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A Literature Review of Continuous User Engagement Towards Computerized Cognitive Behavioral Therapy (cCBT)

Tinjauan Literatur Keterlibatan Berterusan Pengguna Terhadap Terapi Tingkah Laku Kognitif Berkomputer (cCBT)

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ABSTRACT

Cognitive Behavioral Therapy (CBT) is an essential approach in face-to-face sessions between patients and counsellors to address emotional and physical health. With the advancement of information technology, innovative forms of therapy, such as Computerized Cognitive Behavioral Therapy (cCBT), have been introduced. This study aimed to analyse user engagement with cCBT in healthcare, particularly mental health. Through the screening process, n = 14 quality articles were identified and included for review, as depicted in the PRISMA flow chart. A comprehensive study is needed to bridge the knowledge gap in this field. In this review, relevant literature was reviewed from eight major international databases, including PubMed/Medline, CINAHL, ERIC (EBSCO), Cochrane Library, Web of Science, Scopus, Association of Computing Machinery, and IEEE/IEE Electronic Library, focusing on user engagement in cCBT. The review found several key factors significantly affecting user engagement in cCBT, including access, attitude, remote delivery, and effectiveness and engagement. In addition, it was found that individual differences also influenced the continuity and effectiveness of user engagement in this therapy. The systematic review plays an important role in synthesizing the existing literature on user engagement in cCBT. It also critically explains how active user engagement can contribute to improved mental health outcomes in this technology-based intervention.

Keywords: cognitive behavioral therapy, psychotherapy, computer-assisted therapy, user-computer interface, self care

ABSTRAK

Terapi Tingkah Laku Kognitif (CBT) merupakan pendekatan penting dalam sesi bersemuka antara pesakit dan kaunselor untuk menangani kesihatan emosi dan fizikal. Dengan kemajuan teknologi maklumat, bentuk terapi inovatif, seperti Terapi Tingkah Laku Kognitif Berkomputer (cCBT), telah diperkenalkan. Kajian ini bertujuan untuk menganalisis penglibatan pengguna dengan cCBT dalam penjagaan kesihatan, terutamanya kesihatan mental. Melalui proses saringan, n = 14 artikel berkualiti telah dikenal pasti dan dimasukkan untuk semakan, seperti yang digambarkan dalam carta alir PRISMA. Satu kajian komprehensif diperlukan untuk merapatkan jurang pengetahuan dalam bidang ini. Dalam ulasan ini, literatur yang berkaitan telah dikaji semula daripada lapan pangkalan data antarabangsa utama, termasuk PubMed/Medline, CINAHL, ERIC (EBSCO), Perpustakaan Cochrane, Web of Science, Scopus, Association of Computing Machinery, dan Perpustakaan Elektronik IEEE/IEE, yang memberi tumpuan kepada penglibatan pengguna dalam cCBT. Kajian tersebut mendapati beberapa faktor utama yang mempengaruhi penglibatan pengguna dalam cCBT dengan ketara, termasuk akses, sikap, penghantaran jarak jauh, dan keberkesanan serta penglibatan. Di samping itu, didapati bahawa perbezaan individu juga mempengaruhi kesinambungan dan keberkesanan penglibatan pengguna dalam terapi ini. Kajian sistematik memainkan peranan penting dalam mensintesis literatur sedia ada tentang penglibatan pengguna dalam cCBT. Ia juga menjelaskan secara kritis bagaimana penglibatan pengguna yang aktif dapat menyumbang kepada peningkatan hasil kesihatan mental dalam intervensi berasaskan teknologi ini.

Kata kunci**:** cCBT, CBT, terapi berkomputer, keterlibatan berterusan, keterlibatan pengguna

INTRODUCTION

For more than two decades, advances in information and communication technologies (ICT) have driven innovations in psychology, particularly in medicine. The emergence of ICT in psychology has opened up opportunities for researchers to explore studies in psychotherapy (Fonseca & Osma 2021). It also opens up many possibilities, such as research that could be explored in computerised and online self care therapy (O'Donnell et al. 2022). ICT-based self care tools for anxiety, depression, and other mental health conditions are now increasingly available. This tool has become a viable option for psychotherapy, as it can provide psychoeducation, coping mechanisms, as well as basic symptom management, often at a lower cost than traditional therapies (P. Musiat & Tarrier 2014). Mental health services are becoming more accessible to individuals with limited mobility, facing transportation issues, or living in areas with a shortage of therapists (Wendel et al. 2011).

