Predicting response to transdiagnostic iCBT for emotional disorders from patient and therapist involvement

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1. Introduction

Anxiety and depressive disorders are the most common emotional disorders (Bullis et al., 2019) and represent a global mental health concern due to their alarming prevalence rates and associated consequences in terms of economic costs and emotional suffering (Baxter et al., 2014; Lim et al., 2018). In this scenario, for decades, researchers have claimed that efforts should be made to find more accessible, evidence-based psychotherapies for these disorders (Kazdin, 2015). As a result, more automated and easy-to-disseminate ways to

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deliver psychological treatments have emerged in the past two decades. These treatments include, for example, psychological treatments that are partly or completely delivered through the telephone, the Internet, an app, or a combination of media, although most of the effort has been dedicated to Internet-delivered treatments and, increasingly, app-based interventions (Mohr et al., 2017).

Of the range of Internet-delivered psychological treatments, most of the research has focused on the study of Internet-delivered Cognitive Behavior Therapy (iCBT). A large number of studies have demonstrated the efficacy and effectiveness of iCBT (Andrews et al., 2018; Carlbright et al., 2018). Although the effectiveness of iCBT has been relatively well established, less is known about the characteristics that moderate or predict treatment success or failure in iCBT. The study of predictors and moderators of treatment outcomes plays an important role in psychotherapy research because the same treatment is not likely to work for everyone in the same way (Kazdin, 2014). To date, predictors and moderators of treatment outcomes have generally included patients’ sociodemographic characteristics (e.g., age, sex, educational level) and clinical status (e.g., symptom severity, diagnosis) (El Alaoui et al., 2013; Webb et al., 2017). However, in recent years, and especially with the advent of self-administered interventions, researchers have also shown interest in adherence and compliance parameters as potential predictors and moderators of Internet-delivered psychotherapy. The relationship between treatment adherence and treatment outcomes has been highlighted as a critical aspect in the literature on Internet-delivered interventions (Christensen et al., 2009; Van Ballegooijen et al., 2014). However, findings on this relationship remain unclear due to the heterogeneity in the adherence indicators used in these studies (Donkin et al., 2011; Sieverink et al., 2017). Adherence is often defined as a function of the dropout rate (the number of participants who do not complete the treatment) or treatment compliance (i.e., whether the patient completes the treatment in accordance with the study goals) (Donkin et al., 2013). The importance of treatment compliance in terms of adherence to the prescribed use of the platform (e.g., number of modules completed and use of the review content) is less clear. This is a key issue because finishing an Internet-delivered treatment (i.e., completing all the treatment modules) does not necessarily mean that the patient is actively using the intervention. For instance, research has found low or no usage, even in patients who do not drop out of Internet interventions (Christensen and Mackinnon, 2006). Therefore, a wider range of adherence aspects, such as the patients’ level of activity or engagement with the program, deserve more research attention in iCBT. An advantage of iCBT is that it facilitates data collection (Andersson and Titov, 2014). For instance, Internet-delivered interventions can easily collect objective data related to platform usage, such as the number of logins, the number of modules completed, or the time spent using the program (for a review of measures of usage and adherence, see Donkin et al., 2011). This information may help to analyze whether there is a dose-response relationship between usage and treatment outcomes (Sieverink et al., 2017).

To date, the relationship between platform usage and treatment outcomes has been examined in a number of studies (Manwaring et al., 2008; Enrique et al., 2019; Couper et al., 2016; Donkin et al., 2013; Fuhr et al., 2018). For example, Donkin et al. (2013) found that the number of activities completed per login was associated with outcome improvement. In another study, Enrique et al. (2019) showed that patients who achieved clinically meaningful changes after completing iCBT for depression, in general, were more engaged with the program than those who did not experience these changes (including time spent using the platform, number of logins, percentage of treatment completion, and number of activities performed). In sum, the literature suggests that there is a positive relationship between platform usage and treatment outcomes, and that these metrics might be used to establish a dose-response relationship. For example, Enrique et al. (2019) showed that at least 7 h of platform usage distributed over 15 sessions and the completion of 30 activities during a period of 12 weeks predicted a clinically significant change in patients with emotional disorders.

