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REVIEW ARTICLE

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Prevalence and post-pandemic consequences of body dysmorphic disorder: a systematic review with meta-analysis

ABSTRACT

Body dysmorphic disorder (BDD) has had a growing impact in Western cultures, manifesting itself in social pressures to achieve physical standards, affecting both men and women. Media influences have magnified these ideals, promoting a standardized body appearance, which has generated an increase in appearance-related disorders. The COVID-19 pandemic exacerbated body concerns. Therefore, we aimed to determine the post-pandemic prevalence and its consequences. For these purposes, a systematic review was carried out based on the PRISMA strategy to identify relevant studies between 2019 and 2023 in databases such as Web of Science and Scopus. Selection criteria were applied, including cross-sectional or longitudinal studies that focused on populations without a previous diagnosis of BDD and used clinical instruments. Of the 52 articles identified, 10 met the inclusion criteria and were selected. Four were used for the systematic review and 6 to carry out the meta-analysis. The prevalence of BDD was high, at 20.8% (6 studies, logOR = 0.208 [95% CI: 0.121-0.294], $Z = 4.69$, $p < .001$, $I^2 = 98.51\%$). In conclusion, the restrictions caused by the COVID-19 pandemic such as remaining in isolation, the closure of beauty services, and the increase in the use of social networks and video calls increased anxiety and stress levels in patients diagnosed with BDD and also in people with symptoms related to BDD.

KEY WORDS

body dysmorphic disorder; prevalence; mental health; COVID-19

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BACKGROUND

Physical appearance is an important element of self-image. Social pressures in Western cultures have redefined female body standards, emphasizing a toned representation that incorporates both thinness and muscularity. Disseminated content on social networks increasingly praises this physique (Gupta et al., 2023). In the same way, the idea of a muscular man has become ingrained in society, representing bravery and power. This has created much social pressure to maintain a muscular physique, which has led to more people going to gyms and using anabolic steroids to meet these aesthetic standards (Zepeda et al., 2011). Digital devices and social networks reflect an intersubjective assessment and construction of body image, leading to an overvaluation of others' opinions about one's body and a growing need for approval. This, in turn, has negative consequences for people's mental health (Barreto et al., 2019). An example of this is the phenomenon of 'fitspiration,' which promotes the notion of an appearance associated with good shape and health, characterized by a slim and toned body; however, this phenomenon has been positively linked to the distortion of eating behavior and excessive exercise, cognitive distortions regarding body dissatisfaction and self-objectification, as well as negative emotions and mental health issues (Xu, 2024).

Body dysmorphic disorder (BDD) is a psychiatric disorder marked by distress related to perceived flaws in one's physical appearance that are either not visible to others or are too subtle to be noticeable (Craythorne et al., 2024). These defects lead to significant distress, worse quality of life, isolation, and decreased social or professional functioning and are also associated with depression and suicide attempts (Gupta et al., 2023). BDD is a severe psychiatric disorder that presently impacts around 2% of the overall populace (Craythorne et al., 2024) and is estimated to affect between 1.9% and 2.2% of adolescents (Veale et al., 2016). Nevertheless, it has been noted that there are higher prevalence rates among student groups (3.6%) and older adolescents (5.6%) (Bala et al., 2021).

The usual initial age for this disorder is around 16 years (Conceicao Costa et al., 2012); however, apparent symptoms can be detected as early as 12 or 13 years (Bjornsson et al., 2013). Comorbidity in this disorder is frequent, with some related to depressive symptoms, substance abuse, obsessive-compulsive disorder, and social phobia. On the other hand, the most common personality traits present in people with BDD are introversion, shyness, neuroticism, hostility, perfectionism, and hypersensitivity to rejection (Cruzado et al., 2010). In addition to the above, low self-esteem is an important characteristic of BDD beyond the influence of depressive symptoms. Negative evaluation extends beyond appearance to encompass other aspects of the self, including one's perspective and that of others (Kuck et al., 2021). Due to all these characteristics, this disorder tends to be chronic, and it is estimated that the probability of total remission is low, with approximately 20% of cases being effectively treated. In contrast, the probability of relapse is high, averaging 42% of treated cases (Rincón Barreto, 2022).

