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# Internet-based cognitive-behavioral therapy for obsessive-compulsive disorder – a literature review

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**Summary**

Obsessive-compulsive disorder (OCD) is a condition in which the key symptoms are obsessive thoughts and motor compulsions. The prevalence of obsessive-compulsive disorder is about 2–3%.

The issue of the effectiveness of internet-based therapeutic interventions based on cognitive-behavioral therapy (iCBT) for people suffering from obsessive-compulsive disorder (OCD) has not been thoroughly investigated in Poland yet. The aim of this article is to present the results of existing studies on sample iCBT programs for people with OCD and to analyze their effectiveness. In addition to reviewing the conducted research on the therapeutic effectiveness of iCBT, we also presented the results of analyses of the main predictive factors that may influence the effectiveness of internet-based cognitive-behavioral therapy when working with patients with OCD. The following scientific databases were reviewed in search for relevant literature: PubMed/MEDLINE, Web of Science, and EBSCO. The presented study is a review of works published in the last 15 years (from 2010 to 2024). The following key words were used while searching for relevant articles: icbt, internet based cognitive behavioral therapy; internet cognitive behavioral therapy; internet-based intervention ocd; internet-delivered cognitive behavior therapy, and ocd, obsessive compulsive disorder, obsessive-compulsive symptoms. Eventually 38 research papers were selected for further analysis.

The initial research suggests that fully automated iCBT programs, as well as those including therapist support, are promising approaches to working with patients and are an effective way to increase access to treatment for people with OCD.

**Key words:** internet-based cognitive-behavioral therapy (iCBT), obsessive-compulsive disorder (OCD), cognitive-behavioral therapy (CBT)

## Introduction

Obsessive-compulsive disorder is characterized by two main symptoms: obsessions and compulsions. Obsessions are intrusive thoughts, images, or impulses that are unsolicited, unpleasant, unintentional, and cause anxiety and distress, while compul-

sions are compulsive, repetitive actions performed in response to obsessions, aimed at reducing anxiety or preventing distressing events [1, 2]. Obsessions and compulsions cause suffering and significant impairment in various areas of life.

The lifetime prevalence of obsessive-compulsive disorder (OCD) is approximately 2.5% [3]. The average age of OCD onset is 19.5 years, with 25% of people developing it before the age of 14 [1]. In children and adolescents, the prevalence of OCD is 1–3% [4, 5]. The prevalence of OCD in the general population is similar in both sexes [6]. This disorder typically develops gradually, although symptoms may sometimes appear suddenly. Untreated obsessive-compulsive disorder (OCD) has a significant negative impact on the lives and functioning of affected individuals. Between 80% and 100% of individuals with severe OCD symptoms report substantial impairment in family, occupational, and social functioning [6]. Studies indicate that 22–40% of individuals with OCD seeking treatment are unemployed [6]. The access to cognitive-behavioral therapy for patients with obsessive-compulsive disorder in Poland remains limited, especially considering the access to exposure therapy with response prevention, which is recommended as the primary psychological treatment for OCD patients.

In exposure and response prevention therapy (ERP), both real exposures (*in vivo*) and imaginal exposures are used, as well as the technique of reaction prevention. In case of the *in vivo* exposure, the person is exposed to stimuli that trigger obsessive thoughts and the need to perform a compulsive action. In turn, imaginal exposure involves mentally experiencing situations that would be too difficult *in vivo* or that would violate ethical principles. The patient, using imagination, puts himself in situations that arouse fear and the need to perform compulsions, and also imagines the consequences of not taking compulsive actions. Imaginal exposure is also used in the phase preceding the actual exposure, as well as in situations when stimuli cause strong disgust, aversion or when it is impossible to recreate the stimulus triggering obsessive behaviors. Such methods aim to correct the exaggerated assessment of the probability of threat, increase tolerance for emotional discomfort associated with obsessions, and the process of habituation, which may reduce the feeling of anxiety [6, 7]. The technique of response prevention, or preventing the performance of rituals or avoidance behaviors, aims to reduce the reinforcement that occurs as a result of repeating anxiety-reducing actions.

Kowalski et al. [3], in a 2024 meta-analysis review, indicate that cognitive-behavioral therapy (CBT) incorporating exposure and response prevention (ERP) for OCD patients achieved the highest level of scientific evidence reliability. Similar efficacy levels were observed for self-guided computer-based therapy forms and online CBT [3]. Numerous studies and a review of meta-analyses show that one of the most effective strategies for treating obsessive-compulsive disorder is the exposure method with response prevention, as it reduces the severity of compulsions and obsessions [8–14]. A meta-analysis conducted by Foa and Kozak [as cited in: 6] demonstrated that as many as 83% of ERP therapy participants responded positively to the treatment, underscoring the method's effectiveness. Institutions such as the National Institute

for Health and Care Excellence (NICE), the Australian Psychological Society (APS), and the American Psychiatric Association (APA) recommend CBT with ERP as the first-line therapy for both adults and children [3].

Internet-based therapeutic interventions for patients with OCD are based on the assumptions of behavioral therapy, which involves exposure to a stimulus and response prevention (ERP). The internet-based cognitive-behavioral therapy (iCBT) can be divided into three categories based on the degree of therapist involvement in the therapeutic process. Within iCBT, we can distinguish self-guided internet-based treatment programs without therapeutic support, internet-based programs with minimal therapeutic support, and programs using real-time videoconferencing. In this review, we refer to internet-based cognitive-behavioral (iCBT) programs with no or minimal therapist support.

Internet-based cognitive-behavioral (iCBT) programs have the potential to reduce barriers and improve access to evidence-based treatment for people with OCD. Online therapy provides direct and rapid access to psychological care, removing many logistical and financial barriers that often limit access to traditional therapy. With internet-based cognitive-behavioral therapy (iCBT), the waiting time for support can be significantly reduced, resulting in enhanced efficiency for specialized clinics and reduced stress for patients. The implementation of systems such as online cognitive-behavioral therapy tools enables effective large-scale treatment without requiring the patient's physical presence in a clinic, which is particularly valuable for individuals with disabilities or those who prefer anonymous contact.

