



Approach to Patients with Body Dysmorphic Disorder in Dentistry : A Systematic Review

Abordagem dos Pacientes com Transtorno Dismórfico Corporal na Medicina Dentária: Revisão Sistemática

Integrated Master in Dental Medicine

Faculty of Dental Medicine, University of Porto

Célia Borges

Porto, 2024

“Approach to Patients with Body Dysmorphic Disorder in Dentistry: A Systematic Review”

“Abordagem dos Pacientes com Transtorno Dismórfico Corporal na Medicina Dentária: Revisão Sistemática”

Oral Public Health, Preventive and Community Dentistry

INDEX OF CONTENTS

RESUMO.....	1
ABSTRACT.....	2
INTRODUCTION.....	3
MATERIALS AND METHODS.....	5
Protocol and registration.....	5
Search strategy.....	5
Eligibility criteria.....	6
Study selection.....	6
Data extraction.....	7
Quality assessment.....	7
RESULTS.....	8
DISCUSSION.....	13
CONCLUSION.....	15
BIBLIOGRAPHIC REFERENCES.....	16
APPENDIX.....	20

INDEX OF ABBREVIATIONS

BDD: Body dysmorphic disorder

BDD-YBOCS: Yale Brown Obsessive Compulsive Scale Modified for BDD

COPS: Cosmetic Procedure Screening Questionnaire for BDD

DCQ: Dysmorphic Concern Questionnaire

DSM: American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders

OCD: Obsessive-Compulsive Disorder

PICO: Population, Intervention, Comparison, Outcome

PRISMA: Preferred Reporting Items for Systematic Review and Meta-Analysis

WHO: World Health Organization

INDEX OF TABLES

Table I. Specific search strategy formulas used in each search engine.....	5
Table II. Study characteristics.....	8
Table III. BDD screening tools and prevalence.....	10
Table IV. Characteristics of patients positively and negatively screened for BDD.....	11
Table V. Analysis of the quality/risk of bias for each study (Modified Newcastle-Ottawa Scale).....	12

INDEX OF FIGURES

Figure I. Workflow for the selection of studies, according to PRISMA guideline.....	6
--	---

RESUMO

Introdução: O Transtorno Dismórfico Corporal (TDC) é um transtorno psiquiátrico no qual os pacientes se preocupam excessivamente com uma imperfeição leve ou inexistente no corpo que não é visível para outras pessoas. Na população geral, a prevalência varia entre 0,7% e 2,4%, sendo que 20% das preocupações estão focadas na aparência dentária, então os médicos dentistas devem conhecer e identificar pacientes com TDC nos consultórios.

Objetivos: Avaliar a prevalência de TDC e as características dos pacientes na população odontológica.

Materiais e Métodos: A pesquisa foi conduzida utilizando os critérios da metodologia PRISMA e a adoção da estratégia PICO, e realizada em quatro bases de dados, Medline (PubMed), Scopus, Web of Science e LILACS, no dia 20 de novembro de 2023.

Resultados: Foram identificados 376 resultados potencialmente relevantes, que sofreram sucessivas triagens, 8 artigos foram selecionados e incluídos.

Conclusão: A prevalência de TDC na população odontológica variou de 4,2% a 52,5% (média de 16,63%). Os questionários podem ser úteis para a detecção preliminar do TDC, mas não são suficientes para confirmar o diagnóstico. Observou-se tendência para maior prevalência de TDC na população de pacientes do sexo feminino, jovens e solteiros. Para que os resultados sejam conclusivos, são necessários mais estudos, com acompanhamento e com maiores estudos epidemiológicos.

Palavras-Chave: Transtorno Dismórfico Corporal; Dismorfofobia; Medicina Dentária.

ABSTRACT

Introduction: Body Dysmorphic Disorder (BDD) is a psychiatric disorder in which patients focus on an imagined body defect not visible to others. In the general population, the prevalence varies between 0.7% and 2.4%, with 20% of concerns focused on dental appearance, so dentists should recognize and identify patients with BDD in clinics.

Aims: Evaluate the prevalence of BDD and the characteristics of patients in the dental population.

Materials and Methods: The research was conducted using PRISMA criteria and the adoption of the PICO strategy. Through four databases, Medline (PubMed), Scopus, Web of Science and LILACS on November 20, 2023.

Results: 376 relevant studies outcomes were identified, which underwent successive screenings, 8 articles have been selected and included in the description qualitative.

Conclusion: Prevalence of BDD within the dental population varies from 4.2% to 52.5% (average of 16.63%). Questionnaires can be useful for preliminary detection of BDD, but are not sufficient to confirm the diagnosis. A tendency towards a higher prevalence of BDD was observed in the population of female, young and single patients, however, for the results to be conclusive, more studies are needed, with follow-up and with larger epidemiological studies.

Keywords: Body Dysmorphic Disorder; Dysmorphophobia; Dentistry.

INTRODUCTION

Man's concern for physical appearance has always existed over time and across different civilizations. In modern times, this obsession with body image has increased and today, it has given rise to psychological disorders, such as Body Dysmorphic Disorder (BDD), anorexia and bulimia [1]. In 1891, the Italian professor of psychiatry Enrico Morselli described for the first time the condition called "Dysmorphophobia" derived from the Greek word "*dysmorphia*", meaning ugliness [2]. Pierre Janet, a French psychologist, published in 1909 "*Les Nevroses*" where he addresses this condition and labeled it "l'obsession de la honte du corps", which translates as "obsessions of body shame" [3].

