

# Prevalence of Body Dysmorphic Disorder (BDD) among Orthodontic Patients Compared to Community Population in Eastern Mediterranean Region



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## Abstract:

**Background and Objectives:** Many orthodontists may recognize that some of their clinic's patients may have one or more abnormal physical or psychological conditions, such as Body Dysmorphic Disorder (BDD). The aims of this study were to screen and identify the prevalence of BDD among orthodontic patients using the COPS-BDD questionnaire. Additionally, the study aimed to compare the prevalence of BDD between orthodontic patients and the normal population (community group) in the Eastern Mediterranean region.

**Material and Methods:** Two groups of participants aged between 18-25 years old were recruited: a) Community group consisting of dental clinic visitors for operative procedures (n=503 participants), and b) Orthodontic patients' group comprising individuals seeking orthodontic treatment at orthodontic offices (n=500 participants).

**Results:** According to questionnaire guidelines, 7.36% and 11.2% of participants from the community group and orthodontic patients' group, respectively, were likely to have BDD with higher probability. Meanwhile, 16.7% and 12.4% of participants from these groups were still likely to have BDD but with lower probability. Females scored higher than males in both groups. In both groups, BDD was more common among females, with younger individuals showing higher likelihood of BDD. No significant differences in the mean scores of BDD subjects were observed when comparing the study groups. While there were no significant variations in the prevalence of BDD between both groups, the scores of questionnaire items suggested that subjects in the orthodontic patients' group received significantly higher scores than those in the community group, indicating a greater tendency to have BDD.

**Conclusion:** Body Dysmorphic Disorder (BDD) is a notable psychological condition that should be carefully investigated and addressed by orthodontists. It is recommended that BDD be routinely considered as part of the decision-making process in orthodontic offices.

**Keywords:** Orthodontics, Body dysmorphic disorder, BDD, COPS -BDD questionnaire.

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## 1. INTRODUCTION

Nowadays, it is evident that there is a noticeable increase in patients seeking orthodontic treatment to enhance their physical attractiveness and quality of life. Every orthodontist may recognize that many of their clinic's patients could have one or more abnormal physical

or psychological conditions, such as Body Dysmorphic Disorder (BDD) [1-4].

Historically, Morselli, in 1886, was the first to describe BDD as dysmorphophobia [1]. BDD was initially included in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-III) in 1987,

referred to as 'dysmorphophobia' [5, 6].

### 1.1. Etiology

The age of onset of Body Dysmorphic Disorder (BDD) typically occurs during adolescence [7-9], although it can also start in childhood. The exact cause varies from individual to individual but may be attributed to a combination of biological, psychological, and environmental factors from their past or present experiences [10]. Additionally, abuse and neglect can also contribute to the development of BDD [5].

The causes of Body Dysmorphic Disorder (BDD) are multifaceted and not completely understood. Several risk factors are suggested for the onset of the disorder. These include:

- [1] Biological/Genetic:
  - Chemical imbalance in the brain.
  - Genetic predisposition
  - Abnormalities in the brain region.
  - Visual processing
  - Obsessive compulsive disorder
  - Generalized anxiety disorder.
- [2] Psychological:
  - Teasing or criticism
  - Parenting style
  - Other life experiences: such as neglect, physical and/or sexual trauma, in security or rejection.
- [3] Environmental:
  - Media: media pressure like glamour models and the implied necessity of esthetic beauty.
- [4] Personality: Various personality traits have been suggested as potential contributing factors [9-11].

