

## Evaluating internet-based Cognitive Behavioural Therapy (CBT) for body dysmorphic disorder: A systematic review

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### Abstract

**Objective:** To evaluate the effectiveness, cost-effectiveness and feasibility of internet-based Cognitive Behavioural Therapy (CBT) in the treatment of body dysmorphic disorder.

**Method:** The systematic review was conducted from August 19 to September 22, 2023, and comprised search on Cochrane Library, Embase, Google Scholar, PubMed, PsycINFO and Web of Science databases using specific key words for studies published in the English language from 2010 onwards. Grey literature and pertinent conference proceedings were also searched to include as many studies as possible that investigated internet-based cognitive behavioural therapy in the treatment of body dysmorphic disorder. Data extraction was done, and the selected studies were subjected to quality assessment, followed by a narrative synthesis of the findings.

**Results:** Out of the 6,837 studies initially identified, 8(0.11%) were analysed in detail. Of the 8 studies, 4(50%) were RCTs, while 5(62.5%) had been conducted in Sweden. Therapist-guided internet-based cognitive behavioural therapy interventions consistently demonstrated efficacy with respect to reducing body dysmorphic disorder symptom severity, improving insight, and enhancing quality of life. Cost-effectiveness analyses highlighted the favourable economic aspect of internet-based cognitive behavioural therapy. Feasibility and acceptability were demonstrated by high participant engagement and satisfaction.

**Conclusion:** Internet-based cognitive behavioural therapy showed promise in addressing the treatment gap in body dysmorphic disorder care, offering accessible, cost-effective and feasible interventions.

**Keywords:** Body dysmorphic disorder, Cost-effectiveness, Efficacy, Feasibility, Internet-based cognitive behavioural therapy. (JPMA 74: 1488; 2024) DOI: <https://doi.org/10.47391/JPMA.10974>

### Introduction

Body dysmorphic disorder (BDD) is a distressing mental health condition marked by an intense fixation on perceived flaws in physical appearance, often accompanied by compulsive behaviours and avoidance tactics. In the absence of proper treatment, BDD can result in substantial functional impairment, psychiatric hospitalisations, substance dependence, and even suicidal tendencies.<sup>1</sup> Despite its prevalence and far-reaching effects, BDD frequently goes unnoticed and undiagnosed, with estimated rates ranging from 0.7% to 2.2% in the general populace.<sup>2,3</sup> Many individuals with BDD seek non-psychiatric interventions, like dermatological or surgical procedures, which frequently neglect the underlying psychological distress.<sup>4,5</sup>

Treatments rooted in empirical research for BDD encompass cognitive behavioural therapy (CBT) and selective serotonin reuptake inhibitors (SSRIs).<sup>6</sup> However, not everyone can go for this treatment option as it is really hard to get these treatments because there are not enough therapists, it costs a lot, and some people live too far away.<sup>7</sup> Another study mentioned that not many people with BDD can get the right therapy because there are not enough therapists available.<sup>8</sup> This treatment gap is compounded by the escalating demand for mental healthcare, which strains existing resources.<sup>9</sup> Addressing these challenges necessitates innovative and scalable approaches to provide evidence-based care for BDD.

Internet-based cognitive behavioural therapy (ICBT) has surfaced as a hopeful solution to enhance access to psychological interventions. ICBT entails delivering CBT through secure web-based platforms, enabling patients to access treatment materials and communicate with therapists remotely.<sup>10</sup> This approach has been effectively implemented for various mental health disorders in developed countries like Australia, the Netherlands, Sweden, and in many developing countries, including Pakistan.<sup>11</sup> ICBT offers the opportunity to surmount barriers linked to conventional face-to-face therapy, such as geographical limitations, stigma and costs.<sup>12</sup>