The first classification of BDD was made in 1980 by the American Psychiatric Association and appears on the Diagnostic and Statistical Manual of Mental Disorders (DSM) described as an atypical somatoform disease disorder until 1987 where it was classified as a distinct somatoform disorder. The DSM-5 now classifies BDD as "obsessive-compulsive disorder and related disorders", given its similarities to Obsessive-Compulsive Disorder (OCD) in epidemiology, comorbidity, familial aggregation, and response to treatment [4]. The WHO *International Classification of Diseases-10* completed the classification into two variants: a delusional one classified as a psychotic disorder and a non-delusional one known as BDD, defined as a severe psychiatric disorder [5].

These patients focus on an imaginary or slight defect in their appearance that is not visible to others. They regularly do repetitive actions and they are sometimes limited in their social interactions [6]. The exact etiology is unclear but there are some known factors: biological (serotonin deficiency), genetics (about 20% have a first-degree relative who also suffers from this condition), psychological (teasing or criticism, parenting style, other life experiences) and environmental (social media and personality) [7]. BDD can be the primary condition or secondary to other psychiatric disorders and is often present with depressive disorders, social phobias and OCD [8]. It is associated with psychosocial functioning, poor quality of life and appears to pose a public health because of the high suicide rates [9]. Regarding the degree of BDD, there are different treatment modalities including pharmacological treatment, psychotherapy, cognitive behavioral therapy (CBT), and occasionally surgery [10].

The prevalence of BDD ranges from 0.7% to 2.4% in the general population [11], making it the most common of OCD [12]. Veale et al. published a systematic review in 2016, which showed a BDD prevalence of 1.9% in adults general population, with a 95% confidence interval [13]. The literature described the prevalence of BDD for some medical specialties, in general, the population seeking aesthetic treatment has a higher prevalence, between 13% to 15% [14].

Patients with BDD are more affected by the head and the face which includes acne, wrinkles, scars, facial asymmetry or disproportion, excessive facial expression, eyes, cheeks, teeth, lips, mouth and jaw. The treatments most requested by patients are dermatological, surgical and dental (teeth whitening, jaw surgery and orthodontic treatment). One of the most common areas of concern is the dentofacial region, with up to 20% in patients diagnosed with BDD expressing specific concern regarding dental appearance. In the clinical practice, the dentist is subject to attend to these patients, so it is important to understand and familiarize with BDD in order to give the correct treatment [15,16].

Most studies on BDD were performed in a cosmetic or dermatological surgery population but only a limited number of studies available regarding dental care. Identifying BDD is essential because these patients may have unrealistic expectations and are generally dissatisfied with the results of dental treatments [17].

The objective of this systematic review was to evaluate the prevalence of BDD in the dental population and to describe diagnostic tools. Furthermore, the aim was to systematise the characteristics including sex, age and social status of dental patients with BDD that dentists should recognize.

MATERIALS AND METHODS

Protocol and registration

This study was carried out in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) guidelines [18]. The systematic review protocol was registered in the International Prospective Register of Systematic Reviews – PROSPERO (CRD42024512294).

In order to answer the aim of the study, the following research question was formulated: What are the characteristics of patients with BDD that dentists should be able to identify during the consultation?

The research question was based on PICO, where P means population (patients with BDD), I means intervention (diagnosis and characteristics), C means comparison (patients without BDD) and O refers to the outcome (characteristics and prevalence).

Search strategy

The search strategy is depicted in Table I. The following electronic databases were searched until November 20, 2023: MEDLINE via PubMed, Scopus (Elsevier), Web of Science (Clarivate analytics) and LILACS. References were searched manually and exported to EndNote 21 software. The search strategy was based on 2 concepts: “body dysmorphic disorder or dysmorphophobia” AND “dent* OR ortho* OR “aesthetic dentistry”. In the extensive PubMed search strategy, we used Medical Subject Headings (MeSH) and keywords on free text (found in titles and abstracts).

Table I. Specific search strategy formulas used in each search engine.

PubMed	("body dysmorphic disorders"[Mesh terms] OR "dysmorphophobia") AND (dent* OR ortho* OR "aesthetic dentistry")
Scopus	TITTLE-ABS-KEY ("body dysmorphic disorder" OR "dysmorphophobia") AND (dent* OR ortho* OR "aesthetic dentistry")
Web Of Science	("body dysmorphic disorder" OR "dysmorphophobia") AND (dent* OR ortho* OR "aesthetic dentistry")
LILACS	("body dysmorphic disorder" OR "dysmorphophobia") AND (dent* OR ortho* OR "aesthetic dentistry")