The development and evaluation of internet-based cognitive-behavioral (iCBT) programs may be a key response to the current limitations in access to health care for people struggling with these disorders [13]. Initial studies indicate that both fully automated and therapist-assisted iCBT therapeutic programs may be a promising form of support for patients [15–21]. The internet-based cognitive-behavioral therapy (iCBT) has shown effectiveness in the treatment of adults and children with obsessive-compulsive disorder by reducing the severity of obsessions and compulsions.

## Examples of iCBTs for patients with obsessive-compulsive disorder

Internet-delivered cognitive-behavioral therapy (iCBT) for patients with obsessive-compulsive disorder is based on exposure and response prevention; it involves regularly providing patients with psychoeducational information about OCD via email or phone, as well as tips on how to cope with intrusive thoughts and compulsions, providing an environment for independent work using educational resources and practical exercises, as well as regular progress monitoring. This therapy shows patients how to identify, confront, and reduce the anxiety associated with obsessive thoughts, and to resist and gradually limit compulsive behavior in a safe online environment [15–21].

One of the programs that can be used to treat obsessive-compulsive disorder is *OCD? Not Me!* program developed by Rees and Anderson [15]. It is based on ex-

posure and response prevention therapy. It is a self-help OCD treatment for young people aged 12–18 years and it is a fully web-based self-guided intervention program. The program involves eight stages based on the principles of the ERP therapy, namely: graded, prolonged, and real-life exposure to distress-provoking internal or external stimuli; encouragement to reduce, change or eliminate anxiety-reducing rituals; and challenging dysfunctional beliefs via the provision of corrective psychoeducational information [15]. Patients learn to understand the functional link between obsessions and compulsions, how to construct exposure exercises and how to construct the exposure hierarchy. The program is designed to respond to user input, with several different interactive elements. For example, ERP exercises are automatically ordered in a hierarchy based on the anxiety rating the participant assigns to them; details of these exercises are carried through the program and displayed to participants at the appropriate time. What is important, participants can view their treatment progress on a virtual map as they complete the program. Participants can monitor the anxiety reduction graphs in real time, as patients assess their anxiety levels during virtual exposure sessions. In addition, the patient receives graphical feedback on their OCD symptoms, based on weekly measurements. It also includes work on dealing with problematic beliefs using cognitive techniques, such as cognitive restructuring and coping with stress and failure.

An additional therapeutic asset is the fact that at each stage of the program, parents and caregivers are also emailed with a link to online resources. These online resources outline information about what the young person is learning in the program, provide tips for supporting the young person in the program, and help parents and caregivers to manage family/caregiver stress. The program consists of eight treatment modules, designed to be worked through at the rate of one module per week [15].

A Swedish program that is based on exposure and response prevention is the OCD-NET platform [16]. This program has been also translated into English and used in a U.S. study [17, 18]. The program consists of 10 modules available online (OCD-NET). It is based on the standard components of cognitive-behavioral therapy, i.e., psychoeducation, self-management, cognitive restructuring, exposure and response prevention (ERP), as well as relapse prevention. Modules 1–4 include psychoeducation, cognitive restructuring, and constructing an individual exposure hierarchy as well as response prevention. Modules 5–10 include daily real-life exposure practice and monitoring of the subjective units of distress scale (SUDS). Please note that the platform includes customized examples of obsessions and compulsions for each subtype of OCD (contamination, checking, symmetry, and forbidden thoughts). iCBT modules include worksheets and homework assignments designed to reinforce the cognitive-behavioral model. All participants are assigned a therapist who provides individualized support throughout treatment by monitoring the progress and providing support by e-mail and phone [16]. The authors also developed a therapeutic manual and an instructional video for therapists to learn how to navigate the platform and the user panel (e-mail system, doing homework, and weekly self-assessment) to manage

the therapeutic process [17]. Therapists participate in weekly group supervision sessions led by an expert ERP supervisor, who monitors their work.

The OCDdrop program is the first to simulate ERP in the online environment. This program is based on computer-aided vicarious exposure (CAVE), which allows individuals to learn the principles of ERP in a relatively non-threatening way, by directing a character around a virtual world. CAVE programs have previously been trialed in spider phobia, agoraphobia, and obsessive-compulsive disorder [19]. OCDdrop utilizes high fidelity color graphics, allows unrestricted movement throughout the virtual 3D world [19]. The online program uses vicarious exposure or symbolic modeling. In this program, OCD patients use virtual words to direct a character in many different situations. They are supposed to identify themselves with the virtual character, which allows them to practice the exposure in a non-threatening way. The goal is to reduce compulsive behavior such as excessive hand washing after touching dirty objects. By doing interactive tasks in a virtual house, garden or public places such as streets, parks or shops, participants learn to control their anxiety and earn reward points. The program consists of three 45-minute treatment sessions over three weeks.

The OCFighter program consists of nine steps and is based on ERP to help people with OCD heal and monitor their progress. The patients are recommended to use the cCBT at least six times over 12 weeks. The psychoeducation is based on *Obsessive Compulsive Disorder: A Self-Help Book* [20]. Psychoeducation explains what OCD is, presents the characteristics of obsessions and compulsions, and discusses the relationship between thoughts, physical sensations, emotions, and behaviors. Additionally, it presents the four principles of exposure and response prevention therapy, suggests methods for setting behavioral goals at work, and methods for countering obsessions and compulsions. Participants receive in-person or telephone support from a therapist. This support includes using the manual, setting goals, assessing risk, completing homework assignments, reviewing progress, and resolving issues related to the therapeutic process [21].

## Objectives

The objective of this review is to assess the prevalence of internet-based cognitive-behavioral therapy (iCBT) in the treatment of obsessive-compulsive disorder (OCD) and to evaluate its efficacy at post-treatment and follow-up stages in children and adults with clinical OCD symptoms, based on the findings of available studies. Particular emphasis is placed on assessing the therapeutic effects of iCBT, focusing on primary OCD symptoms measured using standardized assessment tools, as well as on comorbid anxiety and depression. Furthermore, the article focuses on identifying key predictive factors that may influence the effectiveness of this therapeutic approach in treating patients with OCD.