Cognitive Behavioral Therapy (CBT) is the most commonly used therapeutic method and is specially formulated to help individuals understand the relationship between their emotions, thoughts, and actions. The basic premise is that our thoughts and perceptions of ourselves, others, and the surrounding environment can influence our emotional state and behaviour. Dr Aaron Beck introduced CBT in the 1960s; CBT has undergone numerous adaptations and applications, making it one of the most widely studied and highly effective approaches in addressing various mental health issues (Beck et al. 1979).

Based on previous research, strong evidence shows that CBT therapy can be effectively delivered through a computerised format (Marsch & Bickel 2008). Research interest in

psychotherapy is also growing rapidly, particularly in computerised CBT. The importance of user engagement must be given attention when using computerised CBT in psychotherapy. As an emerging technology, research comparing user engagement in different CBT interventions is relatively limited in psychotherapy (Treanor et al. 2021).

Computer-assisted therapy, or Computerized Cognitive Behavioral Therapy (cCBT) combines traditional CBT techniques with computer applications, facilitating patient engagement through a user-computer interface. It aims to assist patients in understanding and changing unhelpful thoughts, beliefs, attitudes, and behaviours that contribute to mental health problems such as depression, anxiety, post-traumatic stress disorder and mental health disorder (Stearns-Yoder et al. 2022).

Various previous studies have been conducted regarding cCBT, which was developed to provide therapy to patients with psychological disorders without the need for a physical meeting with a psychologist (Cavanagh & Millings 2013; Cheng & Dizon 2012; Nakao et al. 2021). The evolution of computerised therapy has given researchers various ideas for producing studies on web-based therapy, eHealth, e-intervention, and digital therapy via the internet. These developments show a positive impact on the effectiveness of computerised therapy. Therefore, cCBT is considered a treatment program conducted via computer or the internet, based on the principles of CBT, where the computer represents the routine aspects of therapy and the patient provides input to make decisions in the therapy process (Vallury et al. 2015).

Therefore, investigating the continuous engagement of users in cCBT is essential. This aspect is significant because continuous engagement can influence user motivation, which may be the most crucial element in the learning experience (Melles et al. 2021). This review presents relevant examples of cCBT, offering user-friendly and user-centred designs, thus providing the best learning opportunities. The review also revealed the extent to which the components of continuous user engagement have been comprehensively studied in the context of cCBT. Therefore, the purpose of this study is to analyse the use of cCBT and the continuing engagement of users in this technology in the context of psychotherapy.

This study aims to investigate the multiple dimensions closely related to the effectiveness and implications arising from continuous patient engagement in therapy, particularly through the implementation of cCBT. By focusing on the extent to which patients actively participate in their therapeutic journey, this study seeks to understand the complex relationship between the level of patient engagement and the effectiveness of cCBT interventions.

BACKGROUND

The cCBT method is a structured form of therapy that provides systematic steps and appropriate self-management strategies. This therapy is divided into several modules and is designed to be completed within a certain period of time. Among the therapy techniques applied in cCBT are goal setting, problem identification, psychological education, and the assessment process (Wright & Mishkind 2020). This methodological process leverages the use of computer hardware provided in multimedia format. In addition, a user-friendly interface is designed to encourage continued engagement in cCBT (Norliza et al. 2017). In general, patients can identify the relationship between cognitive, emotional, behavioral and physiological aspects through this approach. Patients need to carry out a process of reality testing, re-evaluating biased thinking, and evaluating their cognitive ideas based on their

interpretation of actual reality (Stearns-Yoder et al. 2022). As a result, patients with high levels of motivation, persistence, and autonomy tend to use cCBT effectively through sustained engagement efforts.