Another important feature of iCBT that may have a considerable impact on treatment adherence and treatment outcomes is the nature and degree of the guidance provided to participants (Andersson, 2018). It is generally assumed that some guidance in Internet interventions is more beneficial than completely self-guided interventions. It is important to note, however, that some studies have failed to find an association between guidance and outcomes in iCBT research. For example, a study by Mira et al. (2017) did not show significant differences between guided and unguided psychotherapy in an Internet-delivered treatment for mild to moderate depression. Similarly, a study that implemented an iCBT intervention for tinnitus found similar levels of treatment efficacy in patients with and without guidance (Rheker et al., 2015). Nevertheless, most of the available evidence suggests that there is a significant relationship between guidance and treatment outcomes (Baumeister et al., 2014; Palmqvist et al., 2007). Additionally, the amount of guidance in iCBT seems to be associated with the magnitude of treatment outcomes in a linear way, that is, patients who receive more guidance appear to show greater improvement (Richards and Richardson, 2012). Research also suggests that clinician-guided iCBT (i.e., guidance includes the delivery of some clinical content) can be as effective as other types of guided iCBT where a clinical background is not necessary, such as technician-guided iCBT, which may include responding to technical questions or making general recommendations to guide a patient through an Internet-delivered intervention (Andersson et al., 2019; Richards and Richardson, 2012). However, even though the literature has shown the relationship between guidance and treatment outcomes, it is unclear whether there is an optimal amount of guidance that could predict the outcome response to iCBT (e.g., time spent on the phone with a therapist).

In the current study, we conceptualized participants’ level of engagement as patient involvement and treatment guidance as therapist involvement. The aim of the present investigation was to explore the relationship between patient and therapist involvement and the response to an iCBT intervention delivered in Spanish public mental health units (i.e., predicting changes in anxiety and depression symptoms in a sample of individuals with emotional disorders). Patient involvement variables included the number of times they logged into the program and the frequency with which they reviewed the treatment contents. Therapist involvement variables were measured as a function of the time spent during phone calls to provide guidance to the patient. Specifically, we aimed to explore whether the amount of patient involvement (i.e., platform usage) and clinician involvement (i.e., amount of guidance) predicted a clinically significant change in depressive and anxiety symptoms after iCBT. In doing so, we explored whether a recommended cut-off point can be obtained for both patient and therapist involvement. In general terms, the literature suggests that guided iCBT frequently leads to better outcomes than unguided iCBT (Baumeister et al., 2014; Palmqvist et al., 2007). Based on these findings, we expected to find a positive relationship between patient involvement and reductions in symptomatology following iCBT. However, although there is some research that links the degree of guidance with the magnitude of the outcomes (e.g., Richards and Richardson, 2012), the available evidence is still limited, and so the study of this relationship warrants further investigation.

2. Methods

2.1. Design

This study is a secondary analysis of data from a randomized controlled trial (RCT) that compared transdiagnostic iCBT for emotional disorders with treatment as usual in public specialized mental healthcare services (González-Robles et al., 2015). Transdiagnostic iCBT for emotional disorders has been successfully tested in a large number of studies, showing that it is superior to waitlist conditions (Newby et al.,
The intervention was a 12-module, transdiagnostic guided Internet-delivered protocol for the treatment of emotional disorders. The protocol was delivered through a web platform (https://psicologiaytecnologia.com/) designed by our research group. The main core components are derived from the Unified Protocol (Barlow et al., 2011a, 2011b), but it also incorporates treatment strategies from Dialectical Behavioral Therapy (Linehan, 1993). The treatment is focused on teaching the individuals adaptive emotion regulation strategies through the following core components: present-focused emotional awareness, cognitive flexibility, emotional avoidance and emotion-driven behaviors, and exposure procedures (interoceptive and situational) (Modules 4 to 11). Most of the content in modules 4 to 11 was adapted from the Unified Protocol. However, modules 4 and 5 also incorporated Dialectical Behavioral Therapy techniques, such as mindfulness “what skills” (observing, describing, and participating) and “how techniques” (non-judgmentally, one-mindedly, and effectively). The protocol contains three additional modules (Modules 1 to 3). They include an introductory module, a module to promote the patient’s engagement with the therapy (i.e., motivation to change), and a module with psychoeducation about emotions (e.g., nature and role of emotions). The protocol ends with a relapse prevention module (Module 12). The 12 treatment modules are preceded by a “Welcome module” with general information about the protocol