This review also aims to highlight the potential of iCBT as an effective and widely accessible therapeutic tool for the treatment of OCD, with particular attention given to its comparison with traditional forms of cognitive-behavioral therapy.

## Material and method

The following scientific databases were reviewed in search for relevant literature: PubMed/MEDLINE, Web of Science and EBSCO. The following key words were used while searching for relevant articles: icbt, internet based cognitive behavioral therapy, internet cognitive behavioral therapy, internet-based intervention ocd, internet-delivered cognitive behavior therapy, ocd, obsessive compulsive disorder, obsessive-compulsive symptoms. The key words were searched for in titles and/or abstracts of articles. Based on the obtained results, 456 articles were initially selected. In the first stage, based on the analysis of titles and initial assessment of abstracts, it was determined whether the selected publications were consistent with the thematic scope of this paper. This was followed by a detailed analysis of abstracts. This review included clinical trials conducted on groups of adult and child patients meeting OCD criteria. Studies were required to utilize reliable and valid tools for assessing the level of OCD, such as the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS), Obsessive Compulsive Inventory – Revised (OCI-R), the Dimensional Obsessive-Compulsive Scale (DOCS), Children's Florida Obsessive Compulsive Inventory (C-FOCI), as a measure of treatment outcomes. The studies needed to involve iCBT interventions specifically designed for OCD treatment. Only studies published in English and in peer-reviewed scientific journals were eligible for inclusion. Finally, 38 research articles were qualified for further analysis. The presented study is a review of works published from 2010 to 2024.

## Results

### Efficacy of iCBT in obsessive-compulsive disorder

The clinical studies conducted on adults with OCD will be discussed first, followed by those on children with OCD. One of the first studies on the effectiveness of iCBT, conducted by Andersson et al. [22] in Stockholm in 2011, included 23 adults with OCD participating in a 15-week therapist-supported iCBT program. The study revealed a reduction in OCD symptoms with a large within-group effect size (Cohen's $d$ = 1.56)[1]. The treatment also resulted in significant improvements in the overall functioning and a reduction in depression severity [22].

A study by Wootton et al. [23] evaluated the effectiveness of a new internet-based cognitive-behavioral therapy protocol, *The OCD Program*. This protocol consists of 8 online lessons delivered over 8 weeks. The study group consisted of 22 adults. The participants showed significant reductions in the severity of compulsions and obsessions after the end of therapy and the 3-month follow-up period. After the follow-up period, the Y-BOCS and OCI-R scores improved, Cohen's $d$ effect size measures were 1.28 and 0.60, respectively. The study participants rated the entire program very

[1] Cohen's $d$ – a measure of effect size used to assess the strength of the difference between the means of two groups.

positively, despite the fact that the average time of telephone contact with a therapist was only 86 minutes over the 8 weeks [23].

In subsequent studies, of 56 patients with OCD, Wootton et al. [24] examined the efficacy and acceptability of cognitive-behavioral therapy delivered via bibliotherapy (bCBT) and iCBT within 8 weeks. Participants in the bCBT and iCBT groups completed five lessons and had two remote sessions with a therapist per week. Y-BOCS scores indicated that participants in both groups (bCBT and iCBT) reported a decrease in the severity of obsessions and compulsions from treatment initiation to treatment completion and at the 3-month follow-up. After completing therapy in the bCBT and iCBT groups, the control group received the iCBT protocol with therapist contact limited to once per week. The results of that study suggested that iCBT has a large effect size ($d = 1.57$) among the waiting group [24].

A study conducted by Titov et al. [25] demonstrated that among individuals who completed the assessment and began the 8-week MindSpot treatment course there was a mean reduction in clinical symptoms, including OCD. Data from the first 30 months indicated that participants who completed the OCD course ($n = 69$) achieved large effect sizes in OCD symptom measures at the end of treatment ($d = 0.9$) and at three-month follow-up ($d = 1.1$). Similar results were also observed in measures of stress and anxiety [25].

A study by Lovell et al. [21], conducted on 473 adults in the UK, found that patients who participated in a 12-week therapy using the OCFighter app-based therapy with therapist support (cCBT) as well as those who participated in a self-help program (written CBT materials with limited telephone or face-to-face support) did not experience clinically significant improvement compared with those who remained on the waiting list. The analyses compared OCD symptoms, as measured by the Yale-Brown Obsessive Compulsive Scale – Observer-Rated (Y-BOCS-OR) at 3, 6, and 12 months. cCBT did not yield any significant benefit (aMD = – 0.71; 95% CI – 2.12 to 0.70)[2]. After 12 months, neither the self-help program nor cCBT led to significant differences in reduction of OCD symptoms [21].

A clinical trial of 225 individuals by Wootton et al. (2021) [26] investigated the effectiveness of an online OCD course on the MindSpot platform. The course consisted of 5–6 lessons delivered over 8 weeks. Patients could complete the treatment on their own or with the support of a clinician, with clinical support provided via telephone or online messaging. The study revealed that participants experienced significant reductions in compulsions and obsessions after treatment, but the effect sizes were moderate (Hedges' $g = 0.6$)[3] [26]. The authors assumed that the improvement would be sustained for three months after the treatment. The results indicated that compulsions and obsessions were further reduced at the three-month follow-up [26].

Another study [27], involving 434 individuals participating in the internet-based cognitive-behavioral therapy in the OCD-NET program, which consists of 10 online

[2] aMD – adjusted mean difference.

[3] Hedges' $g$ – a measure of effect size.

modules completed with therapist support, found significant reductions in obsessions and compulsions from baseline to post-treatment, with a large within-group effect size ($d = 1.94$).

The aim of the next study by Wootton et al. [28] was to examine the effectiveness of 8-week self-guided iCBT for people with OCD. The study involved 216 participants. The study revealed a reduction in the severity of compulsions and obsessions, with a medium effect within the study group from the start to the end of treatment ($g = 0.63$), and a large effect within the group from the start to the end of the three-month follow-up ($g = 0.98$) [28].