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Recent efforts have led to the creation and evaluation of therapist-guided ICBT programmes tailored specifically for BDD, such as BDD-NET, as individuals with BDD often cite feelings of shame and stigma surrounding their appearance concerns as a key reason for avoiding treatment, making telecare options potentially suitable.<sup>13</sup> These interventions have shown safety, efficacy and acceptability in alleviating BDD symptoms.<sup>14</sup> Smartphone-delivered ICBT, such as the 'Perspectives' application (app), offers an even more accessible and flexible method to provide evidence-based care, particularly given the widespread ownership of smartphones.<sup>15</sup> By delivering therapy through digital platforms, individuals with psychological conditions, like BDD, can receive treatment at their convenience, potentially mitigating the impact of stigma and shame associated with seeking traditional therapy.<sup>16</sup>

Despite the potential of ICBT and smartphone-delivered interventions, knowledge gaps persist regarding their effectiveness, cost-effectiveness and feasibility, particularly when implemented in real-life clinical settings.<sup>17</sup> While preliminary studies and randomised controlled trials (RCTs) have shown positive outcomes for therapist-guided ICBT for BDD, there is limited research evaluating its effectiveness in routine clinical care and its potential impact on symptom severity and mobility patterns.<sup>18</sup> Furthermore, the cost-effectiveness of these interventions compared to conventional options, such as face-to-face therapy or medication, requires comprehensive assessment.<sup>19</sup>

The current systematic review was planned to bridge the gaps by analysing the existing body of research on ICBT for BDD, with a specific focus on its effectiveness, cost-effectiveness and feasibility. Given the scarcity of studies on the subject, the current review represents a pioneering effort to synthesize the available evidence and offer treasured comprehensions into the potential of ICBT for BDD. To our knowledge, this is the first systematic review on this topic, and the inclusion of all accessible studies underscores the limited research in this domain.

## Materials and Methods

The systematic review was conducted from August 19 to September 22, 2023, and comprised search on Cochrane Library, Embase, Google Scholar, PubMed, PsycINFO and Web of Science databases using specific key words for studies published in the English language from 2010 onwards. Grey literature and pertinent conference proceedings were also searched to include as many studies as possible that investigated ICBT in the treatment of BDD. Furthermore, reference compilations from pertinent

articles and systematic reviews were scrutinised to pinpoint any supplementary studies adhering to the inclusion criteria.

The search was conducted using key words with appropriate Boolean operators that included Body Dysmorphic Disorder OR BDD AND Cognitive Behavioural Therapy OR Internet-Based Therapy OR Internet-Delivered Intervention OR Online Treatment OR Virtual Therapy OR E-therapy OR Internet-Based Cognitive Behavioural Therapy".

The studies included were those with participants diagnosed with BDD based on standardised clinical criteria, reported outcomes related to efficacy, cost-effectiveness or feasibility of ICBT in BDD cases, and encompassed comparative groups, including conventional therapy, waitlist controls, or alternative interventions. The 2010 cut-off was decided owing to the novelty of the topic and limited research conducted before 2010. Also, the cut-off ensured the inclusion of the most recent and relevant findings in the field.

Studies were excluded if they focussed solely on non-CBT interventions, like medication trials and non-behavioural interventions, lacked adequate data pertaining to relevant outcomes, case reports, reviews and opinion articles, and any study published before 2010.

Three assessors undertook the preliminary assessment of titles and abstracts to identify potentially pertinent studies. Subsequently, full texts of the short-listed studies were evaluated against the criteria for inclusion and exclusion. Any disparities were reconciled through deliberation and mutual agreement. The entire search process was conducted in line with the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines.<sup>20</sup>

Data was extracted using a standardised data extraction template. Data retrieved included study attributes (authors, year of publication, location), research design and approach (RCTs, observational studies and qualitative research), participant specifics (group size, demographic data), intervention particulars (ICBT regimen, length, frequency, therapist engagement), outcome gauges (symptom alleviation, cost-effectiveness measures, feasibility markers), findings and final remarks (focussing on efficacy, feasibility, cost-effectiveness, acceptability, safety, quality of life improvements, insight gains, and long-term outcomes).

