			
Yes	22 (44.9 %)	9 (18.4 %)	0.005
No	27 (55.1 %)	40 (81.6 %)	

The number of plastic procedures done by both group wasn't significantly different, as shown in Table 6. Though, those without BDD showed higher frequency of fillers injection, botox injection, liposuction, and buttock lift at 14(56%), 12(52.17%), 4(66.7%), and 3(75%) compared to 11(44%), 11(47.83%), 2(33.3%), and 1(25%), in the BDD group, respectively. while abdominoplasty was higher in the BDD group 3(75%) vs. 1(25%) in the other group. Similar results were obtained when we compared the frequency of plastic surgery among concerned and non-concerned participants, where the differences were statistically non-significant with all P values >0.05, as shown in Table 7.

**Table 6: Chi-square test and Fisher's exact test for being concerned about the appearance with cosmetic and plastic procedures**

	Concerned about the appearance		P-value
	+ve (n = 32)	-ve (n = 37)	
Abdominoplasty	3 (75.0 %)	1 (25.0 %)	0.254 *
Rhinoplasty	1 (50 %)	1 (50 %)	0.716 *
Breast Augmentation	1 (100 %)	0 (0 %)	0.464 *
Breast Reduction	1 (50 %)	1 (50 %)	0.716 *
Breast Lift	1 (100 %)	0 (0 %)	0.464 *
Facelift	0 (0 %)	1 (100 %)	0.536 *
Liposuction	2 (33.3 %)	4 (66.7 %)	0.409 *
Buttock Lift	1 (25.0 %)	3 (75.0 %)	0.364 *
Botox injection	11 (47.83 %)	12 (52.17 %)	0.864 **
Fillers injection	11 (44.0 %)	14 (56.0 %)	0.765 **
Blepharoplasty	0 (0 %)	0 (0 %)	----

\*By Fisher's exact test, \*\*By Chi-square test

**Table 7: Concerned about the appearance with cosmetic and plastic procedures**

	Are you concerned about the appearance?		P-value
	Yes (n = 40)	No (n = 29)	
Abdominoplasty	2 (50 %)	2 (50%)	0.563 *
Rhinoplasty	1 (50 %)	1 (50 %)	0.668 *
Breast Augmentation	1 (100 %)	0 (0 %)	0.580 *
Breast Reduction	1 (50 %)	1 (50 %)	0.668 *
Breast Lift	0 (0 %)	1 (100 %)	0.420 *
Facelift	1 (100 %)	0 (0 %)	0.580 *
Liposuction	3 ( 50 %)	3 ( 50 %)	0.499 *
Buttock Lift	3 (75.0 %)	1 (25.0 %)	0.437 *
Botox injection	13 (56.5 %)	10 (43.5 %)	0.863 **
Fillers injection	15 (60 %)	10 (40 %)	0.797 **
Blepharoplasty	0 (0 %)	0 (0 %)	----

\*By Fisher's exact test, \*\*By Chi-square test

The current study results revealed that there were no statistically significant (P>0.05) differences in the number of plastic surgery procedures done either by gender, nationality, or educational level Tables 8-10.

**Table 8: Fisher’s exact test for the number of plastic surgery procedures done by gender**

	Gender		P-value
	Male (n = 26)	Female (n = 224)	
Abdominoplasty	1 (25.0 %)	3 (75.0 %)	0.357 *
Rhinoplasty	1 (50.0 %)	1 (50.0 %)	0.198 *
Breast Augmentation	0 (0.0 %)	1 (100.0 %)	0.896 *
Breast Reduction	0 (0.0 %)	2 (100.0 %)	0.802 *
Breast Lift	0 (0.0 %)	1 (100.0 %)	0.896 *
Facelift	0 (0.0 %)	1 (100.0 %)	0.896 *
Liposuction	1 (16.7 %)	5 (83.3 %)	0.486 *
Buttock Lift	1 (25.0 %)	3 (75.0 %)	0.357 *
Botox injection	1 (4.3 %)	22 (95.7 %)	0.279 *
Fillers injection	2 (8.0 %)	23 (92.0 %)	0.503 *
Blepharoplasty	0 (0 %)	0 (0 %)	----

\*By Fisher’s exact test.