| Module | Objective |
|--------|-----------|
| Module 1. Introduction to treatment | Provides a framework about the role of emotion regulation in emotional disorders. |
| Module 2. Motivation for change and goal setting | Analyzes pros and cons of changing, emphasizes the importance of being motivated, and helps to establish significant life goals. |
| Module 3. Understanding the role of emotions | Provides psychoeducation about the roles and functions of emotions and trains the patient to track the three components of emotional experiences. |
| Module 4. Non-judgmental emotional awareness and acceptance of emotional experiences | Teaches the patient non-judgmental emotional awareness (i.e., mindfulness “what” and “how” skills) and the acceptance of emotional experiences. |
| Module 5. Practicing present-focused awareness | Continues to practice the acceptance of emotional experiences and increase awareness of physical sensations, thoughts, emotions, and daily activities. |
| Module 6. Learning to be flexible | Focuses on identifying maladaptive ways of thinking (i.e., thinking traps). |
| Module 7. Practicing cognitive flexibility | Teaches patients strategies to modify thinking traps (i.e., cognitive reappraisal). Provides information about intrusive thoughts and how to deal with them. |
| Module 8. Emotional avoidance | Teaches patients to identify the emotion avoidance strategies that contribute to the maintenance of their emotional problems. |
| Module 9. Emotion-Driven Behaviors | Teaches the concept of emotion-driven behaviors and how to replace them with more adaptive behaviors. |
| Module 10. Accepting and facing physical sensations | Teaches the role of physical sensations in the emotional response and provides training in interoceptive exposure. Builds exposure hierarchies to help patients begin to face situation-elicited avoided emotions. |
| Module 11. Facing emotions in the contexts in which they occur | Reviews what patients have learned throughout the program. Schedules future practice of the learned strategies and teaches patients how to identify and cope with future high-risk situations. |
| Module 12. Relapse prevention | |
protocol and its goals, as well as recommendations for how to use the program. The objectives of the modules are described in Table 1. Regarding the program structure, the modules are presented sequentially (i.e., a module cannot be accessed until the previous one has been completed), and participants are encouraged to review the modules as often as they wish. Fig. 1 displays a screenshot of this functionality.

2.3.1. Guidance

All the participants received therapist and automated guidance. Therapist guidance included one weekly brief phone call with a maximum duration of 10 min. These weekly phone calls were previously scheduled with the patients and were conducted by two of the researchers involved in the trial. Phone calls were not intended to address clinical content. The objectives of these phone calls were: 1) to explore difficulties or concerns the participants might have encountered while using the treatment and help them to solve these problems, 2) to remind them to review the treatment contents as often as necessary, 3) to emphasize the importance of completing the homework tasks, 4) to encourage the participants to keep using the protocol, as well as to reinforce them for engaging in the treatment, and 5) to recommend that they complete one module per week.

Automated guidance consisted of a) 2 weekly brief text messages and b) guidance delivered throughout the treatment modules. Automated guidance included: a) reminders about the importance of reviewing the contents as needed, b) messages encouraging the user to complete the proposed activities in each module, c) messages with positive reinforcement after completing a module and when starting a new one, and d) messages to encourage the user to complete the treatment at an adequate pace (one module per week).

For the purpose of this study, and because all the patients received the same amount of automated support, we only included therapist support (i.e., number of phone calls and their duration) in the analyses.

2.4. Measures

2.4.1. Primary outcome measures

The Beck Anxiety Inventory (BAI) (Beck and Steer, 1993; Magán et al., 2008) is a 21-item self-report questionnaire that assesses anxiety. Scores can range from 0 to 63 points. Patients are asked to report on the severity of their symptoms during the previous week on a 4-point Likert scale (from not at all to severely). The BAI has shown good to excellent internal consistency in previous validation studies (alpha between 0.85 and 0.94), as well as convergent and divergent validity. The Spanish version has demonstrated excellent internal consistency (α = 0.93; Magán et al., 2008). The Cronbach’s α for the BAI in this study was 0.93.

The Beck Depression Inventory, second edition (BDI-II) (Beck et al., 1990; Sanz et al., 2005) is one of the most widely used instruments for the assessment of depressive symptoms. The scale contains 21 items about the different symptoms characterized in major depressive disorders. Scores are added together to obtain a total score that can range between 0 and 63. The BDI-II has demonstrated good internal consistency in previous research (α = 0.76–0.95). The Spanish version showed good internal consistency for both the general and clinical populations (alphas between 0.87 and 0.89; Sanz et al., 2005). The Cronbach’s α for the BDI-II in this study was 0.91.