The aim of a study by Flygare et al. [29] was to evaluate an iCBT intervention for obsessive-compulsive disorder within the *Improving Access to Psychological Therapies* (IAPT) program in the UK. The study included 474 individuals. The participants completed the OCD-NET program, which consists of 10 modules. OCD, depression, anxiety, and level of functioning were measured weekly during treatment. The results of the study indicate that the internet-based intervention was associated with significant reductions in compulsions and obsessions ($d = 1.77$), anxiety ($d = 1.55$), and depression ($d = 0.8$), as well as improvements in functional impairment [29].

Karpov et al. [30] studied patients participating in nationwide iCBT programs run by the Helsinki University Hospital (HUS) in Finland. The program for patients with OCD consists of 10 sessions. Analyses showed that OCD symptoms, measured by the OCI-R, decreased significantly. A statistically significant difference was demonstrated between the mean scores on the OCI-R scale between the first and the last session: 27.7 ($SD = 11.9$) – 14.9 ($SD = 9.6$)[4] [30]. After completing the internet-based therapy, a significant positive correlation was also observed between the scores on the Overall Anxiety Severity and Impairment Scale (OASIS) and the scores on the OCI-R, a scale measuring the severity of obsessions and compulsions [30].

In a study by Luu et al. [31], treatment outcomes were assessed in 309 adults with OCD who enrolled in an online CBT course on the Australian online platform – THIS-WAYUP (with or without the support of a therapist). This program is designed to be completed within 3 months. The study revealed moderate reductions in the severity of compulsions and obsessions ($g = 0.61$) and the severity of depressive symptoms ($g = 0.56$) after treatment completion [31].

A clinical trial by Schröder et al. (2020) [32], involving 128 participants, showed that after the implementation of an 8-module internet-based intervention, there was a significant reduction in the Y-BOCS diagnostic test score in comparison to a control group receiving standard treatment. A larger effect was observed in the reduction of compulsions (Y-BOCS compulsions subscale, $\eta p^2 = 0.06$)[5], than in the reduction of obsessions (Y-BOCS obsessions subscale, $\eta p^2 = 0.03$) [32].

[4] *SD* – standard deviation.

[5] $\eta p^2$ – partial eta-squared: a measure of effect size that determines what percentage of the total variance in the dependent variable is explained by the independent variable.

A study by Li et al. [33] aimed to verify the effectiveness of iCBT for patients with OCD (both self-paced and therapist-led courses) during the first 8 months of the pandemic in Australia and compare the results with the previous year. The study group included 1,343 adults. The levels of compulsions and obsessions as well as severity of depression and psychological distress were measured before and after the online therapy. The study revealed that the severity of compulsions, obsessions, and depressive symptoms was similar in people who underwent the iCBT course during COVID and before the start of the pandemic. It turned out that in both groups (before the pandemic and during COVID), the iCBT course for patients with OCD was associated with a reduction in the severity of compulsions and obsessions (medium effect; $g = 0.65$–$0.68$) and depression (medium effect; $g = 0.56$–$0.65$), as well as a large reduction in psychological distress ($g = 0.77$–$0.83$) [33].

The aim of a study by Kothari et al. [34] was to test whether the guided internet-based cognitive-behavioral therapy (iCBT), a 12-week program, could reduce symptoms of dysfunctional perfectionism and other symptoms, in particular obsessive-compulsive disorder and eating disorders. The study involved 120 people. The results indicate that the internet-based intervention led to significant reductions in OCD symptoms ($d = -0.9$) and eating disorders ($d = -0.6$), and after the therapeutic process, an increase in self-esteem ($d = 0.7$) and a decrease in intolerance of uncertainty ($d = -0.9$) and anxiety were observed [34].

Kyrios et al. [35] conducted a randomized controlled trial comparing the effectiveness of therapist-assisted, 12-modules internet-based cognitive-behavioral therapy (iCBT) with progressive relaxation in the treatment of the obsessive-compulsive disorder. The study included 81 participants from Australia. The results showed that iCBT was more effective in reducing OCD symptoms than progressive relaxation. The mean effect size between groups was $d = 0.55$ [35]. Patients participating in iCBT also achieved significant reductions in depressive symptoms and improvements in social functioning and the quality of life [35].

A clinical study [36] conducted by Göcek Yorulmaz et al. [36] in Turkey on 42 participants, showed that after completing 8 sessions of therapist-assisted iCBT there was a decrease in the severity of compulsions and obsessions, but also a decrease in the severity of depression and an increase in the quality of life, and these results were maintained at the follow-up examination one month after the end of therapy. Analyses indicate significant changes in scores on the Y-BOCS and the DOCS (effect size: $\eta p^2 = 0.62$ and $\eta p^2 = 0.10$) [36].

A study conducted by Kwek et al. [37] in Singapore aimed to verify the effectiveness and acceptability of iCBT among Singaporeans diagnosed with OCD. The study involved 25 individuals who participated in a 10-week iCBT program. The results of the analyses indicate a significant reduction in compulsions and obsessions after the therapeutic process ($d = 2.64$) and one month after the end of treatment ($d = 2.23$) [37]. The iCBT program also resulted in a decrease in depressive and anxiety symptoms, as well as improvement in patients' functioning and quality of life. The program required an average of 129 minutes of therapist support [37].

34 volunteers who met the DSM-IV criteria for OCD participated in a randomized clinical trial conducted by Herbst et al. [38]. The intervention continued for 8-week. The results of the study indicate that obsessive-compulsive symptoms improved significantly in the treatment group compared with the waiting list control group ($d = 0.82$ (Y-BOCS SR) and $d = 0.87$ (OCI-R)). This effect was stable at the 6-month follow-up evaluation [38].

The aim of the next study [39] was to assess the efficacy and cost-effectiveness of the internet-based iCBT with pharmacological treatment compared with CBGT (face-to-face therapy) combined with pharmacological treatment, and conventional medical treatment (TAU). The study was conducted on 99 adults with OCD in China. Patients with OCD were randomly assigned to iCBT, CBGT, and TAU groups for 6 weeks of treatment. After 6 weeks of treatment, the severity of compulsions and obsessions in the three groups significantly decreased ($p < 0.001$)[6], and the differences between groups were not statistically significant [39]. However, the total cost of treatment in the CBGT group was significantly higher than in the iCBT and TAU groups.