For careful and comprehensive quality assessment, the review employed well-defined inclusion and exclusion criteria. A uniform data extraction template was employed, coupled with meticulous scrutiny of each article. Collaborative peer review discussions bolstered objectivity,

enriched by diverse perspectives, and resolved discrepancies through consensus. Sensitivity analyses were conducted, evaluating the impact of excluding low-quality articles to enhance the reliability, stability and robustness of the findings. Additionally, the modified Cochrane Collaboration risk of bias tool<sup>21</sup> was used to gauge the manuscripts' quality. Bias was assessed as a judgment (high, low, or unclear) for individual elements from 5 domains: selection, performance, attrition, reporting, and other.

The collected data was synthesised through a narrative approach, categorising thematically to emphasise the interplay between ICBT and BDD. Employing qualitative analysis, shared patterns and themes across studies were identified, offering a comprehensive insight into the efficacy, cost-effectiveness and feasibility of ICBT for BDD treatment. The narrative synthesis succinctly presented a cohesive and accessible overview of the findings.

To enhance transparency and research integrity, the current systematic review was registered with the International prospective register of systematic reviews (PROSPERO) platform (ID: CRD42023459482) URL: ([https://www.crd.york.ac.uk/prospero/display\\_record.php?ID=CRD42023459482](https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023459482)).<sup>22</sup>

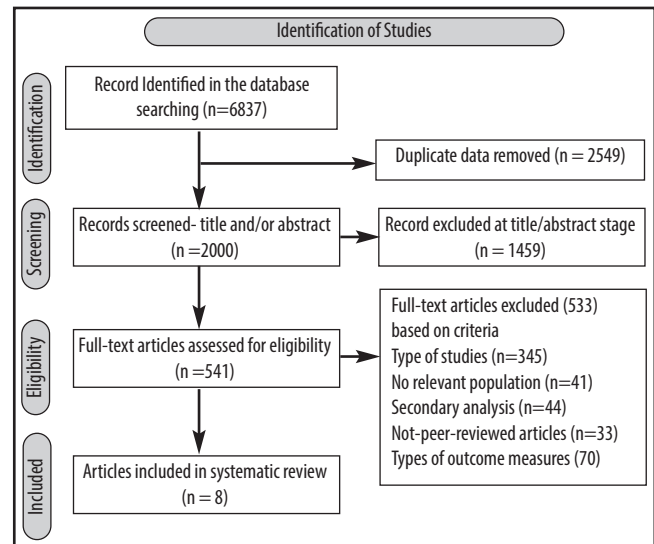
## Results

Of the 6,837 studies initially identified, 8(0.11%) were analysed in detail (Figure).

Of the 8 studies<sup>23-30</sup> 4(50%) were RCTs<sup>23,24,27,28</sup> while 5(62.5%) had been conducted in Sweden. The sample size ranged 10-94 individuals, the age of participants was generally 18 years or older, with a majority of female participants, the interventions provided in the studies primarily involved therapist-guided ICBT programmes tailored for BDD treatment and the duration of interventions was consistently 12 weeks (Table).

The studies collectively demonstrated promising results regarding the efficacy of ICBT interventions in BDD cases. There were 3(37.5%)<sup>24,25,28</sup> studies reporting reduction in BDD symptom severity, enhanced insight and improvements in depression. These studies also reported significant response rates, indicating a positive treatment response in a substantial portion of participants.<sup>24,25,28</sup> Additionally, 3(37.5%) studies<sup>23,24,30</sup> showed that the intervention led to increased quality of life and better functioning in individuals with BDD.

There were 2(25%) studies that focussed on the cost-effectiveness of ICBT for BDD<sup>23,27</sup> and highlighted the favourable cost-effectiveness and cost-utility of the interventions compared to other treatment approaches. There was 1(12.5%) study<sup>26</sup> that utilised machine learning



**Figure:** Preferred Reporting Items for Systematic Reviews (PRISMA) flowchart. techniques to differentiate between individuals who achieved remission post-intervention, showing promise in identifying predictors of treatment response, potentially allowing for more personalised treatment strategies.

The feasibility and acceptability of ICBT interventions were demonstrated by 5(67.5%) studies<sup>23,26,27,29,30</sup> that exhibited high levels of client engagement and satisfaction with the online platforms, indicating that therapist-guided ICBT was well-accepted by the participants, and could overcome barriers, such as stigma and logistical constraints.