## 1.2. Common Symptoms & Compulsive Behavior associated with BDD

### 1.2.1. Common Symptoms of BDD

The primary cognitive feature of BDD is an excessive preoccupation with appearance and the belief that the imagined defect reflects a personal inadequacy. Individuals with BDD may go to great lengths to avoid exposing their perceived defect in public and often shun social interactions, fearing ridicule and believing that the defect signifies a personal shortcoming. In severe cases, this avoidance behavior can lead individuals to become housebound or even contemplate suicide [9, 12-15].- *The primary symptoms of BDD can be categorized as follows [5]:*

- Obsessive thoughts about perceived appearance flaws.
- Symptoms of major depressive disorder.
- Delusional thoughts and beliefs related to appearance.
- Withdrawal from social and family interactions, social phobia, loneliness, and self-imposed isolation.
- Suicidal thoughts.
- Anxiety and potential panic attacks.
- Chronic low self-esteem.
- Feeling self-conscious in social settings and experiencing

strong feelings of shame.

- Inability to work or an inability to focus at work due to preoccupation with appearance.

### 1.2.2. Common Compulsive Behaviors of BDD

- Checking mirrors compulsively, glancing at reflective surfaces, or avoiding looking at one's own reflection or photos may lead to removing mirrors from the home.
- Trying to hide the perceived defect by using cosmetic camouflage, wearing loose clothing, maintaining specific body postures, or wearing hats.
- Engaging in distraction techniques to shift focus away from the perceived flaw, such as wearing flamboyant clothing or excessive jewelry.
- Excessive grooming behaviors like skin picking, hair combing, eyebrow plucking, shaving, *etc.*
- Compulsive touching of the skin, particularly to assess or feel the imagined defect.
- Extreme dieting or exercise, focusing heavily on external appearance.

## 1.3. Prevalence

Despite the studies and reports on the prevalence of Body Dysmorphic Disorder (BDD) among the general population or dental clinic patients, the exact ratios remain uncertain due to the gray area and diagnostic challenges [16]. Underdiagnosis and under-representation are likely as patients often keep their symptoms "secretive" [5].

According to national population-based surveys, the prevalence ratios of Body Dysmorphic Disorder (BDD) were 2.4% in the United States, 1.7-1.8% in Germany, and 2.3% in Australia [5]. Most studies indicate that BDD occurs in both sexes, although reports of sex bias vary. Initially, Phillips quoted a ratio of 1.3:1, female to male, but in later papers, the ratio is suggested to be approximately 1:1 [15].

Higher prevalence of Body Dysmorphic Disorder (BDD) in females is often observed in studies involving self-referrals, emphasis on body shape or weight, and less severe cases of BDD [17]. In a study conducted by Crerand *et al.* on non-psychiatric medical treatment, it was discovered that 71% of individuals with BDD sought such treatment, and 64% of them actually received it [18].

## 1.4. Implications for Orthodontics

Applying the diagnostic criteria for Body Dysmorphic Disorder (BDD) to patients seeking orthodontic treatment can present challenges. These criteria, focusing on individuals preoccupied with minor or perceived flaws in appearance, may overlap with those seeking aesthetic improvements. Many individuals opt for aesthetic procedures to enhance or correct minor imperfections in what is deemed as 'normal' features. Therefore, in the context of orthodontic patients, additional diagnostic criteria that evaluate the extent of functional impairment in daily activities may be more pertinent. It is crucial to thoroughly evaluate the specific feature of concern [19].

Patients who make multiple requests for orthodontic treatment or seek consultations from multiple providers (referred to as 'doctor-shopping'), whether before or after treatment, should raise suspicions of Body Dysmorphic Disorder (BDD) [20, 21]. It is essential to gather a detailed patient history and ensure clear and realistic communication of the patient's expectations. While there isn't a single question that can definitively diagnose Body Dysmorphic Disorder (BDD), diagnosis usually involves a combination of patient interviews, medical history review, and observation of consistent behavioral patterns [22-24].