Eligibility criteria

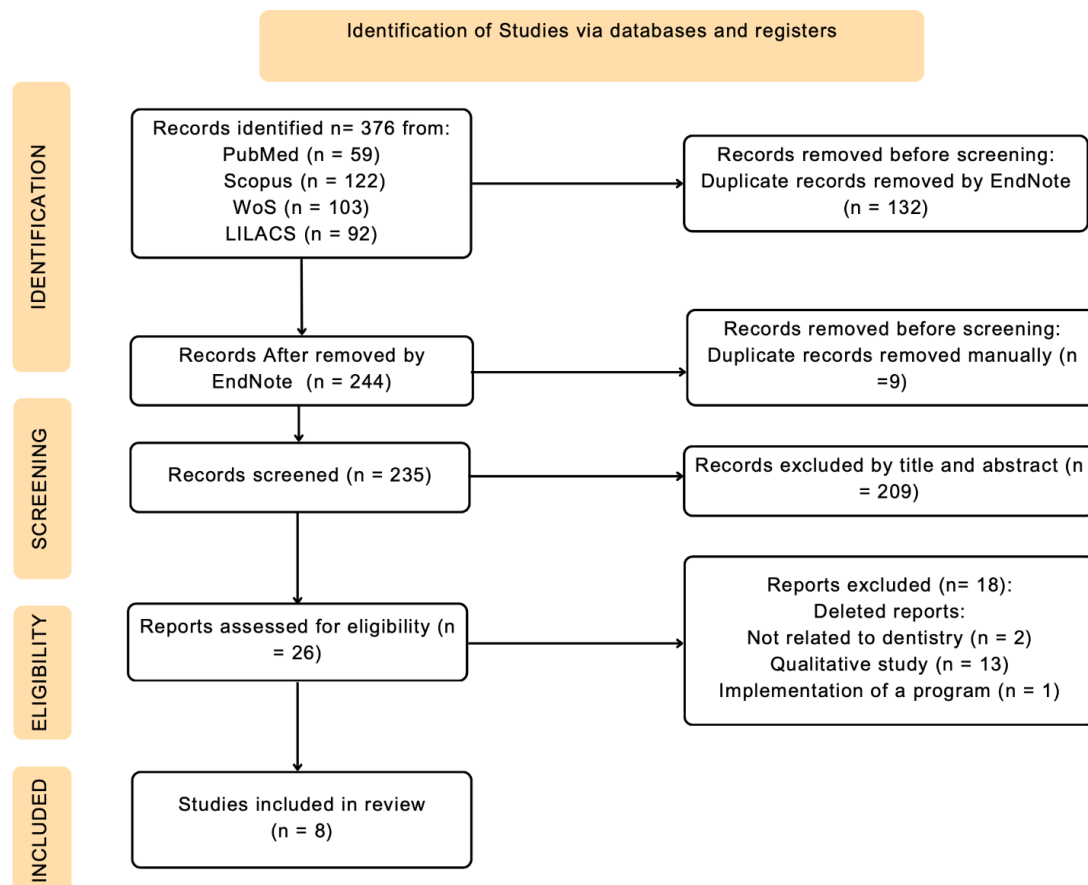
Inclusion criteria included studies with patients seeking dental treatment where BDD as its main theme, written in Portuguese, English, Spanish or French.

Exclusion criteria comprised opinion articles, empirical articles or case reports where full text was not available, articles in which BDD is not the main theme (associated with other pathologies or without the possibility of isolated the data regarding dentistry), studies carried out in adolescent or pediatric populations and articles in which dentistry is not the main topic.

Study selection

The studies were selected independently by the two reviewers represented in Figure I. In the initial electronic search, 59 studies were located in Pubmed, 122 in Scopus, 103 in Web of Science and 92 in LILACS (376 studies in total). After removing 132 duplicate studies by EndNote 21 software, 9 duplicate studies were removed manually. 209 studies were rejected after initial screening of titles and/or abstracts, 18 studies were rejected after reading the free full text. Any divergence was discussed to reach a consensus with a third reviewer. The remaining 8 studies met the inclusion criteria to include the system review.

Figure I. Workflow for the selection of studies, according to PRISMA guidelines.



Data extraction

Data were extracted in a standardized way by the two reviewers of the selected articles on de 6th march 2024. The following variables were extracted: the characteristics of the study (publication date, country, sample size, BDD definition and area of dentistry), the BDD screening tools (prevalence of BDD for control group and for study population, BDD severity score, BDD questionnaire, record type and defect concern) and lastly the demographic variables (gender, age and social status).

Quality assessment

Two reviewers independently assessed the risk of bias based on the information provided in each study using the Modified Newcastle Quality Assessment Scale - Ottawa Cohort Studies [19]. It consists of 7 questions to which the following answers are possible: yes or no (yes=* and no=-). The scale applied focuses on three domains: selection (sample representativeness, sample size, ascertainment of exposure and non-respondents), comparability and results (assessment of outcome test; and statistical analysis). Based on the items in each domain and subdomain, each study received a final score, with a maximum of 10 points. The risk of bias was classified as low, medium or high depending on the response. In the end, of the 8 studies, 7 were classified as medium risk of bias and 1 as high risk of bias.

RESULTS

In Table II are presented the results regarding the study characteristics. Of the 8 studies carried out in the dental population, 5 are in the area of Orthodontics [20-24], 1 of Aesthetic Dentistry [25], 1 of General Dentistry [26] and 1 grouping Prosthesis, Implantology and General Dentistry [27]. Depending on the year of publication of the articles, the authors used different definitions of BDD according to the different editions of the DSM. Yassaei et al. [24] used DSM-III [28], Alharbi et al., De Jongh et al. and Hepburn et al. [20,26,25] used DSM-IV [29] and Masoumi et al., Rodríguez et al. with Sathyanarayana et al. [21,22,27] used the DSM-V [6]. This definition of BDD may condition the screening of patients positively diagnosed with BDD.