## Discussion

Given the scarcity of studies on the subject, the current review represents a pioneering effort to synthesise the available evidence and offer treasured comprehensions into the potential of ICBT for BDD. To our knowledge, this is the first systematic review on the topic, and the inclusion of all accessible studies underscores the limited research in this domain. Besides, there was no information found in the grey literature.

The current systematic review delved into the domain of ICBT for BDD, shedding light on its efficacy, cost-effectiveness and feasibility through an amalgamation of diverse studies. The review showcased (Table) a nuanced panorama of the potential impact of ICBT on BDD, echoing implications that extend beyond the confines of BDD.

The pioneering work by Flygare et al.<sup>23</sup> spearheaded the cost-effectiveness analysis of therapist-guided ICBT, unearthing promising vistas for treatment accessibility and patient outcomes. Their findings aligned with the findings of Wilhelm et al,<sup>25</sup> who underscored the strong efficacy of app-based CBT, hinting at a potential solution for bridging the treatment gap in BDD care. Additionally, the endeavour

**Table:** Studies describing the relationship of Depression and Substance Use Disorder.

Title	Study Reference	Country	Study Type/Design	Sample Characteristics	Interventions	Country	Outcomes
1 Cost-effectiveness of internet-delivered cognitive behaviour therapy for body dysmorphic disorder: Results from a randomized controlled trial.	Flygare, et al., 2023 <sup>21</sup>	Sweden	RCT Study Analysis	n=94 Age=18 years F=80, M=14 Mean Age (yrs) 32.6 ± 11.97	BDD-NET, Online Supportive Psychotherapy	12 weeks	This pioneering study conducted the first cost-effectiveness analysis of therapist-guided internet-delivered cognitive behaviour therapy (BDD-NET) for body dysmorphic disorder (BDD). The results highlight the favourable cost-effectiveness and cost-utility of BDD-NET compared to online supportive therapy. With an additional remission achieved at a reasonable societal cost of \$4132 and an extra quality-adjusted life year (QALY) generated at an average cost of \$14,319, BDD-NET demonstrates promise as a cost-effective treatment option for BDD. These findings offer valuable insights for healthcare resource allocation and suggest a potential avenue for enhancing treatment accessibility and patient outcomes.
2 Efficacy of App-Based Cognitive Behavioural Therapy for Body Dysmorphic Disorder with Coach Support: Initial Randomized Controlled Clinical Trial	Wilhelm, et al., 2022 <sup>24</sup>	United States	RCT	80 patients Age=18 years Mean Age (yrs) 27 ± 9.6	Psychoeducation, Cognitive Restructuring, Exposure with Response Prevention, Mindfulness, Attention Retraining, Relapse Prevention	12 weeks	The guided app-based Cognitive Behavioural Therapy (CBT) programme, Perspectives, demonstrates strong efficacy in treating Body Dysmorphic Disorder (BDD). The 12-week randomized controlled trial revealed substantial reductions in BDD severity, enhanced insight, decreased depression, improved quality of life, and better functioning, supported by significant responder rates. Perspectives' accessibility and potential for widespread dissemination make it a promising tool to address the treatment gap in BDD care.
3 Optimizing Smartphone-Delivered Cognitive Behavioural Therapy for Body Dysmorphic Disorder Using Passive Smartphone Data: Initial Insights From an Open Pilot Trial	Weingarden et al. 2020 <sup>9</sup>	United States	Pilot study	n=10 F=8, M=2 Age=20-64 (years) Mean Age (yrs) 27.6 ± 5.66	Telehealth clinician assessments, Brief, frequent interactions	12 weeks	This study's strengths include a clinical sample diagnosed via gold-standard measures, national recruitment for enhanced generalizability, and robust correlation findings between app usage, GPS patterns, and treatment response. Collecting usage frequency and home time data in future smartphone-delivered CBT trials could enhance interventions by leveraging meaningful correlations with treatment outcomes.