2.4.2. Patient involvement (platform usage) metrics from the baseline assessment to post-treatment

Number of sessions: This metric was established to register the times the patient logged in or accessed the treatment platform. When a specific session had inactivity periods longer than 60 min, the next moment of activity was counted as a new login.

Number of reviews: This metric included the number of times the patients reviewed the modules, that is, the number of times they reopened a given module after the first login. Therefore, this count did not include the first time the patient accessed each module.

Fig. 1. Screenshot of the treatment platform. Patients have the option to review (“repasar”) the modules.
2.4.3. Therapist involvement (guidance)

All patients received a weekly phone call with a maximum duration of 10 min. Because some of the scheduled phone calls were unanswered, the analysis of therapist involvement included a) the number of phone calls that were successfully completed and b) the total duration of all the calls received during the treatment.

2.5. Analytic procedures

First, the sample characteristics were described (means and standard deviations of study variables). Next, the bivariate associations between usage (logins and reviews made), guidance (number and duration of phone calls), and clinical variables (baseline depression and anxiety and their change scores after treatment) were calculated by means of Pearson correlations. To calculate changes in depression and anxiety to include them in the Pearson correlations, we subtracted post scores from pre scores (e.g., change in depression = post-treatment depression – pretreatment depression). Therefore, negative scores reflect a reduction in symptomatology (i.e., improvement).

Finally, two types of analyses were performed to explore whether clinically significant changes (CSC) in outcomes were predicted by patient platform usage and guidance. First, a logistic regression was computed to explore the extent to which more practice and guidance helped to classify those who presented a clinically significant reduction in symptomatology (depression and anxiety). Second, a receiver operating characteristic (ROC) curve was calculated to obtain sensitivity and specificity scores that would reveal optimal levels of practice and guidance (cut-offs).

A clinically significant change in outcomes was considered to occur when a person moved at least two standard deviations from the mean of the group (Jacobson et al., 1984). Because the sample included patients presenting quite diverse symptom severity (i.e., mild, moderate, or severe), for each outcome, the analysis of the clinically significant change was carried out with each of the three subgroups according to symptomatology severity. For example, for depression, cut-offs have been proposed to be 14–19 for mild depression, 20–28 for moderate depression, and above 28 for severe depression (Sanz et al., 2014). For each of these subgroups, a separate mean and standard deviation was calculated, and these values were used to decide whether a patient in that subgroup presented a clinically significant change. The same procedure was followed for anxiety scores using the recommended cut-offs for mild (between 8 and 15), moderate (between 16 and 25), and severe (above 26) anxiety (Sanz et al., 2012).

All analyses were performed with SPSS version 22 (IBM Corp, 2013). Alpha levels were set at 0.01 to reduce the risk of unimportant effects and false positives when conducting multiple comparisons.

3. Results

3.1. Sample characteristics

Table 2 shows the baseline sociodemographic and clinical characteristics of the sample.

3.2. Patient and therapist involvement results (platform usage and guidance)

In terms of practice, study participants logged into the treatment and accessed the review content a median of 28 (mean = 30.4, SD = 26.0) and 2 times (mean = 12.6, SD = 18.6), respectively. Regarding guidance, participants received a median of 8 calls (mean = 7.2, SD = 4.1). The phone calls to the participants had a total median duration of 48.9 min (mean = 37.2, SD = 41.0). Table 3 shows the bivariate association between platform usage (logins and reviews of content), guidance variables (minutes during phone calls), and the clinical characteristics of the sample (baseline depressive and anxiety symptoms and changes in both outcomes after the treatment). The Pearson correlations revealed a significant and positive relationship between the number of phone calls received and the number of times participants accessed the platform (r = 0.61; p < .001) and reviewed the content (r = 0.46; p < .001). Similarly, a significant and positive relationship was observed between the time spent during the phone calls and the number of times patients logged into the platform (r = 0.61, p < .001) and reviewed the modules during the treatment (r = 0.60; p < .001). There was also a significant relationship between the number of phone calls and their total duration at the end of the study (r = 0.80; p < .001), as well as between the number of logins to the platform and the number of times they reviewed the content (r = 0.84, p < .001).

Regarding clinical variables, patients who were more depressed at baseline were more likely to improve on depression after completing the treatment (r = −0.37, p = .003). The same relationship was found between baseline anxiety and anxiety improvement at post-treatment (r = −0.48, p < .001).