The results of a study conducted by Patel et al. [17] in New York on 40 adults with OCD indicate that after using Internet program OCD-NET platform, over a period of 10 weeks, the severity of OCD measured using the Y-BOCS decreased significantly over time ($F = 28.12$; $df = 2, 49$)[7]. Similarly, the severity of depression measured using the Hamilton Depression Rating Scale (HAMD) also decreased significantly ($F = 5.87$; $df = 2, 48$). In addition, the quality of life measured by the questionnaire assessing the quality of professional life, joy, and satisfaction (Q-LES-Q-SF) increased significantly ($F = 12.34$; $df = 2, 48$) [17]. The results of the study indicate that the effectiveness of iCBT was comparable to the traditional methods of treating OCD [15].

A study by Andersson et al. [40] indicated that patients with OCD (101 individuals) participating in a 10-week Internet-based cognitive-behavioral therapy (iCBT) experienced a sudden increase in the severity of obsessive beliefs after receiving a cognitive intervention during the first weeks (weeks 1–3), and that an increase in obsessive beliefs in the initial period of therapy predicted a better therapeutic effect in later treatment. Studies indicate that participation in iCBT was significantly associated with a reduction in OCD symptoms ($B = -1.44$; $t = -6.53$)[8] [40].

A study by Diefenbach et al. [41], conducted on 24 adults, aimed to evaluate the effectiveness of a 17-week internet-based OCFighter program (iGSH) in treating obsessive-compulsive disorder. A statistically significant improvement in the patients' condition was observed after the therapy, with a large treatment effect on OCD symptoms assessed using the Y-BOCS ($d = 0.87$), as well as small to moderate effects on

[6] $p$ – level of statistical significance.

[7] $F$ – $F$-test value: the ratio of between-group variance to within-group variance, used in analysis of variance (ANOVA) to determine whether there are significant differences between groups; $df$ – degrees of freedom.

[8] $B$ – regression coefficient: a coefficient indicating the magnitude and direction of the effect of the independent variable on the dependent variable in a regression model; $t$ – $t$-test statistic: used to assess the significance of differences between means or the significance of coefficients in regression analysis.

depression (*d* = 0.19), functioning (*d* = 0.53), and quality of life (*d* = – 0.18). These results largely persisted during the 6-month follow-up period [41].

A study by Mahoney et al. [42] also confirms the above data, as it showed that 32 individuals who participated in iCBT achieved a significant reduction in OCD symptoms, depression and anxiety over a 10-week period, compared to the group that underwent a standard therapy. Moreover, the achieved benefits remained at a stable level during the 3-month follow-up period after the end of the treatment. The study utilized, among others, the DOCS and the Obsessional Beliefs Questionnaire-20 items (OBQ-20). The clinician-assisted iCBT program was effective in reducing maladaptive beliefs, as well as OCD symptoms, distress, and depression [42], with large within – and between-group effects (>0.78). It is worth emphasizing that iCBT supported by a therapist provides better treatment results [42–44].

The findings of a 2014 study by Wootton et al. [45] involving adults confirm the effectiveness of self-guided iCBT without the participation of a therapist in the treatment of OCD. The analysis of results from two pilot studies (Study 1 – 16 adults; Study 2 – 28 adults) indicates that fully self-guided iCBT therapy (lasting 8 and 10 weeks) for treating OCD symptoms is highly effective. It was observed that Y-BOCS-SR scores significantly decreased in two studies following the completion of therapy (*d* = 1.05 and 1.37) and after a three-month follow-up (*d* = 1.34 and 1.17), achieving large effect sizes [45].

The aim of the next study by Wootton et al. [46] was to evaluate the long-term effectiveness of iCBT. The study was conducted on 28 adults. The course continued for 10 weeks. The effectiveness of iCBT was maintained 12 months after the end of therapeutic interventions. The results indicate a large within-group effect size on the Y-BOCS (*d* = 1.08) [46].

In another study by Wootton et al. (2019) [47], conducted on 140 adults, it was demonstrated that an eight-week self-guided internet-based cognitive-behavioral therapy (iCBT), which did not require contact with a therapist, has demonstrated large effect sizes in reducing OCD symptoms (*d* = 1.05) compared to individuals on the treatment waiting list.

In the study by Andersson et al. [16], participants (*n* = 101) diagnosed with OCD were randomly assigned to either a 10-week iCBT program or a control group that received online supportive therapy. The primary measurement tool was the Y-BOCS. The results indicate that iCBT led to significantly greater improvement compared to the control therapy, with a large effect size (Cohen’s *d* = 1.12) at post-treatment [16].

In subsequent studies, Andersson et al. [48] wanted to examine the long-term effectiveness of the internet-based CBT with therapist support for patients with OCD who either could or did not use an internet-based booster program. The study included 101 participants. Y-BOCS scores were collected at 4, 7, 12, and 24 months after completion of iCBT. In case of all study participants long-term effects were sustained, even after 24 months (Cohen’s *d* = 1.58–2.09) [48]. In contrast, the group receiving the booster program had a greater reduction in OCD symptoms compared to the control group

from the start of the booster program (4 months) to 7 months, as well as significant improvement in overall functioning and fewer relapses [48].

In a study conducted by Seol et al. [49] in South Korea, it was also demonstrated that patients with obsessive-compulsive disorder who participated in an internet-based cognitive-behavioral therapy program called *COT* (www.ocdcbt.com), consisting of 11 sessions, achieved a significant reduction in OCD symptoms ($g = 1.64$).

Matthews et al. [19] conducted a study on 78 adults suffering from OCD, some of whom participated in iCBT in the CAVE program, consisting of three 45-minute therapy sessions, and reported moderate treatment effects ($g = 0.49$).