**Table 9: Fisher’s exact test for the number of plastic surgery procedures done by nationality**

	Nationality		P-value
	Saudi (n = 235)	Non-Saudi (n = 15)	
Abdominoplasty	4 (100 %)	0 (0 %)	0.780 *
Rhinoplasty	2 (100 %)	0 (0 %)	0.883 *
Breast Augmentation	1 (100 %)	0 (0 %)	0.940 *
Breast Reduction	2 (100 %)	0 (0 %)	0.883 *
Breast Lift	1 (100 %)	0 (0 %)	0.940 *
Facelift	1 (100 %)	0 (0 %)	0.940 *
Liposuction	5 (83.3 %)	1 (16.7 %)	0.313 *
Buttock Lift	4 (100 %)	0 (0 %)	0.780 *
Botox injection	23 (100 %)	0 (0 %)	0.225 *
Fillers injection	25 (100 %)	0 (0 %)	0.196 *
Blepharoplasty	0 (0 %)	0 (0 %)	----

\*By Fisher’s exact test

**Table 10: Chi-square test and Fisher’s exact test for the number of plastic surgery procedures done by educational level**

	Education		P-value
	High (n = 156)	Low (n = 94)	
Abdominoplasty	4 (100 %)	0 (0 %)	0.149 *
Rhinoplasty	2 (100 %)	0 (0 %)	0.388 *
Breast Augmentation	1 (100 %)	0 (0 %)	0.624 *
Breast Reduction	2 (100 %)	0 (0 %)	0.388 *
Breast Lift	1 (100 %)	0 (0 %)	0.624 *
Facelift	0 (0 %)	1 (100 %)	0.376 *
Liposuction	3 (50 %)	3 (50 %)	0.406 *
Buttock Lift	1 (25 %)	3 (75 %)	0.151 *
Botox injection	13 (56.5 %)	10 (43.5 %)	0.541 **
Fillers injection	13 (52.0 %)	12 (48.0 %)	0.258 **
Blepharoplasty	0 (0 %)	0 (0 %)	----

\*By Fisher’s exact test, \*\*By Chi square test

However, for the highest frequent procedures, fillers injections and botox injection, they were mostly done by females at 92%, and 95.7%, 100% of them were Saudis, and most of them were highly educated participants 52% and 56.5%, respectively. Similarly, there was no significant difference between the age groups and marital status in terms of undergoing plastic surgery. The mean age of those who did fillers injections and botox injections was 31.28(±10.82), and 33(±10.69), respectively, as shown in Tables 11&12. Except for breast augmentation and botox injections that were mostly done by married participants, other studied plastic surgery procedures were done by single participants as shown in Table 13.

**Table 11: Means and standard deviations of plastic surgery procedures done by age**

	Age (years)				
	N	Mean	SD	Min.	Max.
Abdominoplasty	4	28.50	7.59	21	38
Rhinoplasty	2	26.0	7.07	21	31
Breast Augmentation	1	38.0	0	38	38
Breast Reduction	2	28.5	3.54	26	31
Breast Lift	1	24.0	0	24	24
Facelift	1	17.0	0	17	17
Liposuction	6	30.67	6.53	21	40
Buttock Lift	4	29.0	9.93	17	41
Botox injection	23	33.0	10.69	17	54
Fillers injection	25	31.28	10.82	19	54
Blepharoplasty	0	---	---	---	---