Neither baseline levels of depression and anxiety nor changes in these outcomes after treatment were linearly associated with platform usage and guidance variables (all p > .01). Establishing a less restrictive alpha level, the results would show that patients who were more depressed at baseline received more guidance, that is, longer phone calls

Table 2
Baseline and sociodemographic characteristics of the sample (N = 63).

| Age (years), mean (SD) | 38.64 (10.61) |
|------------------------|--------------|
| Sex, n (%)             | Female       |
|                        | Male         |
| Marital status, n (%)  | Single       |
|                        | Married/partnered |
|                        | Divorced/widowed |
| Education, n (%)       | Basic studies |
|                        | Secondary studies |
|                        | University studies |
| Occupation, n (%)      | Student      |
|                        | Housekeeper  |
|                        | Employed     |
|                        | Unemployed   |
| Monthly income (€), n (%) | None  |
| Principal diagnosis, n (%) | GAD  |
|                        | AG           |
|                        | PD           |
|                        | SAD          |
|                        | OCD          |
|                        | MDD          |
|                        | DD           |
| Comorbid diagnoses, n  | Anxiety NOS  |
| Medication, n (%)      | Alcohol abuse |

GAD: Generalized anxiety disorder; PD: Panic disorder; AG: Agoraphobia; SAD: Social anxiety disorder; OCD: Obsessive-compulsive disorder; MDD: Major depressive disorder; DD: Dysthymic disorder; NOS: Not otherwise specified.
Involvement was evaluated as the number of phone calls with a therapist (n do not show that the amount of patient and therapist involvement pre-
and how often they reviewed the treatment contents. Therapist
value of platform usage and guidance had an adequate sensitivity and
none of the predictions had sufficient classification capacity (all areas
under the curve were below 0.5 and non-significant). Therefore, no

Table 5
Receiver operating characteristic curve analyses.

|                     | CSC in depressive symptoms | CSC in anxiety symptoms |
|---------------------|----------------------------|-------------------------|
|                     | AUC P                      | AUC P                   |
| Logins              | 0.45 0.597                 | 0.37 0.119              |
| Reviews             | 0.44 0.485                 | 0.41 0.284              |
| Number calls        | 0.47 0.768                 | 0.49 0.914              |
| Duration calls      | 0.41 0.322                 | 0.42 0.354              |

CSC: clinically significant change; AUC: area under the curve.

and the number of module reviews, does not predict the patients'
response to transdiagnostic iCBT. Our results differ from other studies
that found a relationship between platform usage and outcomes in iCBT
(e.g., Manwaring et al., 2008; Enrique et al., 2019; Donkin et al., 2013;
Fuhr et al., 2018). However, it is important to note that the relationship
between usage and outcomes in the existing literature is not consistent
across measures, and it is related to the type of usage metric selected. For
instance, Manwaring et al. (2008) found that the amount of platform
usage predicted specific eating-disorder symptom improvement in a
sample with eating disorders but no other related clinical symptoms. In
another study that tested Internet-delivered psychotherapy for depres-
sion, the association between various usage metrics and treatment out-
comes was analyzed. The results showed that only one usage metric was
associated with the treatment outcome (i.e., the number of activities
completed per login), whereas other measures, such as the number of
logins or the number of activities completed, were not related to
symptom reduction (Donkin et al., 2013). In our study, the fact that we
failed to find a significant relationship between usage and symptom
improvement might be explained by the metrics selected in the present
investigation. For example, it is possible that the number of logins and
reviews does not provide information about what the participants do
when they log into the platform or review the treatment modules.
Specifically, a patient might login quite frequently, but the number of
logins per se might not provide information about how the patient is
actually using the treatment (e.g., how much the patient is using the
treatment strategies in real contexts or whether the patient performs
the suggested activities). In other words, the patient might be using the
program passively rather than actively (Enrique et al., 2019).