A significant number of individuals afflicted with BDD are erroneously labeled with depression, anxiety, or social phobia (Phillips et al., 2005). Consequently, they do not obtain sufficient medical care. Individuals with BDD frequently experience a sense of guilt that prevents them from seeking assistance, primarily due to the fear of being misunderstood or not taken seriously (Buhlmann et al., 2010). The most recent research on suicide in individuals with BDD revealed that individuals had a fourfold higher likelihood of experiencing suicidal ideation and a 2.6-fold higher likelihood of engaging in suicide attempts compared to individuals diagnosed with eating disorders (ED), obsessive-compulsive disorder (OCD), or other anxiety disorders (Angelakis et al., 2016). An important element in understanding the origins of BDD is understanding the triggers that each person perceives in their situation. Although this may not reveal a specific origin for the disorder in general, it would help understand what elements or situations could aggravate BDD in people living with it and potentially generate guidance on managing symptoms (Craythorne et al., 2024). The global COVID-19 pandemic, triggered by the SARS-CoV-2 coronavirus, has resulted in substantial alterations to the lifestyles of individuals worldwide, affecting their social and economic well-being as well as their physical and mental health (Cecilia et al., 2022; Martínez-Líbano et al., 2023; Martínez-Líbano & Yeomans-Cabrera, 2023). Research conducted after the pandemic revealed that 61% of participants experienced worry or tension when resuming in-person activities, while nearly 64% actively sought mental health support services. Simultaneously, 30% of respondents expressed their intention to enhance their physical appearance as a means of managing the anxiety associated with returning to face-to-face interactions.

In comparison, less than 30% wanted to undertake measures to modify their look (Silence et al., 2021). People who suffer from BDD have a higher risk of developing comorbidities with other disorders, such as substance use disorder, an association that the literature shows has become more serious due to restrictions related to the pandemic, emotional distress, and anxiety. In addition to this, maladaptive eating habits and disorders resulting from body dissatisfaction were observed to increase as the COVID-19 pandemic unfolded around the world (Zaami et al., 2022). Consequently, in light of the above, it is relevant to

address the following research question: What are BDD's prevalence and post-pandemic consequences?

METHODS

The researchers conducted a systematic analysis utilizing meta-analysis to identify publications published in the Web of Science and Scopus databases from January 2019 to December 2023. The articles were authored in both English and Spanish languages.

SEARCH STRATEGY

The literature search was performed in accordance with the PRISMA reporting guideline for systematic reviews and meta-analyses, as outlined by Moher et al. (2009) and Page et al. (2021). The databases were queried using the title, abstract, and keyword search boxes. The terms "Body Dysmorphic Disorder" and "COVID-19" or "Coronavirus" were merged using Boolean operators (OR/AND). The methodology employed for the identification and inclusion of research is depicted in Figure 1.