Identifying patients who may have Body Dysmorphic Disorder (BDD) is crucial for facilitating access to the necessary treatment. It is recommended that individuals suspected of having BDD be referred to a psychiatrist or clinical psychologist for an accurate diagnosis and appropriate management, although this may pose challenges [23]. A study examining orthodontists in the UK regarding their opinions on referring orthognathic patients to a liaison psychiatrist or clinical psychologist offers insights into this matter [25]. The study showed that more than half of the orthodontists surveyed did not refer any patients for a psychiatric or psychological consultation, even though they believed it would be beneficial [25]. Reasons cited for not referring included not having anyone to refer to or fearing a negative reaction from the patient [25]. Currently, there are no published studies that have explored patients' responses to mental health referrals. This presents an opportunity for future research in this area. Orthodontists could benefit from additional education on local resources and training in effective communication skills to better convey the importance of further assessment and treatment for patients suspected of having Body Dysmorphic Disorder (BDD) [16]. This could enhance the overall care provided to patients with potential mental health concerns, such as Body Dysmorphic Disorder.

### 1.5. Cosmetic Procedure Screening Questionnaire (COPS) for Body Dysmorphic Disorder

Guidelines suggest screening patients for Body Dysmorphic Disorder (BDD) before undergoing cosmetic surgery to pinpoint those who may benefit from additional psychological evaluation [26]. The questionnaire for this purpose was developed by David Veale, Nell Ellison, Tom Werner, Rupa Dodhia, Marc Serfaty, and Alex Clarke [26]. The Cosmetic Procedure Screening Questionnaire (COPS) has been described as a tool that (a) is concise, available for free download, and capable of detecting individuals with Body Dysmorphic Disorder (BDD), (b) may forecast dissatisfaction with a cosmetic procedure or the absence of improvement or even worsening of BDD symptoms, and (c) could be responsive to changes following an intervention [8-10].

The Cosmetic Procedure Screening Questionnaire (COPS) requests information on the specific feature(s) that the individual perceives as unattractive, details about the cosmetic procedures they are considering, and includes diagnostic criteria for Body Dysmorphic Disorder (BDD).

The final version of the COPS questionnaire consists of 9 items, with each item scored from 0 (least impaired) to 8 (most impaired). The scale and a comprehensive version of the paper are accessible for download at <http://www.iop.kcl.ac.uk/cadatquestionnaire>. The score on the Cosmetic Procedure Screening Questionnaire (COPS) is calculated by adding up the scores from Items 2 to 10. Items 2, 3, and 5 are reverse-scored. The total score ranges from 0 to 72, where a higher score indicates higher levels of impairment [26, 27].

### 1.6. Aims of Study

The aims of this study were:

- 1- To screen and identify the prevalence of Body Dysmorphic Disorder (BDD) among orthodontic patients.
- 2- To compare the prevalence of BDD between orthodontic patients and the general population (community group) in the Eastern Mediterranean region.
- 3- To compare the prevalence of BDD between males and females.

## 2. MATERIAL AND METHODS

### 2.1. Sample

This study was approved by the Ethics Committee of Tishreen University (Ethical Permission No 11733 on 22-12-2022). This study was conducted in accordance with the Declaration of Helsinki for human studies in 2013. This study was conducted from January 2023 to January 2024. The sample size was determined according to the G power software, which a 95% confidence level, the size of the total population. The required sample size according to the 95% confidence level, was 900 participants.

#### 2.1.1. The Inclusion Criteria

- [1] The participants had to be over 18 years of age.
- [2] Willing to participate in the study.
- [3] Fill out the questionnaire.

#### 2.1.2. The Exclusion Criteria

Patients with physical deformities, craniofacial syndromes, cleft lip and/or palate, and skeletal malocclusion require orthognathic surgery.

All new subjects who met the inclusion criteria were given a version of the COPS-BDD questionnaire, which has been verified to have reliable validity and reproducibility according to Philips *et al.* [28].

### 2.2. The Questionnaire

The questionnaire comprised 9 questions, with the diagnosis based on the patient's total score. Each question had 9 possible answers, scored between 0 and 8. The total score provides an initial diagnosis, with higher scores indicating more distress and interference in life, increasing the likelihood of a diagnosis of Body Dysmorphic Disorder (BDD).