With regard to guidance, no relationship was observed between the
amount of guidance received (number and duration of phone calls) and
the treatment outcome. To date, the iCBT literature has generally been
interested in comparing therapy with and without therapist guidance,
general supporting the idea that some therapist guidance is preferable
(Aardoom et al., 2016; Baumeister et al., 2014; Palmqvist et al., 2007).
What is less clear is how much guidance is necessary or optimal and
which sources of guidance are preferable (e.g., phone calls, emails, text
messages, etc.). This is important in terms of costs (e.g., texts can be
more automatized and require less therapist involvement). Our results
do not support the idea that certain levels of support are better than
others, which suggests that the amount of therapist involvement will
require some flexibility depending on the patient’s response to iCBT.
An interesting finding was that the patients’ severity before treat-
ment onset did not predict prospective patient and therapist involve-
ment. One might assume that patients experiencing more severe
symptomatology would require more guidance (i.e., more frequent and
longer phone calls) and have to check the treatment content more often
(more logins into the platform and more reviews of the content).
Interestingly, however, the severity of anxiety and depressive symptoms
was unrelated to patient and clinical involvement, which suggests that
additional factors should be investigated to explore individual differ-
ences in patient and therapist involvement in iCBT. In terms of patient
involvement, several factors might influence platform usage, such as
personality characteristics (e.g., neuroticism) and contextual factors (e.g., previous
experience with Internet-delivered treatments) (Wallin et al., 2016)
could predict the amount of clinician involvement patients need. How-
ever, it is worth to note that, when a less restrictive alpha was considered
(i.e., \( p < .05 \)), baseline depression was significantly associated with
therapist involvement (longer phone calls). Taken together, these find-
ings suggest that the extent to which these and other variables predict
patient and therapist involvement in iCBT requires further investigation.
Along the same lines, the lack of relationship between guidance and
outcomes in this study might be partly accounted for by the bond be-
tween the online platform and the patient, in other words, the partici-
pants’ therapeutic alliance with the online program (Herrero et al.,
2020). Research has shown that, as in face-to-face psychotherapy, pa-
tients in Internet-delivered interventions are able to develop a bond with
the online program (Berry et al., 2018), and this relationship is posi-
tively associated with treatment outcomes and satisfaction with the
treatment (Gómez-Penedo et al., 2020; Pihlaja et al., 2018). Thus, it
is important to note that, in the current study, guidance (phone calls) did
not include clinical content. In other words, phone calls were focused on
aspects such as resolving specific questions about the use of the plat-
form, reminders about the importance of practicing, positive rein-
forcement for completing the modules, and so on, aspects that were also
present in the treatment modules as “automated support” (see the
Intervention section). It is possible that participants in this study had
high levels of therapeutic alliance with the online program (i.e., patients
may have benefited from automated guidance) and, therefore, that the
specific type of therapist guidance provided in this study did not add
anything to the intervention in terms of symptom improvement. More-
over, because both therapist and automated guidance had similar con-
tent, the specific influence of each guidance modality (therapist vs.
automated) on treatment outcomes could not be ascertained. In any
case, the literature suggests that the presence of some type of human
contact in an Internet-delivered treatment seems necessary for some
patients to foster their participation and adherence (Fernández-Alvarez
et al., 2017; Schueller et al., 2017), which are core aspects in research on
Internet-delivered interventions.
In the present study, the relationship between patient involvement
(e.g., platform usage) and therapist involvement (i.e., guidance) was
also investigated. On the one hand, the number of sessions (logins) was
strongly associated with the number of reviews. That is, patients who
used the program more frequently also tended to review the treatment
modules more often. On the other hand, time spent on the phone was
associated with higher levels of platform usage (number of logins and
number of module reviews). At a glance, therapist involvement seems to
increase the levels of patient involvement with the platform. That is,
patients who spent more time on the phone may have presented greater
platform usage because they received more positive reinforcement and
had more reminders about the importance of practicing. Another pos-
sibility is that this relationship reflects the different level of engagement
shown by the participants. Specifically, it is possible that patients with
greater availability or interest in using the platform were also more
willing to spend time on the phone. In any case, we only measured the
number of logins and the number of module reviews, but we did not
collect data about the specific behaviors that are assumed to cause
clinical change. These might include, for example, to what degree par-
ticipants understand the different components or whether participants
actively and correctly completed the proposed strategies (e.g., exposure
procedures, cognitive flexibility techniques, and so on). Given the un-
deniable importance of these variables, future research should strive to
integrate assessment strategies (e.g., Ecological Momentary Assessment,
EMA) (Colombo et al., 2020) to analyze how these aspects are related to
treatment outcomes in iCBT. For example, specific EMAs might include
questions about whether a specific treatment strategy (e.g., an inter-
ceptive exposure task) has been practiced at a certain moment, or how
many times specific techniques have been practiced throughout the day.
Similarly, Ecological Momentary Interventions (EMI) (Heron and
Smyth, 2010) might be used to monitor whether the homework is
actively carried out by participants (e.g., a notification in the mobile
phone that encourages the patients to do the homework and asks them to
provide data about their emotions and thoughts after an exposure task).
Our study has limitations. First and foremost, some relevant metrics,
such as the time spent using the different modules or the time spent
reviewing the modules, could not be analyzed. This limitation was due
to technical characteristics of the treatment platform rather than to
a study design flaw. Second, because only completers were included in the
analyses, the sample size was small, which limits the generalizability of
the results. Third, analyses could not be separated according to the
diagnosis because of sample size limitations and frequent comorbidities.
Finally, the design of the current study does not allow separating the
specific effects of therapist guidance vs. automated guidance in treat-
ment outcomes.