**Table 12: Means and standard deviations of plastic surgery procedures done by age**

	Age (years)					*P-value
	< 20	21 – 30	31 – 40	41 – 50	> 50	
Abdominoplasty	0 (0 %)	2 (50 %)	2 (50 %)	0 (0 %)	0 (0 %)	0.565
Rhinoplasty	0 (0 %)	1 (50 %)	1 (50 %)	0 (0 %)	0 (0 %)	0.832
Breast Augmentation	0 (0 %)	0 (0 %)	1 (100 %)	0 (0 %)	0 (0 %)	0.493
Breast Reduction	0 (0 %)	1 (50 %)	1 (50 %)	0 (0 %)	0 (0 %)	0.832
Breast Lift	0 (0 %)	1 (100 %)	0 (0 %)	0 (0 %)	0 (0 %)	0.821
Facelift	1 (100 %)	0 (0 %)	0 (0 %)	0 (0 %)	0 (0 %)	0.081
Liposuction	0 (0 %)	3 (50 %)	3 (50 %)	0 (0 %)	0 (0 %)	0.346
Buttock Lift	1 (25 %)	1 (25 %)	1 (25 %)	1 (25 %)	0 (0 %)	0.845
Botox injection	3 (13 %)	8 (34.8 %)	7 (30.4 %)	3 (13 %)	2 (8.7 %)	0.848
Fillers injection	4 (16 %)	11 (44 %)	5 (20 %)	2 (8 %)	3 (12 %)	0.524
Blepharoplasty	0 (0 %)	0 (0 %)	0 (0 %)	0 (0 %)	0 (0 %)	----

\*By Chi square test

**Table 13: Chi-square analysis for plastic surgery procedures done by marital status**

	Marital status				*P-value
	Single	Married	Widow	Divorced	
<b>Abdominoplasty</b>	3(75 %)	1(25 %)	0(0 %)	0(0 %)	0.686
<b>Rhinoplasty</b>	2(100 %)	0(0 %)	0(0 %)	0(0 %)	0.493
<b>Breast Augmentation</b>	0(0 %)	1(100 %)	0(0 %)	0(0 %)	0.776
<b>Breast Reduction</b>	2(100 %)	0(0 %)	0(0 %)	0(0 %)	0.493
<b>Breast Lift</b>	1(100 %)	0(0 %)	0(0 %)	0(0 %)	0.754
<b>Facelift</b>	1(100 %)	0(0 %)	0(0 %)	0(0 %)	0.754
<b>Liposuction</b>	4(66.7 %)	1(16.7 %)	0(0 %)	1(16.7 %)	0.322
<b>Buttock Lift</b>	3(75 %)	1(25 %)	0(0 %)	0(0 %)	0.686
<b>Botox injection</b>	9(39.1 %)	13(56.5 %)	0(0 %)	1(4.3 %)	0.778
<b>Fillers injection</b>	13(52 %)	11(44 %)	0(0 %)	1(4 %)	0.838
<b>Blepharoplasty</b>	0(0 %)	0(0 %)	0(0 %)	0(0 %)	----

\*By Chi square test

## DISCUSSION

We set out this cross-sectional survey study to assess the prevalence of BDD as well as the number and type of previous cosmetic procedures among BDD patients attending dermatology or plastic surgery clinics in Riyadh, Saudi Arabia. The results revealed that 40% of the participants were concerned about the appearance of some parts of their body, among them; the prevalence of the BDD was 50%. Fillers and Botox injections were the highest frequent plastic procedures in the current study.

The BDD prevalence in the current study is considered far higher compared to what has been reported in a similar local study at 50% vs. 14.1%, respectively<sup>1</sup>. Similarly, far lower prevalence was reported from previous global studies. In the US, the point prevalence of BDD among the adult population was 2.4%<sup>2</sup>. while in the German population it was 1.8% among the German population<sup>3</sup>. In dermatology clinics, the prevalence of BDD ranges from 6.3–11.9%<sup>4,5</sup> to 8.6–29.4%<sup>6-8</sup> in patients seeking cosmetic. Additionally, a study from India reported a BDD prevalence of 4.8%<sup>9</sup>. From the other side, and in line with our results, Vindigni V et al reported that the rate of BDD among patients requesting cosmetic was 53.6%<sup>10</sup>.