According to the guidelines of the questionnaire [29, 30], the scores were categorized as follows:

- [1] If the patient scored 40 or more, it is recommended that they seek an assessment, as they are likely to have Body Dysmorphic Disorder (BDD).
- [2] If the score falls between 30 and 40, the individual may still have BDD and could benefit from an assessment.
- [3] If the score is below 30, it is unlikely that the individual has BDD.

### 2.3. Groups

Two groups of participants were recruited for the study:

#### 2.3.1. Community Group

This group consisted of individuals of both genders who were visiting dental clinics for operative procedures. The questionnaire was completed by 503 participants.

#### 2.3.2. Orthodontic Patients' Group

This group was comprised of patients of both genders seeking orthodontic treatment in the study region. The questionnaire was completed by 500 participants.

### 2.4. Statistical Analyses

The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 18 for Windows (SPSS, Inc., Chicago, IL, USA).

The following analyses were used:

- Descriptive statistics, including the mean and standard deviations.
- Unpaired Student's t-test to compare means between groups, subgroups, and questionnaire items.

The statistical significance was considered to be  $p \leq 0.05$ .

## 3. RESULTS

In this study, a total of 1003 of the 1200 questionnaires distributed to patients were completed (Table 1) provides a descriptive statistic for both groups, including the number of subjects, gender distribution, and percentage, age range, and mean age.

**Table 1. descriptive statistics of study sample.**

Group	Number	Gender No.	Gender Percentage	Age Range	Mean Age
Community	503	M:229	45.5%	18-25	21.38
		F:274	54.5%		20.14
Orthodontic patients	500	M: 238	47.6%	18-25	20.12
		F:262	52.4%		20.08

#### 3.1. Internal Consistency

The reliability analysis showed an internal consistency of Cronbach's  $\alpha = 0.92$ , indicating a high level of internal consistency for the questionnaire used in the study.

#### 3.2. Test-retest Reliability

In the study, 75 participants from the community group repeated the COPS-BDD questionnaire after 1 week.

The questionnaire demonstrated good test-retest reliability with a correlation coefficient of 0.9 ( $p < 0.01$ ).

Table 2 presents the distribution of subjects in each group by gender and psychological status based on the questionnaire criteria categorizations (more likely to have BDD, likely to have BDD, unlikely to have BDD).

In the community group consisting of 503 patients (229 male and 274 female), it was found that:

**Table 2. Results of overall COPS- BDD questionnaire.**

	Subgroup (Gender)	Number	Mean Score	SD
Community Group	Total	503	19.56	13.97
	Male	229	17.16	11.80
	Female	274	21.56	15.27
Orthodontic patients Group	Total	500	20.22	15.12
	Male	238	17.29	12.57
	Female	262	22.88	16.66

- 37 patients (7.36%), including 8 men and 29 women, were diagnosed with a high possibility of Body Dysmorphic Disorder (BDD) as they scored 40 or more.
- 84 patients (16.7%), with 34 men and 50 women, were diagnosed as likely to have BDD as their scores fell between 30 and 40.
- 382 patients (75.95%), comprising 187 men and 195 women, were diagnosed as not having BDD as their scores were below 30.

In the orthodontic patients' group, which consisted of 500 patients (238 male and 262 female):

- 56 patients (11.2%), including 13 males and 43 females, were diagnosed with a high possibility of Body Dysmorphic Disorder (BDD) as their scores were 40 or more.
- 62 patients (12.4%), with 26 men and 36 women, were diagnosed as likely to have BDD based on scores falling between 30 and 40.
- 382 patients (76.4%), comprising 199 men and 183 women, were diagnosed as not having BDD as their scores were below 30.

In comparing the mean scores of the COPS-BDD questionnaire between the study groups, it was observed that the orthodontic patients' group subjects obtained slightly higher scores than the community group subjects, although this difference was not statistically significant. However, when comparing these scores between males and females within each group, significant differences were found between the genders, with females scoring higher. This significant gender difference was evident in both the community and orthodontic patients' groups, as indicated in Tables 3-4 ( $p \leq 0.001$ ).