Table II. Study characteristics.

Study		Population		Context	
References	Country	Size <i>n</i>	Sample	BDD Definition	Area of Dentistry
Alharbi et al. 2023 [26]	SAU	507	public and private dental hospital/clinic	DSM-IV	General Dentistry
De Jongh et al. 2009 [25]	Netherlands	170	6 cosmetic clinics	DSM-IV	Aesthetic Dentistry
Hepburn et al. 2006 [20]	UK	40	Department of Orthodontics at Dental Hospital	DSM-IV	Orthodontics
Masoumi et al. 2022 [21]	Iran	320	Dentistry Faculty of GUMS	DSM-V	Orthodontics
Rodríguez et al. 2018 [27]	Australia	213	2 public clinics and 3 private clinics	DSM-V	Prosthodontics Implantology General Dentistry
Sathyanarayana et al. 2020 [22]	India	1184	Department of Orthodontics	DSM-V	Orthodontics
Sobouti et al. 2022 [23]	Iran	699	7 private orthodontic clinics	-	Orthodontics
Yassaei et al. 2014 [24]	Iran	270	2 private orthodontic clinics and 1 orthodontic teaching center	DSM-III	Orthodontics

Legend= DSM: Diagnostic and Statistical Manual of Mental Disorders; SAU: Saudi Arabia; UK: United Kingdom; - : Not Applicable.

In Table III are depicted the results regarding epidemiology and also the screening tools used for BDD diagnosis. In the dental population the prevalence is between 4.2% [25] and 52.5% [21], while in the 2 control groups of the general population the prevalence varies between 1.5% [25] and 2.86%. [20] and De Jongh et al. found a significant difference between the prevalence of these two populations ($p=0.021$) [25]. In 5 studies, they classify the severity of BDD [20-24] from mild to severe, the majority of patients had mild or moderate BDD. The main concerns about dental defects in patients with BDD are restorations [26,27], rotations, spacing, midline discrepancy [22] and crowns [26].

The table III also presents an overview of the screening tools used for BDD: 7 studies used questionnaires [20,21,22,23,24,26,27] and 1 study used DSM-IV diagnostic criteria [25].

Regarding the diagnostic tools, the most used questionnaire to evaluate the presence of BDD was the BDD-YBOCS (Yale Brown Obsessive Compulsive Scale Modified for BDD) [30] by 5 authors [20-24], 1 author [26] used the COPS (Cosmetic Procedure Screening) questionnaire Questionnaire for BDD) [31,32] and 1 [27] used the DCQ (Dysmorphic Concern Questionnaire) [33].

The BDD-YBOCS consists of 12 questions: the first 3 are based on the BDD diagnostic criteria [12] and the remaining questions reflect the severity of the symptoms. Four studies [20,22,23,24] based only on the first 3 questions to diagnose BDD: if the diagnosis was positive, the remainder of the semi-structured interview (12 items) was used to establish the severity. Yassaei et al. [24] combined the questionnaire with 3 questions (regarding history of previous orthodontic problem, history of previous cosmetic procedure and history of psychological/psychiatric evaluation) and Sathyanarayana et al. [22] with 1 question (about the history of previous orthodontic consultations) proposed by Polo et al. to be more specific in the diagnosis [15]. Hepburn et al. and Yassaei et al. [20,24] confirmed the diagnosis with a psychiatric consultation. Masoumi et al. [21] used the BDD-YBOCS as a semi-structured questionnaire of 10 items. Alharbi et al. [28] used COPS questionnaire [31,32] which uses 9 questions without severity classification.

The DCQ questionnaire [33] used by Rodrigues et al. [27] consists of 7 questions with two cut-off points, 9 and 12 indicating probable BDD. A minimal aesthetic defect was also assessed by the dentist during the examination.

De Jongh et al. [25] used DSM IV-TR criteria [29]: I. Preoccupation with an imaginary flaw in appearance. If a slight physical anomaly is present, the person's worry is markedly excessive. II. The worry causes clinically significant distress or impairment in social, occupational, or other important activities operating areas.

All diagnoses were made by self-reports [20-26] except Rodriguez et al. [27] which includes an interview.

Table III. BDD screening tools and prevalence.

References	Control Group	Study Population		BDD Screening Tools	
		Size <i>n</i> Prevalence BDD (<i>n</i> ; %)	Size <i>n</i> Prevalence BDD (<i>n</i> ; %)	BDD Severity Score %	BDD Questionnaire/ Record Type Defect Concern
Alharbi et al. [26]	-	507 (173; 34,1%)	-	COPS/ Self-Report	crowns, restorations
De Jongh et al. [25]	878 (13; 1,5%)	170 (7; 4,2%)	-	DSM-IV Criteria/ Self-Report	abdomen, teeth, mouth
Hepburn et al. [20]	70 (2; 2,86%)	40 (3; 7,50%)	Mild= 2,5% Moderat= 2,5% Severe= 2,5%	BDD-YBOCS/ Interview	facial profile, teeth, chin, smile
Masoumi et al. [21]	-	320 (168; 52,5%)	Mild= 34,4% Moderate= 17,2% Severe= 0,9%	BDD-YBOCS/ Self-Report	-
Rodríguez et al. [27]	-	213 (15; 7%)	Score ≥ 9= 7% Score ≥ 12= 4%	DCQ + clinician questionnaire / Interview	failing dentition, restorations
Sathyanarayana et al. [22]	-	1184 (62; 5,2%)	Mild= 3,2% Moderat= 1,6% Severe= 0,4%	BDD-YBOCS/ Self-Report	rotations, spacing, midline discrepancy
Sobouti et al. [23]	-	699 (119; 17,02%)	Mild= 14,02% M-M= 1,72% Moderate= 0,86% M-S= 0,29% S-ES= 0,14%	BDD-YBOCS/ Self-Report	-
Yassaei et al. [24]	-	270 (15; 5,5%)	Mild = 2,2% Moderate = 3,3%	BDD-YBOCS/ Self-Report	teeth, nose, hair