The rate of body concern in the current study was also far higher compared to a similar Iranian study at 40%, and 19.1%, respectively, however, there was an age difference between the two studies population, being from 17 to 20 years in the Iranian one<sup>11</sup>

As per the literature, BDD usually starts in adolescence<sup>12</sup> and it is appearing to be chronic and establishing an accurate diagnosis might be taking many years. In our case, the highest prevalence was in the age group of 31–40, which might indicate a late diagnosis of cases in Saudi Arabia. Though considered to be more frequent in females, sex differences were not significant in our study, which is in an agreement with some studies<sup>6,7,9</sup>. Similarly, the age did not differ significantly in our case and also in previous studies<sup>6,7,9</sup>. Also, in an agreement with the Indian study, there was no significant difference in the educational level between BDD patients and those without BDD, despite that Dunai et al. reported that though BDD patients have executive function deficits<sup>13</sup>. As per the results of the two largest population-based studies of BDD<sup>2,14</sup> individuals with BDD are more likely to be divorced, which is in line with our results.

Social impairment appears to be widespread in BDD, as “individuals with BDD are often avoiding socializing, have a significant reduction in the quality of their relationships, and have high levels of social isolation”<sup>15,16</sup>, our results are augmented with our finding. Also, our results revealed that BDD individuals have an excessive preoccupation with their appearance, and this was previously reported by the American Psychiatric Association [APA] 2000<sup>17</sup>. BDD is typically “persistent and

pervasive, causing the individual significant distress and impairment in important areas including social life”<sup>18</sup>. Additionally, Phillips et al. reported that 40% in their study met the criteria for social phobia<sup>19</sup>. Social isolation with BDD looks like a natural consequence, whether it is fearing rejection or the fear of being ridiculed because of the appearance or even because of feeling undeserving of social contact. Also, as we found, social isolation, work loss, or absence from school were frequently a part of the BDD picture in Koblenzer CS study<sup>20</sup>. In another study<sup>21</sup>, it was found that patients with clinically relevant BDD exhibited poor social adaptation, however, these patients revealed a high motivation for change, signifying the necessity for psychotherapeutic support. Accordingly, psychoeducation as well as psychotherapy should be more frequently offered to patients with BDD.

In Germany, it was found that patients undergoing injectable aesthetic treatments in an urban dermatology practice were women, middle-aged, highly educated, and mostly employed. Such results are considered more or less in line with ours.

Based on the current study results and given the high prevalence of BDD identified in the current study, plastic surgeons and dermatologists need to be attentive to the possibility that their patients may have BDD; the right diagnosis and treatment of this disorder might improve self-esteem and quality of life in these patients, who may need a multidisciplinary approach.

Our data was based on both self-report and physician diagnosis, which give a strength to the findings, and give it a good reliability. The present study was done on medical participants from only one institution and this somewhat restricts the generalization of the results to the whole kingdom.

## LIMITATION

The majority of this study samples were collected from governmental hospital setting which offers only medical and surgical services but not cosmetic. This could represent an underestimation of the real BDD prevalence and number of cosmetic procedures.