STUDY SELECTION

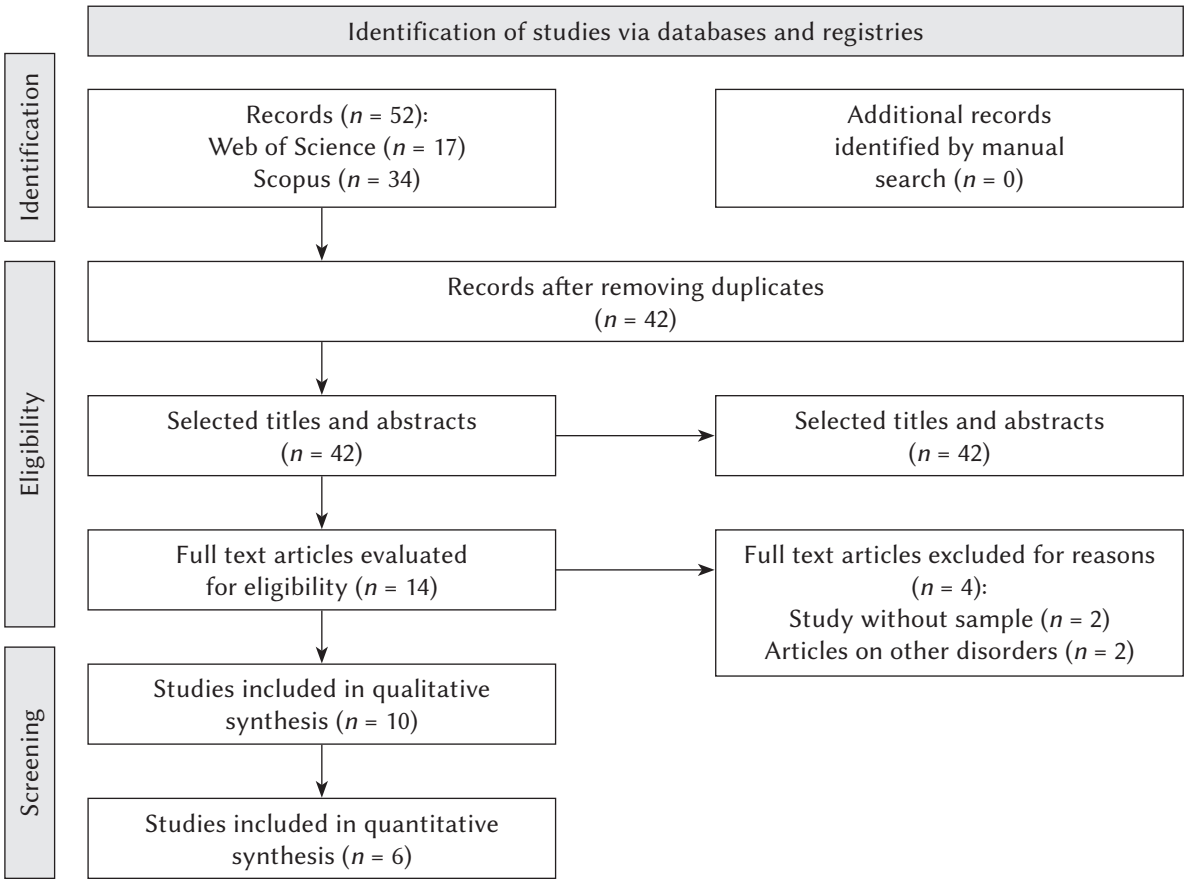
The titles and abstracts of each article were initially evaluated, followed by a comprehensive evaluation of the complete text to ascertain its eligibility.

Inclusion criteria encompassed the following criteria: 1) adherence to a cross-sectional study design; 2) presence of a diagnosis or symptoms of BDD within the population; 3) utilization of both clinical and non-clinical instruments; 4) attainment of positive or negative outcomes; 5) availability of texts in both English and Spanish languages.

The inclusion criteria were meticulously crafted to guarantee the relevance and rigor of the assessed studies. By concentrating on cross-sectional research, we sought to provide a picture of BDD prevalence and symptoms within specific groups, which is essential for discerning trends and relationships in the post-pandemic era. The inclusion of investigations utilizing both clinical and non-clinical instruments was determined to guarantee a comprehensive viewpoint, as clinical tools offer diagnostic accuracy, whereas non-clinical measurements reflect broader population-level patterns. The inclusion of research in both English and Spanish facilitated a broader representa-

Figure 1

PRISMA flowchart



tion of findings, hence reducing any regional or linguistic biases.

The exclusion criteria employed in this study were as follows: 1) research studies lacking information on sample sizes; 2) studies that do not specifically examine BDD or its associated symptoms; 3) systematic reviews and meta-analytical research; 4) scholarly remarks, letters to the editor, or reflective works.

The exclusion criteria were equally rigorous to improve the quality and reliability of the meta-analysis. Studies without specified sample sizes were removed to mitigate data variability and guarantee statistical rigor in the study. In a similar vein, systematic reviews and meta-analyses were omitted to avoid data redundancy and to concentrate on primary research. Editorials, letters to the editor, and reflective works were excluded as these sources lack empirical evidence and do not satisfy the necessary methodological rigor for inclusion. These criteria collectively sought to harmonize inclusivity with methodological rigor, guaranteeing that the results of this review and meta-analysis are both dependable and generalizable.