In Table 5, a comparison of the questionnaire items individually (1-9) between the orthodontic patients and community groups was conducted. It was evident that the orthodontic patients' group subjects obtained significantly higher scores than the community group subjects for all

items except item No. 9. Interestingly, for item No. 9, it was found that orthodontic patients' group subjects showed a greater tendency toward Body Dysmorphic

Disorder (BDD) compared to the community group subjects, despite the total mean score not reflecting this difference significantly (as indicated in (Table 3)).

**Table 3. Distribution and percentages of groups' subjects according to gender and psychological status.**

Group	Gender	Inference	N	Mean of Score	SD	Percentage from Total Group Subjects (males+ Females)	Percentage from Gender Subgroup
Community group N(503)	All participants	More likely to have BDD	37	50.32	8.59	7.36%	
		Likely to have BDD	84	34.23	3.07	16.7%	
		No BDD	382	13.35	8.38	75.94%	
	Male N(229)	More likely to have BDD	8	44.63	4.24	1.59%	3.49%
		Likely to have BDD	34	33.62	2.82	6.76%	14.85%
		No BDD	187	12.99	8.33	37.18%	81.66%
	Female N(274)	More likely to have BDD	29	51.9	8.82	5.76%	10.58%
		Likely to have BDD	50	34.64	3.17	9.94%	18.25%
		No BDD	195	13.69	8.4	38.77%	71.17%
Orthodontic patients group N(500)	All participants	More likely to have BDD	56	51.29	8.79	11.2%	
		Likely to have BDD	62	33.34	2.71	12.4%	
		No BDD	382	13.52	8.51	76.4%	
	Male N(238)	More likely to have BDD	13	46.92	6.09	2.6%	5.46%
		Likely to have BDD	26	33	2.75	5.2%	10.92%
		No BDD	199	13.31	8.95	39.8%	83.61%
	Female N(262)	More likely to have BDD	43	52.6	9.03	8.6%	16.41%
		Likely to have BDD	36	33.58	2.66	7.2%	13.74%
		No BDD	183	13.79	8	36.6%	52.67%

**Table 4. Comparison of mean overall scores between study groups.**

Group	Number	Mean of score	SD	t value	Sig. p value
Community Group	503	19.56	13.97	0.718	0.473 Ns
Orthodontic patients group	500	20.22	15.12		

Note: NS Not Significant, \*p value < 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001.

**Table 5. Comparison of mean overall scores between males and females in every group.**

Group	Gender	Number	Mean of Score	SD	t value	Sig. p value	-
Community Group	Male	229	17.16	11.80	-3.561	0.000***	
	Female	274	21.56	15.27			
Orthodontic patients group	Male	238	17.29	12.57	-4.202	0.000***	
	Female	262	22.88	16.66			

Note: NS Not Significant, \*p value < 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001.

**Table 6. Comparison between questionnaires mean score between both groups according to psychological status.**

Inference	Group	Number	Mean Score	SD	T	p-value
No BDD	Community Group	382	13.35	8.38	0.311	0.756 Ns
	Orthodontic patients group	382	13.54	8.51		
Likely to have BDD	Community Group	84	34.23	3.07	-1.819	0.071 Ns
	Orthodontic patients group	62	33.34	2.71		
More likely to have BDD	Community Group	37	50.32	8.59	0.526	0.6 Ns
	Orthodontic patients group	56	51.29	8.79		

Note: NS Not Significant, \*p value < 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001.

#### 4. DISCUSSION

Since patients with Body Dysmorphic Disorder (BDD) often lack insight into the psychiatric nature of their condition and tend to prefer non-psychiatric treatments, they may not disclose prior psychological consultations [4]. Therefore, it is important for orthodontists to be mindful of the prevalence of such psychological cases to make informed decisions and treatment plans.

This study aimed to compare the prevalence of BDD among patients who seek orthodontics treatment and other community individuals, taking into account gender in order to study the effect of this psychological condition on making patients make the decision to visit orthodontic clinics as a branch of cosmetic practice.