The main benefit of cCBT is the convenience of immediate access without the need to schedule a visit with a psychologist. With advances in technology, patients are able to receive cCBT therapy anytime and anywhere. Based on the results of the study, patients who live in remote areas or face constraints in obtaining face-to-face CBT therapy services can obtain cCBT treatment through the use of a computer or smartphone (Akramin, Dalbir, Mohd, et al. 2018; Keltner, D., Sauter, D., Tracy, J., Cowen 2019). The flexibility of cCBT therapy provides patients with the advantage of being able to complete treatment outside of work, family time, and other social commitments. The modular design of the therapy allows patients to engage repeatedly at their own convenience, allowing them to undergo treatment in the privacy of their own homes. This high level of confidentiality also has the potential to reduce stigma against receiving counseling treatment (Vigerland et al. 2014). Potential discomfort occurs during face-to-face therapy sessions with a psychologist when sensitive topics are discussed, compared to cCBT-based therapy which allows patients to maintain a level of anonymity (Wickersham et al. 2022). Since cCBT is a self-management approach, this method has the potential to improve patients' self-management capabilities as well as enhance the effectiveness and outcomes of treatment.

cCBT has been shown to reduce the need for face-to-face sessions with a psychologist, thereby reducing treatment costs and allowing psychologists to focus more time on more complex cases. The implementation of cCBT involves the use of computers, smartphones, and other digital devices to deliver therapeutic interventions tailored to the individual needs of the patient, in line with established CBT treatment guidelines and protocols. Unlike human psychologists, computer-based programs do not face issues related to fatigue or memory impairment. To address these challenges, patients are provided with a self-guided cCBT program designed to minimize these constraints and increase the effectiveness of the therapy (Ghosh et al. 2023). The effectiveness of the therapy that patients undergo is influenced by their level of dynamic motivation towards cCBT as well as the decisions taken in an effort to achieve the set therapeutic goals. (Lv et al. 2021).

cCBT has been proven to be an effective form of non-pharmacological intervention in reducing symptoms of depression and anxiety, particularly among patients affected by the COVID-19 pandemic (Liu et al. 2021). Another study conducted during the lockdown period found that cCBT was effective in reducing levels of anxiety and depression, particularly among young people. (Lv et al. 2021).

The use of cCBT has shown significant growth, with experts now integrating it into treatment protocols and improving its implementation to help patients master the basic knowledge and skills of CBT (Wright & Mishkind 2020). Concerns have been raised regarding the limited level of continuous patient engagement with the use of cCBT applications. (Jonassaint et al. 2017). Research into factors that influence continuous engagement is important for researchers and cCBT application developers in their efforts to strengthen support for mental health. (Borghouts et al. 2021). Continuous engagement is defined as the active and continuous involvement of an individual or group in a particular activity, process, or relationship. Studies on continuous engagement cover a variety of domains such as the work environment, healthcare, customer experience, and community involvement. (Akramin, Dalbir, Mohamad, et al. 2018).

Continuous User Engagement Towards cCBT

Continuous user engagement refers to the ongoing and active involvement of an individual or group in a particular activity, process, or relationship. Research on continuous engagement has been conducted in a variety of domains, including the workplace, healthcare, customer experience, and community participation. Several studies have examined continuous user engagement in the context of cCBT implementation. The contribution of these research involves the development of the models by (Tyler & Blader 2003), (Fuller et al. 2009), (Hu et al. 2012), (Barazzone et al. 2012), (Cavanagh & Millings 2013), (Shepherd et al. 2015), (Giordani et al. 2015) and (Jaeggi et al. 2011). The effectiveness of user for ensuring continuous engagement towards cCBT applications across diverse countries, ethnicities, and cultures is still being determined. This uncertainty stems from differences in the level of encouragement and motivation of user to continuously engaged towards cCBT, which is influenced by individual backgrounds (Bengs et al. 2016; Duncker et al. 2013; Purkayastha et al. 2020).

According to Lv et al. (2021) and Hatami Kaleshtari et al. (2016), the effectiveness of cCBT therapy is influenced by the individual's level of motivation, which can potentially vary according to variations in the patient's wishes and previous experiences. Patient preferences for cCBT applications vary according to the combination of specific functions and modules offered in the application. (Alanzi et al. 2014; Treanor et al. 2021).