SYSTEMATIC REVIEWS

The researchers employed a data extraction form (see Table 1). To evaluate the quality of the studies, the Newcastle-Ottawa Scale (NOS), specifically designed for cross-sectional research, was employed (Moskalewicz & Oremus, 2020). The NOS assesses quality by considering content, design, and interpretation, demonstrating high levels of reliability and validity compared to alternative scales (Sirriyeh et al., 2012). Three dimensions comprise the scale, namely selection, comparability, and outcome. The sample's representativeness is assessed through seven categories: sufficient sample size justification, comparability between respondents and non-respondents, determination of exposure, comparability based on study design or analysis, evaluation of the result, and appropriateness of the statistical analysis. If the study meets specific conditions, it may receive nine stars. The selection dimension can receive a maximum of four stars, the comparability dimension can receive a maximum of two stars, and the results can receive a maximum of three stars (Moskalewicz & Oremus, 2020).

SELECTION METHOD OF THE META-ANALYSIS

The articles selected for the meta-analysis followed a cross-sectional study design, with measurements made using psychological scales with good psychometric properties and a representative sample.

The methodological quality of the studies included in the meta-analysis was evaluated using the Newcastle-Ottawa Scale. All the articles obtained a score indicating high quality (7-10 points); therefore, they met good standards of participant selection, comparability of the results, and objective evaluation of the results.

RESULTS

Within the search results, a comprehensive analysis revealed 52 scholarly papers about BDD's prevalence and post-pandemic ramifications. Nine duplicates were deleted from the dataset. Twenty-eight papers were omitted from the analysis based on examining the title and abstract, while four articles were discarded after reading the complete text. Thus, 10 publications that satisfied the specified inclusion criteria were chosen. Out of these, 10 articles were included in the systematic review, while the remaining six articles were used for the meta-analysis.

QUALITATIVE SYNTHESIS

Study characteristics. Table 1 summarizes the study features and conclusions included in this review. The article's sample sizes varied between 114 and 1643 people, resulting in 4,894 participants. The cross-sectional study design was employed in all of the studies. A total of ten studies were undertaken in different nations throughout the globe, including Australia (n = 3), Saudi Arabia (n = 1), the United States (n = 2), Iran (n = 1), England (n = 1), Nigeria (n = 1), and Poland (n = 1).

Quality evaluation. Table 2 presents the methodological quality assessment of the studies. The overall quality of the included studies was good, with a total of 6 to 9 stars. There was one study with nine stars (Pikoos et al., 2021), three studies with eight stars (Bala et al., 2021; Pikoos et al., 2020; Yurtsever et al., 2023), five studies with seven stars (Akinboro et al., 2019; Fontenelle et al., 2021; Gelidan et al., 2020; Pourani & Ghalamkarpour, 2022; Toh et al., 2022), and a study with six stars (Stevens et al., 2023).

QUANTITATIVE SYNTHESIS (META-ANALYSIS)

The prevalence statistics encompassed six studies, with a collective sample size of 2,722 individuals. The meta-analysis used the statistical software Jamovi. The findings are presented as the general occurrence rate with a 95% level of certainty. The determination of the prevalence % for BDD was achieved by amalgamating findings and considering the sample size in the respective study. The Cochran Q test and I^2 were employed to assess heterogeneity. A fixed-effects model was employed when I^2 was less than 50%, and a random-effects model was chosen when I^2 exceeded

Table 1

Summary of study sample characteristics, study design, assessment tools used, prevalence rates, and main findings

Author	Country	Methods	Sample size	Measurement tools	Main findings
Pikoos et al., 2021	Australia	Cross-sectional	335	DASS-21; DCQ; Scale of change in desire to obtain aesthetic services; Survey on the use of video calls	Video calls may promote dissatisfaction with appearance during the pandemic
Gelidan et al., 2020	Saudi Arabia	Cross-sectional	1643	COPS	Being female, the presence of body image concerns, and higher scores on the cosmetic procedure screening questionnaire were associated with a greater willingness to undergo cosmetic procedures
Pikoos et al., 2020	Australia	Cross-sectional	216	DCQ; DASS-21; Likert scale of appearance-focused behaviors; Scale of change in desire to obtain beauty services	COVID-19 restrictions and temporary closure of beauty services may have positive implications for the general public, but present risks for people with high dysmorphic concern
Stevens et al., 2023	United States	Cross-sectional	175	DCQ	There is a significant association with social media use and increased concern about physical appearance since the COVID-19 pandemic
Pourani & Ghalam-karpour, 2022	Iran	Cross-sectional	120	CDAS; BDD-YBOCS	The presence of BDD in individuals was not correlated with the level of anxiety related to COVID-19
Toh et al., 2022	Australia	Cross-sectional	343	DASS-21; DCQ; HF-MPS	Socially prescribed perfectionism could be a viable therapeutic target for dysmorphic and symmetry problems
Bala et al., 2021	England	Cross-sectional	707	AAI; BIQ-C	Body dysmorphic symptoms are continuously distributed among adolescents, with no evidence of qualitative differences between mild and severe symptoms
Akinboro et al., 2019	Nigeria	Cross-sectional	114	BDD-YBOCS; HADS	The prevalence of BDD is high among dermatology patients and more prevalent in facial disorders. Facial diseases are associated with the highest burden of anxiety/depression symptoms