Legend= COPS: Cosmetic Procedure Screening Questionnaire for BDD; DCQ: Dysmorphic Concern Questionnaire; BDD-YBOCS: Yale Brown Obsessive Compulsive Scale Modified for BDD; M-M: mild-to-moderate BDD; M-S: moderate-to-severe BDD; S-ES: severe to extremely severe BDD; - : Not Applicable.

The sociodemographic data of patients positively and negatively screened for BDD are presented in Table IV. Among 7 studies, 4 [20,21,23,24] demonstrated a higher prevalence of BDD in women and identified a significant difference between BDD and gender ($p=0.018$ [21]; $p=0.040$ [23]; $p=0.042$ [24]; $p=0.009$ [25]). On the contrary, 2 studies found a higher prevalence in men [22,26] but with no significant difference ($p=0.251$ [26]). In the population with a negative diagnosis of BDD from the 6 studies, 3 showed male dominance [21,22,26] and 3 showed female dominance [20,23,24]. Within 6 articles [21-26] 5 demonstrated that the population with BDD was younger than in patients without a diagnosis of BDD [21-25] with an average age between 19 [24] and 33 years old [25], 1 of them calculated a significantly different association between young age and the prevalence of BDD ($p=0.000$ [23]). Only 1 study showed an older age for patients with BDD but without a significant difference ($p=0.981$ [26]). Among 5 studies, 4 [21-24] demonstrated a greater tendency for patients with BDD to be single and all concluded a significant difference ($p=0.017$ [21]; $p=0.02$ [22]; $p=0.039$ [23]; $p=0.006$ [24]). Only 1 study [26] showed a higher prevalence of patients with BDD in a relationship, but without a significant difference. Patients with a negative diagnosis of BDD followed the same model, 4 studies [21-24] with a higher proportion of single people and 1 study with a tendency to be married [26].

Table IV. Characteristics of patients positively and negatively screened for BDD.

References	BDD+						BDD-				
	Gender %		Mean Age	Social Status %			Gender %		Mean Age	Social Status %	
	Male	Female		R	S		Male	Female		R	S
Alharbi et al. [26]	59,5%	40,5%	36,69	62,4%	37,6%		56,0%	44,0%	34,79	60,8%	39,2%
De Jongh et al. [25]	-	-	33,2	-	-		-	-	45,8	-	-
Hepburn et al. [20]	33,3%	66,7%	-	-	-		40,5%	59,5%	-	-	-
Masoumi et al. [21]	43,5%	56,5%	-	20,8%	79,2%		57,2%	42,8%	-	35,5%	64,5%
Rodríguez et al. [27]	-	-	-	-	-		-	-	-	-	-
Sathyanarayana et al. [22]	79,0%	21,0%	20,40	25,8%	74,2%		56,4%	43,6%	24,30	41,8%	58,2%
Sobouti et al. [23]	23,5%	76,5%	24,14	47,1%	52,9%		33,5%	66,5%	24,84	36,7%	63,3%
Yassaei et al. [24]	13,3%	86,7%	19,06	26,7%	73,3%		39,6%	60,4%	24,20	49,8%	50,2%

Legend= BDD+: Patients Positively Screened for BDD; BDD-: Patients Negatively Screened for BDD; R: relationship; S: single.

The results of the risk of bias analysis and quality assessment of the included studies are displayed in Table V. The scores varied between 4 and 7 in the 8 studies, with 7 articles classified with medium risk and 1 with high risk of bias.

Table V. Analysis of the quality/risk of bias for each study (Modified Newcastle-Ottawa Scale).

References	Selection				Comparability		Results		Score	Risk of Bias
	Q1	Q2	Q3	Q4	Q5		Q6	Q7		
Alharbi et al. [26]	*	*	*	*	**		-	-	6	medium
De Jongh et al. [25]	*	*	-	*	*		-	-	4	high
Hepburn et al. [20]	*	*	*	*	*		-	*	6	medium
Masoumi et al. [21]	*	*	*	*	**		-	-	6	medium
Rodríguez et al. [27]	*	*	*	*	**		-	-	6	medium
Sathyanarayana et al. [22]	*	*	*	*	**		-	-	6	medium
Sobouti et al. [23]	*	*	*	*	**		-	*	7	medium
Yassaei et al. [24]	*	*	*	*	**		-	-	6	medium

Legend= Q1: Representativeness of the sample; Q2: Sample size; Q3: Ascertainment of exposure; Q4: Non-respondents; Q5: Comparability; Q6: Assessment of outcome test; Q7: Statistical analysis; Scores 0–4: high risk of bias; 5–7: medium risk of bias; 8–10: low risk of bias.