Additionally, studies conducted by Gilbody et al. (2015) and Stawarz et al. (2020) found that differences in application interface design had a significant impact on users' continued engagement with cCBT, thus emphasizing the importance of examining and considering these design factors in more depth. Potential factors contributing to patient disengagement from cCBT use may include excessive text density in the application, complex interface design, low levels of responsiveness, lack of constructive feedback, and lack of enjoyment or perceived beneficial utility. (Lawler et al. 2021; Wright et al. 2019).

Various studies have examined approaches used to increase continuous engagement in cCBT, with particular emphasis on aspects of interface design (Siti Fadzilah et al. 2024; Wright & Mishkind 2020; Yusof & Riaza 2014). cCBT interface design, which is a rarely explored topic, has received limited attention in existing research, which mostly focuses on guidelines, technological aspects, as well as treatment effectiveness (Keyworth et al. 2018). Additionally, the limited focus on factors influencing motivation for continued engagement in cCBT highlights the need for more in-depth and comprehensive research and discussion on this issue (Roldan 2023).

This study aims to examine in depth the various aspects of the effectiveness and implications of continuous patient engagement in therapy, with a specific focus on the implementation of cCBT. By analyzing the level of patient engagement throughout their therapeutic journey, this study aims to elucidate the complex relationship between patient engagement and the success of cCBT interventions. In addition, this study evaluates the potential outcomes and benefits of consistent patient engagement in cCBT, to provide insights that can contribute to the optimization of therapeutic practice and improved mental health outcomes. Through rigorous research and analysis, this study is expected to make a significant contribution to the rapidly growing field of digital mental health interventions, as well as provide valuable guidance to practitioners, researchers, and policymakers. The next section will describe the study

methodology in detail, including aspects of participant recruitment, procedures, interview implementation, and analysis methods used.

METHODOLOGY

This study's search approach was designed based on the PRISMA methodology (Moher et al. 2009) to clarify inclusion criteria and identify relevant studies. As a widely recognised standard, PRISMA guides the conducting and reporting of systematic reviews. The approach also includes a checklist to ensure the assessment is conducted transparently while providing effective guidelines for reporting systematic reviews (Page et al. 2021).

RESEARCH QUESTION FORMULATION

Based on the PICO framework, the research question was formulated by identifying the population, namely patients receiving mental health interventions such as depression and anxiety, which is the main focus of the existing literature (Peter Musiat et al. 2014; Stearns-Yoder et al. 2022) The intervention studied was cCBT, a therapy method that combines traditional CBT principles with a digital platform (Vallury et al. 2015). The relevant comparison was between the levels of continuous user engagement in cCBT, as previous studies have found that such comparisons are still limited in psychotherapy (Treanor et al. 2021). The outcome to be achieved was the effectiveness of the cCBT intervention which is influenced by the continuous user engagement, as this engagement has been found to influence motivation and learning experiences (Melles et al. 2021). By integrating these four elements, the resulting research question is: “How does the level of continuous user engagement in cCBT influence the effectiveness of therapy compared to other approaches among mental health patients?

COORDINATED REVIEW

A specific systematic research approach involves a review combining empirical and theoretical literature. This approach then allows for a deeper understanding of a particular phenomenon or issue related to healthcare while integrating qualitative methodologies (Renjith et al. 2021). The process of survey analysis, in turn, includes several main stages: (i) identifying the problem, (ii) conducting a systematic literature review, (iii) conducting a comprehensive data assessment, (iv) analysing the data, and (v) presenting the data.

SEARCHING STRATEGY

The databases used in the literature search included PubMed/Medline, CINAHL, ERIC (EBSCO), Cochrane Library, Web of Science, Scopus, Society for Computing Machinery, and IEEE/IEE Electronic Library, without any restrictions. Various combinations of search terms such as computer-assisted therapy, computerised therapy, computer-based therapy, online therapy, digital therapy, eHealth therapy, and user or patient involvement were combined using Boolean operators (AND, OR). In addition, Medical Subject Heading (MeSH) terms were also used in this review.