4 Predictors of remission from body dysmorphic disorder after internet delivered cognitive behavior therapy: a machine learning approach	Flygare, et al., 2020 <sup>23</sup>	Sweden	Logistic regression analyses	n=94 F=74, M=14 Age: over 18 years Mean Age (yrs) 32.48 ± 11.62	Telehealth clinician assessments, Brief, frequent interactions	12 weeks	This proof-of-concept study suggests that machine learning, like random forests, can help differentiate remitters from non-remitters post-ICBT for BDD, supporting its potential for personalized BDD treatment. Further experimental testing of these predictive models is warranted.
5 Development and Pilot Testing of a Cognitive-Behavioural Therapy Digital Service for Body Dysmorphic Disorder	Wilhelm, et al., 2020 <sup>27</sup>	Boston	RCT	n=10 participants 18 years or older Mean Age (yrs) 27.6 ± 5.66	ICBT	12 weeks	The development and pilot testing of the smartphone-based CBT treatment "Perspectives" for Body Dysmorphic Disorder show promising early results in addressing treatment barriers and improving BDD-related outcomes. The collaborative approach, user engagement, and fast response to treatment underscore its potential. While further research in larger randomized trials is essential, this study presents a novel and accessible avenue for enhancing BDD treatment accessibility and efficacy, offering hope for a more inclusive and effective therapeutic approach.
6 Internet-based, therapist-guided, cognitive-behavioural therapy for body dysmorphic disorder with global eligibility for inclusion: an uncontrolled pilot study	Gentile, et al., 2019 <sup>28</sup>	Sweden	Uncontrolled clinical trial.	n=32 Age= 18 years or older F=24, M=8 Mean Age (yrs) 31.91 ± 7.44	BDD-NET, 12-week treatment, therapist-supported	12 weeks	This pioneering study demonstrates the remarkable potential of fully remote psychological treatment, exemplified by BDD-NET, in transcending geographical barriers and effectively addressing BDD symptoms. The substantial reduction in symptoms, impressive remission rates, and strong therapeutic bonds established remotely underscore the feasibility, safety, and acceptance of this approach across international boundaries. The findings of this research not only offer a promising solution to the global mental health crisis but also underscore the transformative possibilities of technology-driven interventions in advancing mental well-being on a global scale.
7 Therapist guided internet based cognitive behavioural therapy for body dysmorphic disorder: single blind randomised controlled trial	Enander, et al., 2016 <sup>29</sup>	Sweden	RCT	n=94 Age=aged 18 or over F=13, M=79	BDD-NET (n=47) or Supportive therapy (n=47)	12 weeks	BDD-NET, an online CBT program, outperformed supportive therapy in treating body dysmorphic disorder, showing sustained improvements in symptoms, depression, and functioning. Although both groups improved, BDD-NET's potential for widespread evidence-based treatment access was underscored, with study strengths including size and design awareness of limited generalizability to severely affected patients.

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**Table:** Continued from previous page.

Title	Study Reference	Country	Study Type/Design	Sample Characteristics	Interventions	Country	Outcomes
8 Therapist-guided, Internet-based cognitive-behavioural therapy for body dysmorphic disorder (BDD-NET): A feasibility study	Enander, et al., 2014 <sup>30</sup>	Sweden	Uncontrolled clinical trial	n= 23 Age= 21-Adult (years) Mean Age (yrs) 30.3±6.3	therapist-guided, including psychoeducation, functional analysis, cognitive restructuring, exposure and response prevention, and relapse prevention modules.	12 weeks	This study demonstrated the high acceptability and promising efficacy of the therapist-guided ICBT program, BDD-NET, in reducing symptoms and improving the quality of life for moderately ill patients with Body Dysmorphic Disorder. The significant treatment effects and sustained improvements observed, coupled with the accessible and engaging nature of the online platform, suggest that BDD-NET holds potential as a valuable addition to stepped-care approaches, providing evidence-based treatment to a wider range of individuals while addressing barriers such as stigma and logistical constraints. Further research, including randomized controlled trials, is warranted to validate and expand upon these encouraging findings.