Table 1 continues

Table 1

Table 1 continued

Autor	Country	Methods	Sample size	Measurement tools	Main findings
Fontenelle, et al., 2021	United States	Cross-sectional	829	COROTRAS; DOCS; VOCI-MC; HRS-SR; MGHHS; SPS-R; WHODAS 2.0; Q-LES-Q-SF; CHIT; BIS-11	Distress resulting from the COVID-19 pandemic in 2020 includes significant worsening of several symptoms of obsessive-compulsive and related disorders in the general population
Yurtsever et al., 2023	Poland	Cross-sectional	412	FAS; BAS-2; BSQ-16; RSES; AAI; COPS	Higher BMI and a history of psychiatric treatment are risk factors for BDD, body dissatisfaction, and depreciation. The financial situation had a notable influence on all characteristics

50%. In order to assess publication bias, a funnel plot diagram was employed.

Through the analysis, it was determined that BDD had a prevalence of 20.8% during the COVID-19 pandemic (6 studies, logOR = 0.208 [95% CI: 0.121-0.294], $Z = 4.69$, $p < .001$, $I^2 = 98.51\%$).

DISCUSSION

This review aimed to investigate the prevalence and impact of the pandemic on BDD. The prevalence of BDD was high (20.8%). In pre-pandemic studies, the prevalence of BDD ranged from 0.7% (Otto et al., 2001) to 2.1% in the general population (Brohede et al., 2015), 15.04% in plastic surgery patients and 12.65% in dermatological patients (Ribeiro, 2017). Therefore, our results suggest that the increase has been very high since the pandemic began.

The studies mention the use of social networks as the first relevant factor, given that the COVID-19 pandemic exacerbated the use of these media during confinement (Barone et al., 2024). The COVID-19 pandemic led to an overall 26% of participants in an aesthetic clinic study reporting increased use of social media. On the other hand, 38% of respondents tested positive for BDD, and this same group showed more significant use of social networks and a greater number of hours per day worrying about appearance since the beginning of the pandemic (Stevens et al., 2023). This study aligns with previous research demonstrating that confinement influences social network usage, potentially leading to a heightened desire for thinness and increased susceptibility to suffering eating disorders, especially among adolescents and young women (Vall-Roqué et al., 2021). In addition to this, significant associations were found between BDD and greater use of social media platforms (Berjaoui & Chahine, 2024), especially Snapchat and Instagram, as well as being more likely to compare their appearance to that of famous people on social networks (Alsaidan et al., 2020). Similarly, other studies found that excessive social media use may increase concern about imagined image defects among BDD patients, leading them to perform a more significant number of cosmetic procedures (Laughter et al., 2023). According to Chen, the use of specific social networks and photo editing applications may lead to a greater acceptance of cosmetic surgery, reinforcing the notion that social network use could perpetuate negative body image (Chen et al., 2019; Stevens et al., 2023).