## CONCLUSION

**Based on the current study results, it could be concluded that a high percentage of patients with BDD was observed in dermatology and plastic surgery clinics at King Khalid University Hospital in Riyadh (50%). The prevalence of BDD did not differ significantly by gender. therefore, professionals from both dermatology and plastic surgery specialties should have more awareness of these findings and the likelihood of BDD among their patients, and they must adequately assess their patients to identify those with an increased potential for BDD and should arrange multidisciplinary care for such individuals.**

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## REFERENCES

1. Alshahwan M. Prevalence and characteristics of body dysmorphic disorder in Arab dermatology patients. *Saudi Med J* 2020; 41(1): 73-8
2. Koran LM, Abujaoude E, Large MD, et al. The prevalence of body dysmorphic disorder in the United States adult population. *CNS Spectr* 2008; 13(4): 316-22.
3. Buhlmann U, Glaesmer H, Mewes R, et al. Updates on the prevalence of body dysmorphic disorder: A population-based survey. *Psychiatry Res* 2010; 178(1): 171-5.
4. Phillips KA, Crino RD. Body dysmorphic disorder. *Curr Opin Psychiatry* 2001;14: 113-8.
5. Mackley CL. Body dysmorphic disorder. *Dermatol Surg* 2005; 31(5): 553-8.
6. DogrukKacar S, Ozuguz P, Bagcioglu E, et al. The frequency of body dysmorphic disorder in dermatology and cosmetic dermatology clinics: A study from Turkey. *Clin Exp Dermatol* 2014; 39(4): 433-8.
7. Conrado LA, Hounie AG, Diniz JB, et al. Body dysmorphic disorder among dermatologic patients: Prevalence and clinical features. *J Am Acad Dermatol* 2010; 63(2): 235-43.
8. Hsu C, Ali Juma H, Goh CL. Prevalence of body dysmorphic features in patients undergoing cosmetic procedures at the National Skin Centre, Singapore. *Dermatology*2009; 219(4): 295-8.
9. Thanveer F, Khunger N. Screening for Body Dysmorphic Disorder in a Dermatology Outpatient Setting at a Tertiary Care Centre. *J Cutan Aesthet Surg* 2016; 9(3):188-91.
10. Vindigni V, Pavan C, Semenzin M, et al. The importance of recognizing body dysmorphic disorder in cosmetic surgery patients: Do our patients need a preoperative psychiatric evaluation? *Eur J Plast Surg* 2002; 25:305-8.
11. Barahmand U, Shahbazi Z. Prevalence of and associations between body dysmorphic concerns, obsessive beliefs and social anxiety. *Asia Pac Psychiatry* 2015; 7(1): 54-63.
12. Phillips KA, Menard W, Fay C, et al. Demographic characteristics, phenomenology, comorbidity, and family history in 200 individuals with body dysmorphic disorder. *Psychosomatics* 2005; 46(4): 317-25.
13. Dunai J, Labuschagne I, Castle DJ, et al. Executive function in body dysmorphic disorder. *Psychol Med* 2010; 40(9):1541-8.
14. Rief W, Buhlmann U, Wilhelm S, et al. The prevalence of body dysmorphic disorder: a population-based survey. *Psychol Med* 2006; 36(6): 877-85.
15. Phillips KA. *The Broken Mirror: Understanding and Treating Body Dysmorphic Disorder*. Oxford University Press 2005; New York.
16. Phillips KA, Menard W, Fay C, et al. Psychosocial functioning and quality of life in body dysmorphic disorder. *Comprehensive Psychiatry* 2005; 46(4): 254-60.
17. American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders (4th ed. text rev.)*. Washington, DC: Author
18. Phillips KA, Didie ER, Feusner J, et al. Body dysmorphic disorder: Treating an underrecognized disorder. *Am J Psychiatry* 2008; 165(9): 1111-8.
19. Phillips KA, Menard W, Fay C, et al. Psychosocial functioning and quality of life in body dysmorphic disorder. *Compr Psychiatry* 2005; 46(4): 254-60.
20. Koblenzer CS. Body dysmorphic disorder in the dermatology patient. *Clin Dermatol* 2017; 35(3): 298-301.
21. Ritter V, Fluhr JW, Schliemann-Willers S, et al. Body dysmorphic concerns, social adaptation, and motivation for psychotherapeutic support in dermatological outpatients. *JDDG: J Dtsch Dermatol Ges* 2016; 14(9): 901-8.