RCT: Randomised controlled trial.

by Weingarden et al.<sup>26</sup> resonated with the feasibility aspect, demonstrating the potential of smartphone-delivered CBT to optimise BDD treatment through passive smartphone data. The congruence of these findings with the research done by Aspell et al.<sup>31</sup> who brought up economic evaluation based on an RCT for obsessive-compulsive disorder (OCD), strengthened the notion of cost-effective ICBT. This alignment highlighted the potential of innovative digital interventions, like ICBT, to lower the costs while maintaining or enhancing treatment efficacy.

Further reinforcement was evident in the work of Denecke et al.<sup>32</sup> whose investigation into machine learning applications for individualised CBT in anxiety disorders paralleled exploration in the context of BDD.<sup>26</sup> Additionally, the smartphone-based CBT intervention by Hrynyschyn et al.<sup>33</sup> aligned with the approach of Wilhelm et al.<sup>27</sup> who offered an accessible approach for enhancing treatment effectiveness in anxiety disorders, while resonating with research by Gentile et al.<sup>28</sup> that highlighted ICBT's potential to transcend geographical boundaries in the treatment of depression.

Similarly, in the realm of generalised anxiety disorder (GAD), Gandy et al.<sup>34</sup> showcased the effectiveness of ICBT in reducing anxiety symptoms and improving overall wellbeing. This mirrored the findings of Enander et al.<sup>29</sup> and Fontenelle et al.<sup>35</sup> underscoring the broader applicability of ICBT in diverse mental health conditions, such as GAD and BDD, by providing accessible and efficacious treatment options.

While the current systematic review centred around ICBT's impact on BDD, it found resonance in studies beyond the BDD spectrum. This echoed the broader significance of ICBT, with potential cross-applicability to other mental health domains. The diverse perspectives gained from the amalgamated studies not only deepened the understanding of ICBT's potential in BDD treatment, but also hinted at its role as a transformative tool in the broader landscape of mental health interventions.

The current systematic review had limitations stemming from the relatively limited pool of available studies on ICBT for BDD. The scarcity of research in this specific domain may impact the depth of analysis and the ability to draw robust conclusions. To address this, the review leveraged relevant research from other therapeutic contexts to provide broader insights. The study's findings should be interpreted within the context of the constrained literature, emphasising the need for further dedicated research to comprehensively elucidate the efficacy, cost-effectiveness and feasibility of ICBT for BDD.

Despite the limitations, however, the systematic review underscored the substantial potential of ICBT as an effective, accessible and cost-efficient treatment approach for BDD. The findings highlighted the efficacy of therapist-guided ICBT in symptom-reduction and improved quality of life, supported by cost-effectiveness. The feasibility of smartphone-delivered ICBT and app-based CBT further improved the ease of accessing treatment. These insights offer a transformative avenue for addressing the treatment gap in BDD care, with broader implications for mental health interventions. ICBT's versatility and positive outcomes pave the way for more inclusive, efficient and patient-centred interventions in the field of mental health. Further research, including larger RCTs, is recommended to validate and expand upon the current findings.

**Limitation:** In light of the scarcity of relevant studies available on our systematic review topic, we aimed to primarily include references from the past five years starting from 2019. However, to ensure comprehensiveness and relevance to the current state of research in the field, references from all available studies were included.

## Conclusion

The systematic review revealed a limited but promising body of evidence supporting the efficacy, feasibility and cost-effectiveness of ICBT interventions for individuals with BDD. The interventions consistently led to reductions in

symptom severity, improvements in depression, enhanced insight, and better quality of life. The findings underscored the potential of these interventions to address the treatment gap in BDD care, and offered a more accessible and inclusive therapeutic approach.

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**Author Contribution:**

MJ: Literature review, data extraction, quality assessment and writing.

MS: Search strategy, data synthesis, interpretation and drafting.

AH: Study selection, writing, drafting and synthesis.

AU: Search strategy, data extraction, interpretation and drafting.

SE: Study selection, data synthesis, drafting, discussion synthesis.