A study by Jelinek et al. [50] included 151 people with OCD. Some of them were assigned to a group that implemented the iCBT program with a fixed order of modules (iCBTfixed), and the other part to a group where the order of modules was free (iCBTfree+). The patients completed an 8-module program without therapist support. Analyses showed that both iCBT programs significantly reduced the severity of obsessions and compulsions. However, greater improvements were observed in the iCBTfixed group compared with the iCBTfree+ group in terms of OCD severity and the quality of life, with moderate effect sizes ($\eta p^2 = 0.067–0.077$) [50].

A study by Lundström et al. [51] compared the effectiveness of therapist-supported internet-based cognitive-behavioral therapy (iCBT), self-guided iCBT, and traditional face-to-face CBT over a 14-week period. The study included 120 participants with OCD. All three therapeutic groups showed significant improvement from baseline to the end of the study, as well as at the 3-month follow-up, with large effect sizes. The effect size for face-to-face CBT was $d = -1.56$ at the end of treatment and $d = -2.73$ at the 3-month follow-up; for therapist-supported iCBT, the effect sizes were $d = -1.25$ post-treatment and $d = -2.19$ at follow-up; and for self-guided iCBT, the effect sizes were $d = -0.77$ post-treatment and $d = -1.35$ at follow-up [51].

The following section discusses clinical studies on children and adolescents with OCD.

The aim of a study by Vigerland et al. [52], conducted in Sweden, was to test the effectiveness of iCBT for children and adolescents with anxiety disorders and obsessive-compulsive disorder. The study involved 83 children aged 8 to 17 years, who participated in the iCBT program under the supervision of a therapist for 12 weeks. The study found statistically significant improvement in children, i.e., a reduction in the intensity of compulsions and obsessions from the beginning of the study to the end of the three-month follow-up period after the therapy (regression coefficient $B = -0.92$) [52].

A study by Lenhard et al. [53] indicates that after the implementation of a 12-week therapist-assisted iCBT program in 21 participants aged 12 to 17, with OCD, a significant reduction in the severity of OCD symptoms ($d = 2.29$) and related impairment in functioning was observed, as well as a significant reduction in the severity of anxiety. After 6 months, 71% of participants responded well to the treatment, and 76% were in

remission. The average time of clinical support received by patients was approximately 20 minutes per week [53].

A study by Rees et al. [54] on the effectiveness of the eight-stage iCBT program *OCD? Not Me!* in reducing OCD symptoms was conducted on 132 participants. The study utilized the C-FOCI questionnaire, which was used to assess the presence and severity of OCD symptoms in adolescents. The results of the study indicate that after the use of the fully automated iCBT program without the support of a therapist, there was a significant reduction in OCD symptoms ($d$ = 0.64) and a reduction in the severity of OCD ($d$ = 0.89) [54].

As a part of their research, Guzick et al. [55] developed a 12-week family-based internet-based cognitive-behavioral therapy (iCBT) program for adolescents with autism spectrum disorder, aged 7–15 years, with anxiety and/or OCD. Eight families were randomly assigned to receive either weekly email support or weekly email support plus biweekly telephone consultations. After completing the therapy, the participants experienced a 39% reduction in anxiety ($d$ = 1.08) [55].

In a study by Lenhard et al. [56], 67 adolescents with OCD were randomly assigned to a 12-week therapist – and parent-supported iCBT program (BiP OCD) or a waiting list group. At the end of treatment, the iCBT group had significantly lower total scores on the CY-BOCS compared to the waiting list group ($B$ = 4.53; $z$ = 3.98; $p$ <0.001), corresponding to a moderate between-group effect size (Cohen's $d$), equal to 0.69 [56]. The average therapist support time was 17.5 minutes per patient per week.

In a study by Aspvall et al. [57], 152 participants aged 8 to 17 with OCD were included, with 74 receiving iCBT for 16 weeks and the remaining ones receiving traditional CBT. The results indicate that iCBT for children and adolescents showed comparable efficacy in reducing OCD symptoms after six months compared to individual therapy. After six months, the average CY-BOCS score was 11.57 in the iCBT-treated group compared to 10.57 in the traditional CBT group, meeting the predetermined noninferiority margin of 4 points [57].

In another study by Lenhard et al. [58], a qualitative analysis was conducted and interviews were carried out with eight adolescents with OCD who had undergone iCBT using the BiP OCD platform, regarding their experiences of the online intervention. The analysis showed that patients participating in the internet therapy felt that they control over the method, pace, and intensity of the therapy. The internet form of therapy was perceived by the respondents as a safe method of expressing feelings and thoughts. In addition, the participants positively assessed independent work with the materials, which gave them a sense of control over the therapy process. Moreover, the possibility of choosing when to start the therapy process had a positive effect on their motivation and made it easier to focus on important tasks [58].

## Baseline predictors of iCBT effectiveness

An important problem related to the effectiveness of iCBT is the factors that impede its course. Few studies focus on baseline characteristics that can predict the results of iCBT in patients with OCD.

A study by Lenhard et al. [59] involved 61 adolescents who took part in a 12-week *BiP OCD*' program, supported by their parents and led by a therapist. Analyses indicated that the age of patients undergoing iCBT was a significant predictor of therapy efficacy. Responders to treatment had a later average onset of OCD (mean (*M*) = 11.3 years; standard deviation (*SD*) = 1.8) compared to non-responders (*M* = 9.3 years; *SD* = 2.8 years). An earlier onset of OCD was associated with reduced chances of successful iCBT treatment. Additionally, the results suggest that patients with more severe OCD symptoms had poorer outcomes during iCBT treatment. Other variables related to iCBT efficacy included avoidance behaviors and depressive symptoms [59].

A study conducted in Sweden [60] involving 101 patients with OCD who participated in a 10-week internet-based iCBT therapy via the OCD-NET platform indicates that significant predictors of effectiveness and improvement in the patient's condition are higher baseline OCD symptom severity and better cooperation with the therapist. It turns out that the higher the baseline OCD symptom severity, the higher the symptom severity after treatment [60]. Additionally, it is worth mentioning that OCD symptoms associated with disgust were associated with poorer iCBT outcomes and smaller improvement [18].