Another relevant factor associated with BDD is video calls or video conferences. An association was found between the increase in the use of video calls and a greater demand for aesthetic treatments during the pandemic, considering that 36% reported that they had identified new aspects of their appearance that they did not like while they were on video, which in turn led to greater interest in obtaining specific cosmetic procedures compared to before the pandemic. In addition, those with more significant dysmorphic concerns were particularly likely to focus on themselves during video calls, identify new concerns about their appearance, and engage in video manipulation behaviors (Pikoos et al., 2021). The above is similar to what was found in another study, where the increase in video conferencing during the pandemic had associations with satisfaction with appearance and daily hours spent in video chat

Table 2

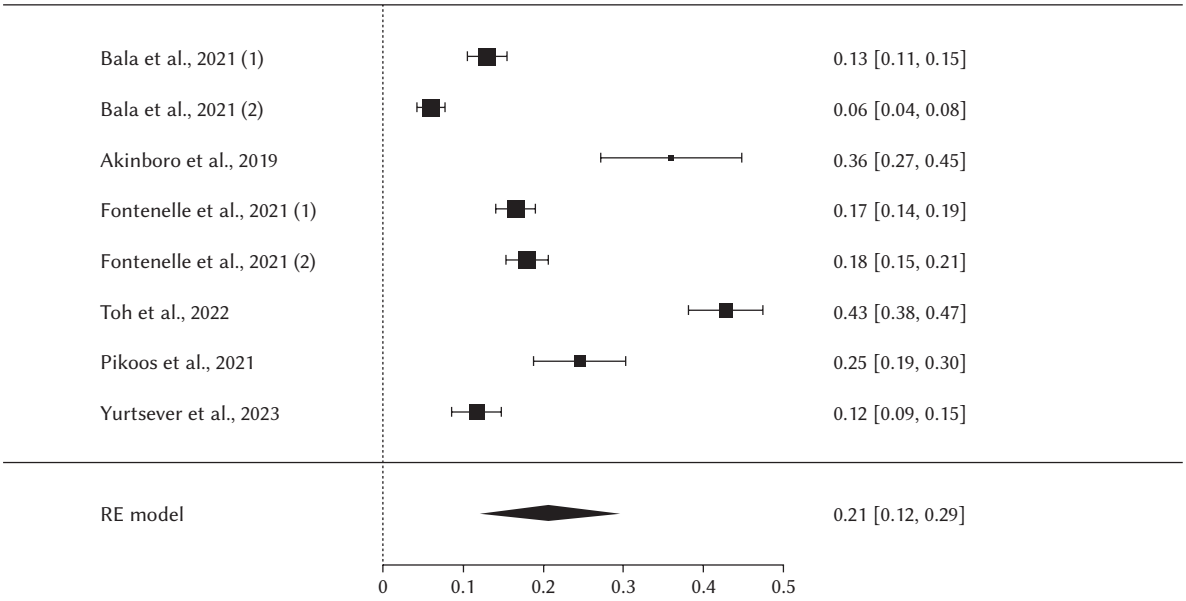
Results of NOS quality assessment of included studies. Representativeness of the sample

Study	Total score	Selection			Comparability		Results		
		Representativeness of the sample	Sample size	Not surveyed	Exposure check	Design and analysis	Assessment	Statistical test	Quality
1. Pikoos et al., 2021	9	*	*	*	**	*	**	*	Very good
2. Gelidan et al., 2020	7	*	*		**		**	*	Good
3. Pikoos et al., 2020	8	*	*		**	*	**	*	Good
4. Stevens et al., 2023	6		*		**		**	*	Satisfactory
5. Pourani & Ghalamkarpour, 2022	7		*		**	*	**	*	Good
6. Toh et al., 2022	7	*	*		**		**	*	Good
7. Bala et al., 2021	8	*	*		**	*	**	*	Good
8. Akinboro et al., 2019	7		*		**	*	**	*	Good
9. Fontenelle et al., 2021	7	*	*		**		**	*	Good
10. Yurtsever et al., 2023	8	*	*		**	*	**	*	Good

Note. The overall quality of the included studies was good, with a total of 6 to 9 stars. NOS – Newcastle-Ottawa Scale.

Figure 2

Forest plot of prevalence for body dysmorphic disorder



(Pfund et al., 2020). Despite the high popularity of this new post-pandemic communication modality, we found no other studies related to BDD and video calls, highlighting the need for more research that explores the benefits and risks of video communication and disorders such as BDD (Pikoos et al., 2021).