DISCUSSION

In this study, a wide variation was observed in the prevalence of BDD in the dental population: 4.2% [25] and 52.5% [21] with an average of 16.63%. The dentist could have a determining and privileged role, due to the higher prevalence of these patients in the dental clinics compared to the general population which is 1.5% [25] and 2.86% [20]. This rate of prevalence can be explained by some factors such; an increase in demand for dental aesthetics treatments which correspond with the evolution of patient's lifestyles and the new aesthetic criteria. In the young population, the literature admitted that the use of social networks had an impact on the development of symptoms related to BDD [34]. It also has been discussed that the Covid-19 pandemic period (due to confinement, greater use of digital tools, social isolation...) may have aggravated existing symptoms of BDD [35], which is also expected to have had an impact on the area of dentistry.

Devanna et al. [36] published a systematic review and meta-analysis in 2021, which concluded that BDD patients who sought aesthetic treatments are more focused on teeth and facial areas. This study is in line with other authors who assessed that up to 86% of BDD patients have concerns in the area of the teeth and/or face. [15,37] Dentists should be aware of the characteristics of patients with BDD to identify potentially high-risk patients.

Compared to other medical specialties, the prevalence of BDD increases considerably in aesthetic surgery settings, the prevalence of BDD was 17% in maxillofacial patients [38], 13.2% in general aesthetic surgery and 11.3% in dermatology [13].

Eight articles in this systematic review presented different diagnosis screening tools. Four authors based their diagnosis only on the first 3-item BDD-YBOCS and found a prevalence of BDD between 5.2% [22] to 17.02% [23]. Masoumi et al. [21] used the 10-item BDD-YBOCS and found a higher prevalence of BDD: 52.5%. Sobouti et al. also compare the prevalence of BDD with 2 means of diagnosis using the 3-item BDD-YBOCS (as recommended by Phillips et al. [30]) and 12-item BDD-YBOCS (full questionnaire). He found a respective prevalence of 17.02% (3-item BDD-YBOCS) and 2.86% (12-item BDD-YBOCS), suggesting that it would be better to use both diagnostic methods or develop more comprehensive questionnaires due to the divergence of the results obtained [23]. Rodrigues et al. [27] used the DCQ and stated that it does not attempt to diagnose BDD, but rather to identify individuals' preoccupation with physical appearance. Due to the difficulty of establishing a standardized diagnostic tool, the use of the questionnaire must be evaluated by the classification and by the presence of non-existent or minimal facial deformity. Furthermore, the DSM-V criteria [6] for social impact with reduced normal functioning in society must also be considered. The questionnaires are only screening tools, and the diagnosis should be confirmed by a psychiatrist [39]. In fact a systematic review published by Picavet et al. [40] highlights the issue of compliance with reliable screening tools for BDD tailored to each area. In 2008, Battini et al. [41] described a

computing resource for evaluating BDD, a software called *Afrodite* that could be applied in the health area, specifically in psychology, nutrition, dentistry and medicine as a starting point to improve the diagnosis of BDD.

According to Hepburn et al. [20] it would not be feasible to carry out psychological assessments on all patients, but they suggested 5 questions to include in the anamnesis that would help identify patients with BDD: about satisfaction with personal appearance; the possibility of changing body characteristics and the motivation; impact of this defect on the day; previous help seeking and expected results from treatment.

The modality of the questionnaires can also be discussed, Rodriguez et al. [27] includes an interview with a dentist in the diagnosis process, unlike most authors who preferred the self-report method. A hospital environment or a consultation waiting room are more stressful for the patient, so the use of self-report allows the patient to fill the form in a calmer way [24,25].

In the present systematic review, the diagnosis of BDD reported a higher prevalence in female patients than male patients with a gender-BDD association [21,23,24,25]. These results are in line with most previous studies [14,13,30,42]. Veale et al. reported that the prevalence of BDD to be 3 times more in females [43], however, some studies report greater prevalence in males [38,44]. Patients with BDD were in majority younger than non BDD patients despite knowing that this condition develops already in childhood, this finding was in line with previous study results [38,14]. In 4 studies, all concluded a significant difference between being single and having BDD [21-24]. Abramowitz et al. and Phillips et al. [45,46], also reported a higher prevalence of BDD in single people due to the higher level of stress, less mental and social support compared to married patients however, Esmaeili et al. showed a significant relation between married patients and BDD [47]. A systematic review was published in 2021 by Dons et al. [39] to study patients with BDD in the orthodontic and orthognathic population; the study also concluded a greater proportion for females, younger and single patients.

Regarding the limitations, there are few studies in the literature relating dental population and BDD, explaining the small number of studies included in this systematic review despite face and dental region being one of the most involved areas. The knowledge about the impact of BDD on oral health is also limited which makes it difficult to draw conclusions. The discrepancies observed throughout the methods and results of the studies reflect the lack of standardized validated questionnaires on this topic. The assessment of the outcome based on self-report questionnaires, could not allow accuracy of the results. Concerning the statistical analysis, not all authors presented inferential statistics with confidence intervals, so it was not even feasible to establish relationships between the BDD and the sociodemographic characteristics of patients (gender, age, social status).

CONCLUSION

This systematic review suggests that BDD may be more common in the dental population than in the general population; this clearly requires further investigation with a larger sample size and more studies.