The aim of a study by Wootton et al. [61], which included 157 participants, was to determine clinical and demographic predictors of OCD symptom severity after completion of iCBT treatment and predictors of clinically significant treatment response. The authors found that higher OCD severity at baseline, younger age, OCD symptoms related to contamination or symmetry, and previous treatment history were significantly associated with higher levels of obsessions and compulsions after treatment in the intention-to-treat (ITT) sample (a group of participants regardless of whether they completed treatment). In the sample of individuals who completed treatment, only higher OCD severity at baseline and higher levels of obsessions related to harm and compulsions involving checking were significantly associated with higher levels of obsessions and compulsions after treatment [61].

An interesting study by Jelinek et al. [50] aimed to check whether the order in which patients completed modules in iCBT programs affects the effectiveness of therapy. The study provides preliminary evidence that fixed content order is associated with better treatment effects.

Among the examined predictor variables, higher baseline OCD severity, avoidance behaviors, and previous face-to-face CBT were significantly associated with poorer internet-based treatment effects [18].

Another study [41], in which patients (*n* = 17) were provided with therapist support in conjunction with the OCFighter application, indicated that among a number

of variables (baseline OCD severity, depression severity, motivation for treatment, executive functioning, and treatment engagement), only willingness to reduce OCD-related avoidance and previous individual CBT significantly correlated with reduction of OCD symptoms.

In 2015, Hedman et al. [62] examined the predictors of iCBT outcomes and found that the severity of health anxiety at the beginning of treatment and adherence to treatment recommendations were associated with the effectiveness of the therapy (iCBT). In addition, anxiety sensitivity, beliefs about the credibility of the treatment, and the quality of the therapeutic relationship were significant predictors of improved health [62]. Research conducted by El Alaoui et al. [63] in 2016 among people with depression indicates that beliefs about the credibility of iCBT are a strong predictor of treatment response.

Research conducted by Seol et al. [49] confirm that the severity of anxiety and depressive symptoms may play a role in the effectiveness of therapy. The study observed that individuals who did not complete iCBT had significantly higher scores on depression (Beck Depression Inventory – BDI)) and anxiety (The Beck Anxiety Inventory – BAI) questionnaires compared to those who completed the therapy.

## Discussion

A review of the literature [16, 17, 19, 22–42, 45–57] suggests that internet-based cognitive-behavioral therapy can be an effective treatment for patients with obsessive-compulsive disorder (OCD), yielding moderate to large therapeutic effects and significantly reducing OCD symptoms. Findings indicate that the benefits of iCBT persisted for 3 to 24 months post-treatment [25, 26, 28, 38, 46, 48], suggesting sustained symptom improvement following the intervention. Notably, implementing a booster program post-iCBT further contributed to greater symptom reduction and fewer relapses [48]. Additionally, iCBT treatment resulted in substantial improvements in overall functioning and reductions in depressive symptoms [17, 22, 29, 31, 33, 35–37, 41], as well as stress and anxiety levels [25, 29, 33, 34, 37]. The reduction in OCD symptoms often coincided with improvements in depression and anxiety, likely due to the overall enhancement in patients' functioning and quality of life. Improvements in one area of mental health, such as OCD symptoms, can produce complementary benefits in depression and anxiety, potentially by alleviating psychological burdens associated with the disorder. Furthermore, post-iCBT patients exhibited increased self-esteem [34], reduced intolerance of uncertainty [34], and enhanced social functioning and quality of life [17, 35–37, 41]. These findings indicate that iCBT is an effective treatment for OCD. Only one study – by Lovell et al. [21] – did not demonstrate significant benefits of computer-based CBT (cCBT), as it observed no substantial differences in OCD symptom reduction.

The above analyses suggest that for the average OCD patient, the benefits of CBT are likely to be the same, regardless of the mode of delivery – in-person or remotely.

However, it is important to note that while online therapy is associated with high levels of patient satisfaction, convenience, and acceptance [64], it also carries risks related to confidentiality and data security, as noted by Stoll et al. [65]. Online platforms must adhere to high security standards, which are not always maintained, potentially leading to breaches of sensitive data [66].

The literature review also highlights that the efficacy of iCBT [15, 39, 42, 51, 57] was comparable to traditional OCD treatments, such as face-to-face cognitive-behavioral group therapy (CBGT) combined with pharmacological treatment and conventional medical treatment (treatment as usual, TAU)). These results align with the analysis by Andersson et al. [67], which confirms that internet-based CBT appears as effective as face-to-face CBT for several mental health disorders, including depression and anxiety disorders. The growing number of studies evaluating iCBT efficacy shows comparable results to those achieved in face-to-face formats. Future studies conducted within the Polish context could be valuable.

Studies comparing the efficacy of various therapeutic techniques for OCD patients indicate that both iCBT and bibliotherapy resulted in reduced obsessive-compulsive symptom severity [24]. However, when comparing iCBT and relaxation techniques, iCBT was more effective in reducing OCD symptoms than progressive relaxation [35].

The literature [42–45, 47, 54] also suggests that, regarding support forms within iCBT for OCD patients, both therapist-supported and self-guided iCBT approaches yield comparable outcomes. In the study conducted by Lundström et al. [51], the outcomes of unsupported internet-based cognitive behavioral therapy (iCBT) were compared with those of iCBT with therapeutic support. The analysis showed that the effect size difference between the groups was small, both at the end of treatment and at the 3-month follow-up. A meta-analysis conducted by Imai et al. [68] indicates that computer-assisted self-help therapy, conducted without therapist involvement, proved significantly more effective than waiting for treatment or receiving a placebo ($SDM = -0.47$)[9]. A previous meta-analysis on self-help therapeutic interventions for OCD found larger effect sizes for self-help with therapist contact ($g = 0.91$) than for self-help without therapist contact ($g = 0.33$) [69]. Other studies show that internet-based iCBT for depression can be effective with or without added support [70]. Similarly, findings by Titov et al. [71] suggest that carefully designed iCBT interventions can significantly reduce symptoms of anxiety and depression – both in the clinician-led or self-guided form.