CRITERIA FOR INCLUSION AND EXCLUSION

The criteria for inclusion in this review were as follows: (i) qualitative or quantitative studies related to various mental health issues; (ii) studies that emphasised user or patient involvement; (iii) studies that discussed user or patient involvement issues; and (iv) studies that contained

empirical material. In contrast, exclusion criteria included (i) studies that were still in the process of being implemented, (ii) studies that did not meet the inclusion criteria, and (iii) studies that were non-scientific or anecdotal in nature. Duplicates were removed entirely. Subsequently, the full text of the manuscripts was analysed, resulting in 14 articles that met the inclusion criteria. In addition, a manual search was also performed on the references in the included articles. No restrictions were imposed during the search process. The complete process of literature search is shown in Figure 1.

QUALITY EVALUATION

In this study, the quality of the remaining publications was critically assessed using the quality assessment criteria of (Rost et al. 2017). Quality assessment was performed by assigning a score between 0 (indicating lack of mention or ambiguity) and 1 (indicating the presence of mention) for each criterion question. Overall, most articles were found to be of adequate quality.

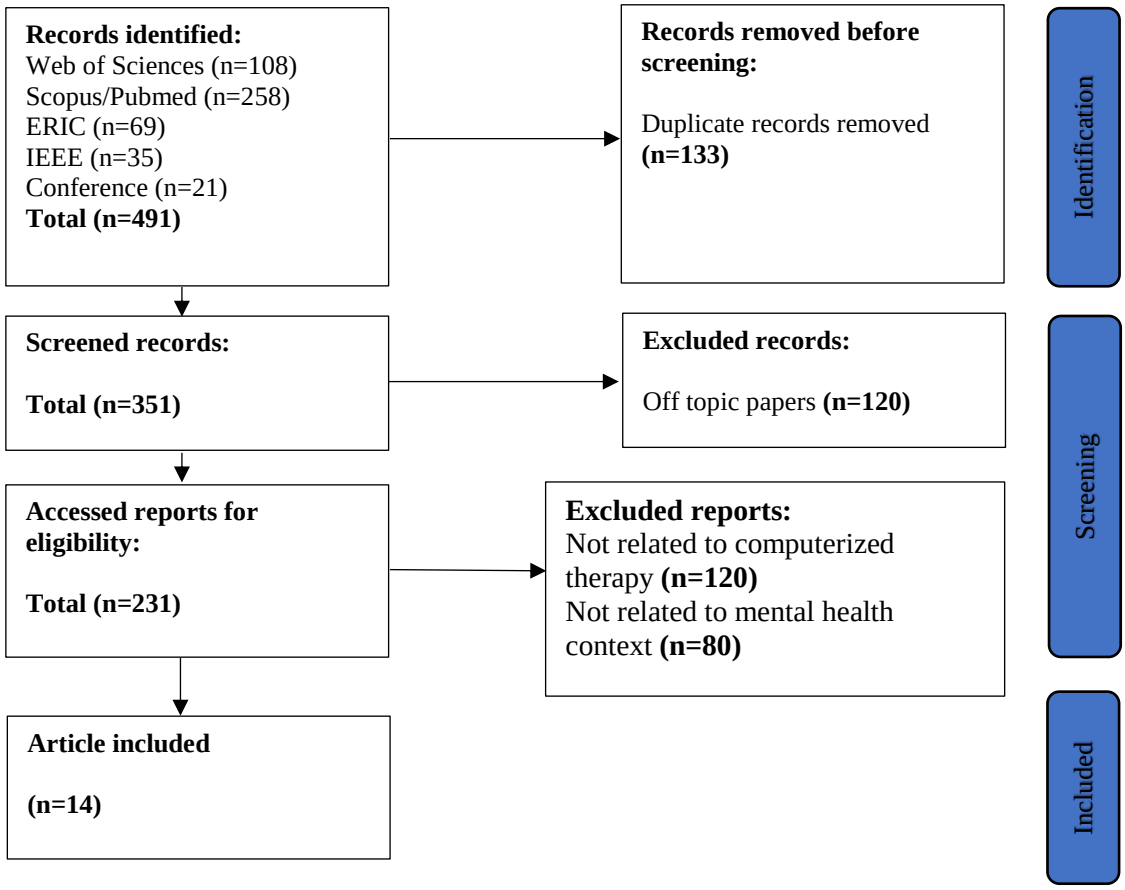

FIGURE 1. PRISMA Flowchart for the literature search process

The quality of the scores was affected mainly by unclear inclusion or exclusion criteria and incomplete descriptions of the study setting. Several studies used unvalidated instruments, while others did not explain the reasons for the loss of follow-up or the possible impact on their findings. However, after completing the quality evaluation process, no studies were deemed ineligible for inclusion.

Data Presentation

Information from the selected studies was collected and organised in Table 1, including author information, publication year, study type, content context, and field of study. In this study, ATLAS.ti software was used for data coding and analysis purposes, as recommended by (Friese 2019). ATLAS.ti was used in this study because it offers a user-computer interface and a variety of functions to systematically manage and analyze qualitative data. These help simplify the data organisation and analysis process, thus speeding up research. Furthermore, this software provides sophisticated search and retrieval features, allowing users to retrieve specific information in the data set quickly.

After conducting screening procedures, 14 studies were selected for inclusion in the final analysis. Table 1 presents the particulars of the chosen research investigations.

TABLE 1. Issues of the selected studies