The questionnaires can be used by dentists to establish a preliminary detection of BDD, but must be evaluated with the score obtained, general anamnesis, psychiatric history, medication and personal perception.

Patients with BDD tend to be mostly females, single, younger, with most common areas of concern the teeth and face however results are not conclusive and require prospective studies.

Ethics approval information

Not required.

Declaration of Competing Interest

There are no conflicts of interest.

Financial disclosure

No funding was received to develop this research.

BIBLIOGRAPHIC REFERENCES

1. Ahluwalia R, Bhatia NK, Kumar PS, Kaur P. Body dysmorphic disorder: Diagnosis, clinical aspects and treatment strategies. *Indian J Dent Res* 2017 Mar-Apr;28(2):193-197.
2. NICEWICZ HR; BOUTROUILLE JF. Body Dysmorphic Disorder (BDD, Dysmorphobia, Dysmorphic Syndrome). *StatPearls* 2020.
3. JANET, Pierre. *Les Névroses*. Ernest Flammarion.,1919, 397
4. KREBS G, FERNÁNDEZ DE LA CRUZ L, MATAIX-COLS D. Recent advances in understanding and managing body dysmorphic disorder. *Evid Based Ment Health* 2017;20(3):71-75.
5. The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines. World Health Organization 1992;164-66.
6. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th edn. Arlington, VA: American Psychiatric Association; 2013.\6.
7. Avinash B, Avinash BS, Shivalinga BM, Jain S. Body Dysmorphic Disorder in Orthodontic Patients. *World Journal of Dentistry*, January-March 2013;4(1):56-59.
8. Phillips KA. Body dysmorphic disorder: clinical aspects and treatment strategies. *Bull Menninger Clin* 1998;62:A33-48.
9. Bjornsson AS, Didie ER, Phillips KA. Body dysmorphic disorder *Dialogues Clin Neurosci*. 2010;12:221.
10. Allen A, Hollander E. Body dysmorphic disorder. *Psychiatr Clin North Am* 2000;23:617-28.
11. PHILLIPS KA. Body Dysmorphic Disorder: Common, Severe and in Need of Treatment Research. *Psychother Psychosom* 2014;83:325–329.
12. Leone JE, Sedory EJ, Gray KA. Recognition and treatment of muscle dysmorphia and related body image disorders. *J Athl Train*. 2005;40:352–9.
13. D. Veale, et al. Body dysmorphic disorder in different settings: a systematic review and estimated weighted prevalence, *Body Image* 18 (2016) 168–186.
14. Ribeiro RVE. Prevalence of body dysmorphic disorder in plastic surgery and dermatology patients: a systematic review with meta-analysis, *Aesthetic Plast. Surg.* 41 (4) (2017) 964–970.

15. Polo M. Body dysmorphic disorder: a screening guide for orthodontists. *Am J Orthod Dentofacial Orthop.* 2011;139(2):170–3.
16. Phillips KA, Dufresne RG. Body dysmorphic disorder. A guide for dermatologists and cosmetic surgeons. *Am J Clin Dermatol.* 2000;1:235–43.
17. Ahmady A, Pakkhesal M, Zafarmand A, Lando H. Patient satisfaction surveys in dental school clinics: a review and comparison. *J Dent Educ.* 2015, 79:388-93.
18. Moher D, Liberati A, Tetzlaff J, Altman DG, The PG. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLOS Medicine.* 2009;6(7):e1000097.
19. Herzog R, Álvarez-Pasquin MJ, Díaz C, Del Barrio JL, Estrada JM, Gil Á. Are healthcare workers' intentions to vaccinate related to their knowledge, beliefs and attitudes? A systematic review. *BMC Public Health.* 2013;13:154.
20. Hepburn S, Cunningham S. Body Dysmorphic Disorder in adult orthodontic patients. *Am J Orthod Dentofacial Orthoped* 2006;130:569–74.
21. Masoumi F, Shirkhouii S, Asghari M. The Evaluation of Body Dysmorphic Disorder in Adult Orthodontic Patients. *Cumhuriyet Dental Journal*, 25(1): 60-64, 2022.
22. Sathyanarayana HP, Padmanabhan S, Balakrishnan R, Chitharanjan AB. Prevalence of Body Dysmorphic Disorder among patients seeking orthodontic treatment. *Prog Orthod* 2020;21(1):20.
23. Sobouti F, Elyasi F, Navaei RA, Rayatnia F, Kalantari NR, Dadgar S, Rakhshan V. Associations between body dysmorphic disorder (BDD) with the dental health component of the index of orthodontic treatment need (IOTN-DHC) and other BDD risk factors in orthodontic patients: a preliminary study. *Korean J Orthod.* 2023, 53:3-15. 10.4041/kjod22.155.
24. Yassaei S, Moghadam MG, Aghili H, Tabatabaei SM. Body Dysmorphic Disorder in Iranian Orthodontic Patients. *Acta Med Iran* 2014;52(6):454–7.
25. De Jongh A, Aartman IH, Parvaneh H, Ilik M. Symptoms of body dysmorphic disorder among people presenting for cosmetic dental treatment: a comparative study of cosmetic dental patients and a general population sample. *Community Dent Oral Epidemiol.* 2009;37:350-356.
26. Alharbi A, Alkhatami A, Farooqi FA, Al-Khalifa KS, Shahin S, Nassar E, Gaffar B. The Prevalence of Body Dysmorphic Disorder and Its Associated Risk Factors Among Dental Patients: Why Are My Patients Not Satisfied? *Cureus* 15(11): e49739; November 30, 2023.