To conclude, our study found no relationship between patient
involvement (i.e., platform usage) and therapist involvement (i.e.,
guidance) in predicting the response to transdiagnostic iCBT for
reducing depressive and anxiety symptoms in patients with emotional
disorders. Thus, our findings do not support the idea that patients should
be given specific recommendations in terms of platform usage, at least in
terms of the variables analyzed in this study (i.e., number of logins and
number of reviews of the contents). Moreover, therapist support should
be provided flexibly depending on the patient and the situation. These
results shed new light on the role of patient and therapist involvement in
iCBT. Although patient and therapist involvement may be important,
as reported in the literature, specific cut-offs might be difficult to establish
(or unnecessary), at least for some usage metrics. More research is
warranted to explore this specific aspect. Moreover, our findings suggest
that therapist involvement is important for patient involvement in iCBT.
Based on our findings, we believe that the interrelationship between the
therapist and patient involvement variables, as well as the role of this
relationship in treatment outcomes, is an important area of research that
should be further explored. We encourage researchers to replicate the
current study findings and include additional patient and therapist
involvement metrics to provide a more comprehensive view of patient
and therapist factors that predict response to iCBT, which is crucial for
enhancing the effectiveness of these interventions. Finally, we suggest
that future studies move beyond the traditional assessment and treat-
ment approaches by integrating EMAs and EMIs to examine the rela-
tionship between therapist and patient involvement factors and
outcomes in Internet-delivered interventions.

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References

Aarood, J.J., Dingemans, A.E., Spinholven, P., van Ginkel, J.R., de Roosij, M., van Furth, E.F., 2016. Web-based fully automated self-help with different levels of therapist support for individuals with eating disorder symptoms: a randomized controlled trial. J. Med. Internet Res. 18 (6), e159.

Andrews, G., 2018. Internet interventions: past, present and future. Internet Interv. 12, 181–188.

Anderson, G., Titov, N., 2014. Advantages and limitations of internet-based interventions for common mental disorders. World Psychiatry 13 (1), 4–11.

Andrews, G., Titov, N., Deas, B.P., Rovental, A., Carlbring, P., 2019. Internet-delivered psychological treatments: from innovation to implementation. World Psychiatry 18 (1), 20–28.

Andrews, G., Basu, A., Cuijpers, P., Craske, M.G., McEvoy, P., English, C.L., Newby, J.M., 2018. Computer therapy for the anxiety and depression disorders is effective, acceptable and practical health care: an updated meta-analysis. J. Anxiety Disorder. 55, 70–78.

Arnold, C., Villagonzalo, K.A., Meyer, D., Farhall, J., Foley, F., Kyrios, M., Thomas, N., Baxter, A.J., Scott, K.M., Ferrari, A.J., Norman, R.E., Vos, T., Whiteford, H.A., 2014. A systematic review of the impact of adherence on the effectiveness of e-therapies. J. Med. Internet Res. 16 (9), e150.

Berger, T., 2020. The association between adherence and outcome in an Internet intervention for depression. J. Affect. Disord. 266, 105–109.

Gómez-Penedo, J.M., Balm, A.M., Grosse Holtforth, M., Hohagen, F., Krieger, T., Berger, T., 2020. The association of therapeutic alliance with long-term outcome in a guided internet intervention for depression: secondary analysis from a randomized controlled trial. J. Med. Internet Res. 22 (3), e1824.