The study showed that about 7.36% and 11.2% of a community group and orthodontic patient group respectively, are "more likely to have BDD", and it's recommended that they seek assessment (Table 6).

Whereas 16.7% of a community group and 12.4% of orthodontic patients group were diagnosed to "may still have BDD" and may still benefit from assessment.

On the other hand, the subjects' percentages who were diagnosed as "unlikely to have BDD" according to their scores in the questionnaire were 75.95% and 76.4% for the community group and orthodontic patient group, respectively.

This study showed a significant difference in scores between males and females; however, the females got higher scores and had a higher tendency to have BDD than males.

In one study, the prevalence of Body Dysmorphic Disorder (BDD) has been estimated to be 1-2% in the general population of the United States. However, BDD is more common among patients seeking cosmetic treatments, with reported diagnoses in around 7.5% of an orthodontic patient sample in London, which included 40 patients [17]. Another study on an Iranian sample found

that 5.5% of orthodontic patients screened positive for BDD [4]. Veale *et al.* conducted a systematic review that showed that BDD had different estimated weighted prevalence in different settings. For example, whilst the weighted prevalence of BDD in adults in the community was estimated to be 1.9%, the figure for adult psychiatric inpatients was much higher at 7.4%. Interestingly and more importantly for orthodontists, they found that the weighted prevalence was 5.2% in orthodontics/cosmetic dentistry settings, with prevalence ranging from 4.2% to 7.5% [10].

In our study, no significant differences were noted between males, females, and all subjects when comparing them separately for both groups according to scores and psychological status, which means that our sample conducted from orthodontic clinics had no significant difference from a community group. However, when comparing the questionnaire total score means of males and females (number X questionnaire score) for every individual group, the study showed that the prevalence of BDD was higher among females in both groups, and females in general have a higher tendency to get higher scores for both groups. The same result was found in the study of Veale D *et al.*, with the estimated weighted prevalence of 7.9% among women and 2.5% among men [10]. According to the same study, there was a sex ratio of 1.27 for women to men in the community [10] (Table 7).

In our study, we observed a gender preference towards females [4, 32], which aligns with some previous findings and differs from others [1, 31-33].

The comparison of the questionnaire's items between both groups showed significant differences in scores of all questions except (question number 9) with higher scores for the orthodontic patient's group, which can play a role in making subjects of this group more aware of their appearance, although there were no significant differences in total score means between both groups according to psychological status.

**Table 7. Comparison between questionnaires mean score between group genders according to psychological status.**

Group	inference	Gender	Number	Mean Score	SD	T	p-value
Orthodontic Patients Group	No BDD	Male	199	13.31	8.95	-0.551	0.582 Ns
		Female	183	13.79	8		
	Likely to have BDD	Male	26	33	2.75	-0.835	0.407 Ns
		Female	36	33.58	2.66		
	More likely to have BDD	Male	13	46.92	6.09	-2.121	0.014*
		Female	43	52.6	9.03		
Community	No BDD	Male	187	12.99	8.33	-0.818	0.414 Ns
		Female	195	13.69	8.4		
	Likely to have BDD	Male	34	33.62	2.82	-1.512	0.134 Ns
		Female	50	34.64	3.17		
	More likely to have BDD	Male	8	44.63	4.24	-2.244	0.031*
		Female	29	51.9	8.82		