Limited studies [72, 73] suggest that internet-based medical services in psychotherapy and psychiatry may be enhanced through artificial intelligence (e.g., ChatGPT) in the future. ChatGPT could serve as an auxiliary tool in therapy and psychiatry by gathering information from patients between sessions and providing emotional support [74]. Research suggests that ChatGPT generates responses similar to those provided

[9] *SDM* – standardized mean difference; a measure of effect size that allows comparison of differences between groups in studies.

by therapists [75]. The application of AI-based systems, such as GPT models, in iCBT represents an important area for further research.

The literature review also highlights the tangible benefits of iCBT in reducing therapy costs for OCD patients. iCBT reduced the average time of phone or email contact with a therapist, ranging from 86 minutes [23] to 129 minutes [37] during the program. iCBT requires less direct therapist involvement than traditional face-to-face therapy, thereby reducing therapist labor costs. However, future studies should better define the level of therapist contact and support, as few iCBT studies did not provide consistent or clear descriptions in this regard. Future research should address this issue and analyze the role of therapist engagement in treatment efficacy more thoroughly.

Analyses suggest that the number of sessions in the program also influences the effectiveness of iCBT. Recent iCBT protocols include 8–10 sessions [16, 45, 46], which show significantly higher efficacy than shorter programs like the CAVE program, which consisted of three 45-minute sessions [19]. Shorter iCBT programs (3 sessions) are less effective, as they do not allow patients to fully benefit from the comprehensive range of cognitive and behavioral techniques nor support the gradual skill development necessary to manage mental health issues effectively. More sessions increase exposure, which in turn increases the likelihood of initiating the habituation process – desensitization of the nervous system to anxiety-provoking stimuli, a crucial component of effective therapy. Longer therapies offer a more comprehensive approach, resulting in better therapeutic outcomes.

Additionally, iCBT programs with a fixed module sequence (iCBTfixed) provide greater therapeutic benefits compared to programs where module order is flexible (iCBTfree+) [50]. CBT relies on a logical and thoughtfully constructed sequence of techniques that reinforce each other. For example, introductory techniques such as psychoeducation or thought monitoring prepare the patient for more advanced methods, such as exposure or cognitive restructuring. Jumping between techniques or altering their sequence may disrupt the therapeutic process and reduce therapy effectiveness.

Limited studies [18, 60, 61] indicate that higher initial OCD symptom severity is a significant predictor of iCBT effectiveness. Patients with severe OCD symptoms at treatment onset often have more ingrained thought patterns and compulsive behaviors, making therapy more challenging. These patients often exhibit greater resistance to standard therapeutic techniques. Their symptoms are more complex or co-occur with other mental disorders, which may exacerbate OCD symptoms and hinder a complete response to therapy, resulting in higher symptom levels post-treatment. The results suggest that iCBT is suitable for mild to moderate cases of OCD, whereas in-person CBT may be more appropriate for severe cases.

Studies show that avoidance behaviors [18, 41] were significantly correlated with OCD symptom reduction following iCBT completion. Avoidance behaviors play a key role in sustaining anxiety and preventing the habituation process, which is the natural

extinction of the anxiety response following repeated exposure to anxiety-inducing stimuli. Additionally, research indicates that a critical factor in iCBT effectiveness was a history of previous individual CBT therapy [18, 41].

Furthermore, beliefs about treatment credibility, and the quality of the therapeutic relationship were significant predictors of health improvement [62]. Positive beliefs about therapy can enhance treatment effects by increasing patient engagement and optimism about outcomes. Patients who believe in the effectiveness of therapy are more likely to actively participate in the treatment process, more often adhere to therapeutic recommendations, and are more engaged in therapeutic exercises, positively impacting treatment efficacy and increasing the likelihood of success. Therefore, assessing beliefs and expectations in patients with OCD may be a useful tool for clinicians in identifying individuals who may benefit more or less from iCBT.

Studies indicate that the OCD subtype is a critical predictor of iCBT effectiveness; symptoms related to disgust [18], harm-related obsessions [61], and checking compulsions [61] were associated with poorer iCBT outcomes and less improvement. Harm-related obsessions are highly aversive and unrealistic, perceived as dangerous in themselves, while disgust-related obsessions often involve very strong negative emotions, such as disgust or anxiety. Such stimuli may be particularly challenging to manage in exposure therapy, as they trigger strong avoidance reactions and discomfort. Exposure to disgust-inducing stimuli requires greater effort from the patient, and the exposure itself is harder to accept and tolerate compared to other OCD forms. These types of obsessions may be directly associated with increased obsession duration, higher distress levels, and increased avoidance – all clinically significant for OCD assessment and treatment.

It is worth noting some limitations of iCBT regarding exposures related to highly aversive obsessions. When patients have obsessions about harming loved ones or children, sexual obsessions, or obsessions causing clear aversion or disgust, real-life exposure may not be possible due to ethical considerations, as triggering stimuli are challenging to replicate. In such cases, most effective are imaginal exposures, where the exposure scenario is highly individualized. An essential issue regarding iCBT effectiveness is understanding the interfering factors that impact the therapeutic process. Future research should focus on baseline characteristics that allow prediction of iCBT outcomes for patients with OCD.

## Conclusions

A review of clinical research suggests that both fully automated and therapist-assisted iCBT programs are promising methods for working with patients. Research suggests that iCBT is highly effective for both adults and children and adolescents with OCD. iCBT is effective in reducing OCD symptoms as well as other significant symptoms, such as depression and anxiety. Research suggests that iCBT can be an effective treatment for OCD, offering similar outcomes to traditional treatment ap-

proaches while increasing access and potentially reducing the costs associated with treatment. Internet-based cognitive-behavioral therapy (iCBT), which does not require face-to-face interaction with a therapist, can be an effective treatment for people with OCD who are unable or unwilling to see a mental health professional. This form of therapy is a way to increase access to treatment for young people with OCD. The development and evaluation of the internet-based cognitive-behavioral therapy (iCBT) represents an important solution to the current limitations in access to mental health care for people with the obsessive-compulsive disorder (OCD).

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