Due to excessive concern about imagined or minor flaws in the physical appearance of those who suffer from BDD, they are more likely to seek help to modify the physical appearance that they consider negative (AlShahwan, 2020). It has been estimated that between 50 and 88% of people with BDD may reach the point of undergoing cosmetic surgery (Raeissosadati et al., 2022). Regarding this, a study evaluated people's willingness to undergo plastic surgery procedures during the COVID-19 pandemic; 85% expressed not being willing to undergo plastic surgery procedures; however, the desire to improve a part of the body, the presence of positive results for BDD (7%), and being a woman were found to be associated with a greater willingness to undergo plastic surgery during the pandemic period. On the other hand, 74.9% of participants reported that they would consider undergoing cosmetic procedures two months after the end of the COVID-19 outbreak (Gelidan et al., 2020). These findings are related to what was found in different studies of cosmetic clinics, where the evaluation of the prevalence of BDD in these patients ranges from 7.7% to 31.5% for various procedures (Fathololoomi et al., 2013; Lai et al., 2010; Mortada et al., 2020). The literature exposes a disparity regarding the performance of cosmetic surgery in people with BDD, related to questions about whether it is beneficial or harmful for these people to undergo the procedures and what harm could be generated if they are not allowed access such procedures (Spriggs & Gillam, 2016), also considering that around 75% of patients with BDD are dissatisfied with the post-procedure results (Raeissosadati et al., 2022). All of the above could explain why, despite the majority of respondents expressing an understanding of the seriousness of COVID-19 in the study by Gelidan et al. (2020), the desire to undergo surgery did not decrease in the group that tested positive for COVID-19. BDD added to the increase in the use of social networks caused by the pandemic, a factor that has previously been associated with an increase in the acceptance of cosmetic surgery (Chen et al., 2019).

Finally, the latest study investigated anxiety levels perceived during the pandemic. Overall, it was found that 20.8% of participants reported moderate to severe levels of anxiety associated with the COVID-19 pandemic. Regarding BDD, younger people presented significantly more BDD symptoms than older patients. Although BDD was not associated with higher levels of anxiety related to the pandemic, the younger group experienced higher levels of anxiety during the COVID-19 pandemic (Pourani & Ghalamkarpour, 2022). This is related to what was found in a study on the psychological consequences of the pandemic in people with mental disorders, finding an increase in the symptoms of each disorder in the group of depression, BDD, anxiety disorder, and generalized anxiety disorder, added because in all disorders an increase in levels of perceived stress was revealed (Quittkat et al., 2020). The fear of being judged negatively constitutes a central element of anxiety and social maladjustment in patients with BDD, which

subsequently contributes significantly to social anxiety (Zaami et al., 2022). This could help explain the increase in previously reported anxiety in youth with BDD symptoms (Pourani & Ghalamkarpour, 2022). Despite this, no other studies on anxiety and BDD during the COVID-19 pandemic were found.

Finally, our meta-analysis demonstrated a BDD prevalence rate of 20.8% during the pandemic. This figure, significantly higher than the typical pre-pandemic prevalence of 2% in the general population (Craythorne et al., 2024), supports the argument that pandemic-related factors likely contributed to an increase in BDD cases.

LIMITATIONS

Among the main limitations of the present study is the heterogeneity of the included studies, which could affect the generalization of the results. Also, the large number of tools used to measure BDD could affect the results. Additionally, longitudinal studies were not included in the analysis. Finally, although the Newcastle-Ottawa Scale was included to assess the quality of the studies, this tool has limitations and may not capture all aspects of methodological quality. We acknowledge that not all studies directly compared pre- and post-pandemic data. However, the convergence of findings across multiple sources, highlighting pandemic-related factors such as increased anxiety and self-objectification, provides strong support for the association between the pandemic and a rise in BDD.

CONCLUSIONS

The main objective of this research was to identify the prevalence and consequences of BDD. From the results, we can say that the prevalence of BDD after the pandemic increased significantly to 20.8%. The global population was exposed to health restrictions, fear of contagion, increased use and abuse of social networks during confinement, and increased anxiety, depression, and stress in the youngest population. All of the above could have interfered with the excessive increase in this pathology. Field studies are now required to help researchers and health professionals identify possible risk factors and causal variables to establish effective prevention and treatment programs.

Disclosures

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The authors declare no conflict of interest.

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