**Note:** NS Not Significant, \*p value < 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001.

**Table 8. Comparison between questionnaires mean score between psychological status subgroups according to gender.**

Gender	Inference	Group	Number	Mean Score	SD	T	p-value
Male	No BDD	Orthodontic	199	13.31	8.95	0.363	0.717 Ns
		Community	187	12.99	8.33		
	Likely to have BDD	Orthodontic	26	33	2.75	-0.853	0.397 Ns
		Community	34	33.62	2.82		
	More likely to have BDD	Orthodontic	13	46.92	6.09	0.93	0.364 Ns
		Community	8	44.63	4.24		
Total	Orthodontic	238	17.29	12.57	0.115	0.908 Ns	
	Community	229	17.16	11.8			
Female	No BDD	Orthodontic	183	13.79	8	-0.118	0.906 Ns
		Community	195	13.69	8.4		
	Likely to have BDD	Orthodontic	36	33.58	2.66	-1.634	0.106 Ns
		Community	50	34.64	3.17		
	More likely to have BDD	Orthodontic	43	52.6	9.03	0.326	0.746 Ns
		Community	29	51.9	8.82		
	Total	Orthodontic	262	22.88	16.66	0.957	0.339 Ns
		Community	274	21.56	15.27		

Note: NS Not Significant, \*p value < 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001.

**Table 9. Comparison of the questionnaire's items between orthodontic patients and community groups.**

Variable	Community Group	Orthodontic Patients Group	Difference between Groups	
	M (SD)	M (SD)	t value	Sig. p value
1. Avoid looking at my feature(s)	3.5368 (0.2796)	4.1160 (0.4613)	-24.061	0.000**
2. Frequency of checking feature(s)	3.4513 (0.4049)	5.3700 (0.5681)	-61.617	0.000**
3. How ugly, unattractive or 'not right' feature(s) are	3.2624 (0.3132)	4.9380 (0.4553)	-67.933	0.000**
4. Distress caused by feature(s)	2.3738 (0.2743)	4.2040 (0.4601)	-76.573	0.000**
5. Avoid situations or activities because of feature(s)	3.0795 (0.2454)	4.8000 (0.5200)	-67.072	0.000**
6. Preoccupation with feature(s)	2.3400 (0.2799)	3.9960 (0.2962)	-91.009	0.000**
7. Interference with relationship/dating	2.4274 (0.2868)	3.0840 (0.3087)	-34.896	0.000**
8. Interference with relationship	2.9165 (0.3406)	3.4200 (0.2961)	-24.979	0.000**
9. Inability to work/study due to feature(s)	2.9423 (0.3234)	2.9400 (0.2638)	0.126	0.900 Ns

Note: NS Not Significant, \*p value < 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001.

**Table 10. Mean ages.**

Group	Inference	Mean Age (years)
Community group	More likely to have BDD	20.2
	Likely to have BDD	20.8
	NO BDD	21.3

(Table 10) contd....

Group	Inference	Mean Age (years)
Orthodontic patient group	More likely to have BDD	19.6
	Likely to have BDD	20.1
	NO BDD	20.8

Note: NS Not Significant, \* $p$  value  $< 0.05$ , \*\* $p \leq 0.01$ , \*\*\* $p \leq 0.001$ .

In both groups, the subjects with BDD were younger than other subjects, which accords with earlier findings of Sathyanarayana *et al.* (1) Yassaei *et al.* [4], Vulink *et al.* [33], and Philips *et al.* [32] in which BDD was more prevalent in the younger age group, and was in contrary to the findings of Uzun *et al.* [34] (Tables 8-10).

## CONCLUSION

We expect that the decreased level of awareness about the role of orthodontic treatment in improving Health Related Quality of Life - functionally, not only esthetically - played a significant role in changing society's point of view to orthodontics as a therapeutic procedure, not just cosmetic one, which resulted in more patients seeking this treatment with higher recognition to treat malocclusion pathological condition not just to improve their smile. However, it is recommended to investigate and reveal such BDD cases by using COPS- BDD questionnaire as a routine step in diagnosis and decision-making procedures in order to take into account the requirements of these patients individually, which need special deals.

## AUTHORS' CONTRIBUTION

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethics Committee of Tishreen University (Ethical Permission No 11733 on 22-12-2022).

## HUMAN AND ANIMAL RIGHTS

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

## CONSENT FOR PUBLICATION

Informed consent was obtained from the participants.

## STANDARDS OF REPORTING

STROBE guidelines were followed.

## AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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None.

## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

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