González-Robles, A., García-Palacios, A., Baños, R., Riera, A., Llorca, G., Traver, F., Botella, C., 2015. Effectiveness of a transdiagnostic internet-based protocol for the treatment of emotional disorders versus treatment as usual in specialized care: study protocol for a randomized controlled trial. Trials 16, 488.

González-Robles, A., Díaz-García, A., García-Palacios, A., Roca, P., Ramos-Quiróga, J.A., Botella, C., 2020. Effectiveness of a transdiagnostic guided internet-delivered protocol for treatment of emotional disorders versus treatment as usual in specialized care: randomized controlled trial. J. Med. Internet Res. 22 (7), e1820.

Heron, K.E., Smyth, J.M., 2010. Ecological momentary interventions: incorporating mobile technology into psychosocial and health behaviour treatments. Br. J. Health Psychol. 15 (1), 1–39.

Herrero, R., Vara, M., Miragall, M., Botella, C., García-Palacios, A., Riper, H., Baños, R. M., 2020. Working alliance inventory for online interventions—short form (Wai-sf): the role of the therapeutic alliance between patient and online program in therapeutic outcomes. Int. J. Environ. Res. Public Health 17 (17), 6169.

IBM Corp. 2013. IBM SPSS Statistics for Windows, Version 22.0. (No. 22). IBM Corp.

Jacobson, N.S., Follette, W.C., Revenstorf, D., 1984. Psychotherapy outcome research: methods for reporting variability and evaluating clinical significance. Behav. Ther. 15 (4), 336–352.

Kazdin, A.E., 2014. Moderators, mediators and mechanisms of change in psychotherapy. In: Lutz, W., Knox, S. (Eds.), Explorations in Mental Health. Quantitative and Qualitative Methods in Psychotherapy Research. Routledge/Taylor & Francis Group, New York, NY, US.

Kazdin, A.E., 2015. Technology-based interventions and reducing the burdens of mental illness: perspectives and comments on the special series. Cogn. Behav. Pract. 22 (3), 359–366.

Lindefors, N., 2013. Predictors and moderators of internet-and group-based psychological treatment of patients with eating-related disorders: an updated systematic review and meta-analysis. Cogn. Behav. Ther. 42 (4), 277–309.

Niva del Inventario para la Depresión en la Comunidad de Madrid (IVAD-CM): manual de aplicación y desarrollo. Gómez-Penedo, J.M., Botella, C., 2015. Manual del Inventario para la Depresión en la Comunidad de Madrid (IVAD-CM): manual de aplicación y desarrollo. Gómez-Penedo, J.M., Botella, C., 2015.

Meyer, D., Johnson, C.C., 2010. Engagement and retention: measuring breadth and depth of participant use of an online intervention. J. Med. Internet Res. 12 (4), e52.

Molinero, J., 2015.DSM: DSM-5-R: The New Diagnostic and Statistical Manual of Mental Disorders. American Psychiatric Association, Washington, DC.

Newby, J.M., 2010. Engaging patients to benefit from the internet: the role of online interventions in mental health care. J. Med. Internet Res. 12 (4), e52.

Newby, J.M., 2011. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2012. Engaging patients to benefit from the internet: the role of online interventions in mental health care. J. Med. Internet Res. 12 (4), e52.

Newby, J.M., 2013. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2014. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2015. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2016. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2017. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2018. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2019. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2020. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2021. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2022. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2023. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2024. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2025. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2026. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2027. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2028. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2029. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2030. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2031. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2032. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.

Newby, J.M., 2033. Transdiagnostic computerised cognitive therapy for depression and anxiety: a systematic review and meta-analysis. J. Affect. Disord. 132 (3), 639–653.
Van Ballegooijen, W., Cuijpers, P., van Straten, A., Karyotaki, E., Andersson, G., Smit, J. H., Riper, H., 2014. Adherence to internet-based and face-to-face cognitive behavioural therapy for depression: a meta-analysis. PLoS One 9 (7), e100674.

Wallin, E.E.K., Mattsson, S., Olsson, E.M.G., 2016. The preference for internet-based psychological interventions by individuals without past or current use of mental health treatment delivered online: a survey study with mixed-methods analysis. JMIR Ment. Health 3 (2), e25.

Webb, C.A., Rosso, I.M., Rauch, S.L., 2017. Internet-based cognitive behavioral therapy for depression: current progress & future directions. Harv. Rev. Psychiatry 25 (3), 114–122.