27. Rodríguez CP, Judge RB, Castle D, Phillipou A. Body dysmorphia in dentistry and prosthodontics: a practice based study. *J Dent*. 2019, 81:33-8. 10.1016/j.jdent.2018.12.003.
28. American Psychiatric Association, editor. *Diagnostic and statistical manual of mental disorders*. 3rd ed. Washington, DC: American Psychiatric Association; 1987.
29. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders, DSM-IV*. 4th ed. Washington, DC: American Psychiatric Press; 1994.
30. Phillips KA, Hollander E, Rasmussen SA, Aronowitz BR, DeCaria C, Goodman WK. A severity rating scale for body dysmorphic disorder: development, reliability and validity of a modified version of the Yale-Brown Obsessive Compulsive Scale. *Psychopharmacol Bull* 1997;33(1):17–22.
31. Veale D, Ellison N, Werner TG, Dodhia R, Serfaty MA, Clarke A: Development of a cosmetic procedure screening questionnaire (COPS) for body dysmorphic disorder. *J Plast Reconstr Aesthet Surg*. 2012, 65:530-2. 10.1016/j.bjps.2011.09.007.
32. Al Arfaj AM, Al Otaibi TM, Obeid AA, Alkhunaizi AA, Subhan YS, Al Arfaj A: Development, validation, and testing of an Arabic version of the cosmetic procedure screening questionnaire COPS for body dysmorphic disorder. *Kuwait Med J*. 2016, 48:38-41.
33. S.G.Mancuso,N.P.Knoesen,D.J.Castle,The Dysmorphic Concern Questionnaire:a screening measure for body dysmorphic disorder, *Aust. N. Z. J. Psychiatry* 44 (6) (2010) 535–542.
34. Alsaidan MS, Altayar NS, Alshmmari SH, Alshammari MM, Alqahtani FT, Mohajer KA. The prevalence and determinants of body dysmorphic disorder among young social media users: A cross-sectional study. *Dermatol Reports*. 2020 Dec 22;12(3):8774.
35. Quittkat HL, Düsing R, Holtmann FJ, Buhlmann U, Svaldi J, Vocks S. Perceived Impact of Covid-19 Across Different Mental Disorders: A Study on Disorder-Specific Symptoms, Psychosocial Stress and Behavior. *Front Psychol*. 2020 Nov 17;11:586246.
36. Devanna R. Prevalence of Body Dysmorphic Disorder in Patients Seeking Orthodontic Treatment: A Systematic Review and Meta-analysis. *Ann Med Health Sci Res*. 2021;11: 1232-1237.
37. Veale D, Gournay K, Dryden W, Boocock A, Shah F, Willson R, Walburn J. Body dysmorphic disorder: a cognitive behavioural model and pilot randomized controlled trial. *Behav Res Ther* 1996;34(9):717–29.

38. Vulink NC, Rosenberg A, Plooi JM, et al. Body dysmorphic disorder screening in maxillofacial outpatients presenting for orthognathic surgery. *Int J Oral Maxillofac Surg* 2008;37(11):985-91.
39. Dons F, Mulier D, Maleux O, Shaheen E, Politis C. Body dysmorphic disorder (BDD) in the orthodontic and orthognathic setting: A systematic review. *J Stomatol Oral Maxillofac Surg*. 2022 Sep;123(4):e145-e152.
40. Picavet V, Gabriels L, Jorissen M, Hellings PW. Screening tools for body dysmorphic disorder in a cosmetic surgery setting. *Laryngoscope* 2011;121(12):2535–41.
41. Battini E, Soares MRZ, Zakir NSA. Elaboração de software para avaliação do transtorno dismórfico corporal sob enfoque analítico-comportamental. *Temas psicol.* 2008, vol.16, n.1,pp. 63-72.
42. Perugi G, Akiskal HS, Giannotti D, Frare F, Di Vaio S, Cassano GB. Gender-related differences in body dysmorphic disorder (dysmorphophobia). *J Nerv Ment Dis* 1997;185:578-82.
43. Veale D, Boocock A, Gournay K, Dryden W, Shah F, Willson R, Walburn J. Body dysmorphic disorder: a survey of fifty cases. *The British Journal of Psychiatry*. 1996 Aug;169(2):196-201.
44. Hollander E, Cohen LJ, Simeon D. Body dysmorphic disorder. *Psychiatr Ann* 1993;23:359-64.
45. Abramowitz JS, Moore EL. An experimental analysis of hypochondriasis. *Behaviour Research and Therapy*. 2007 Mar 1;45(3):413-424.
46. Phillips KA, McElroy SL, Keck PE, Hudson JI, Pope HG. A comparison of delusional and nondelusional body dysmorphic disorder in 100 cases. *Psychopharmacology Bulletin*. 1994 May 150:302-308.
47. Esmaeili A, Shahrabadi M, Adib H. Body dysmorphic disorder and anxiety in patients in orthodontic clinics of Birjand University of Medical Sciences in 2014-2015. *Journal of Birjand University of Medical Sciences*. 2017 Sep 15;24(2):147-153.