Issues regarding continued engagement with cCBT	Titov et al. 2010	Kenicer et al. 2012	Vigerland et al. 2014	Naeem et al. 2019	Maura & Kopelovich 2020	Luo et al. 2020	Murphy et al. 2020	J. H. Wright & Mishkind 2020	Treanor et al. 2021	Borghouts et al. 2021	Charron & Gorey 2022	Kambeitz-Ilankovic et al. 2022	Nelson et al. 2023	Lipschitz et al. 2023
Technical barriers	✓	✓					✓	✓		✓	✓			✓
Compliance		✓	✓			✓	✓	✓	✓	✓		✓		✓
Active involvement	✓			✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Infrastructure facilities	✓	✓				✓							✓	
Difficult to connect with experts	✓		✓			✓	✓	✓	✓	✓		✓		✓
CBT Similarity	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	
Complementary							✓	✓						
Risk of withdrawal		✓	✓			✓		✓	✓			✓		✓
Limited use	✓		✓			✓	✓	✓	✓	✓				✓
Human support	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓
Cultural differences				✓	✓			✓		✓	✓			
Culturally sensitive				✓	✓					✓		✓		
Cultural effectiveness				✓	✓			✓	✓					

The significant reduction from 491 records to 14 included studies was epistemically justified because these studies specifically focused on continuous user engagement in cCBT in the context of psychotherapy, a construct that is still underexplored in the existing literature. Most of the excluded studies failed conceptually because they only assessed engagement at an early stage (e.g., retention rates or module completion) without addressing the ongoing dynamics of engagement throughout the therapeutic process, or because they focused solely on the technical usability of the interface without integrating the therapeutic aspects that are at the core of cCBT (Melles et al. 2021; Treanor et al. 2021) In other words, the excluded studies did not meet the conceptual definition of continuous user engagement as a phenomenon involving motivation,

active interaction, and ongoing cognitive-behavioral change processes, but rather shared topical similarities such as general cCBT use without comprehensively investigating the dimensions of engagement.

RESULTS

Table 1 examines various issues related to cCBT from 2010 to 2023. Key topics discussed include technical barriers, adherence, active engagement, and difficulties connecting with experts. Studies such as Titov et al. (Titov et al. 2010), Kenicer et al. (Kenicer et al. 2012), and Borghouts et al. (Borghouts et al. 2021) emphasise the importance of human support and infrastructure in enhancing the effectiveness of cCBT. Cultural sensitivity and effectiveness issues are also discussed in studies such as Naeem et al. (Naeem et al. 2019) and Charron & Gorey (Charron & Gorey 2022). In addition, the risk of attrition and limited use of cCBT are also a focus in studies such as Luo et al. (Luo et al. 2020) and Nelson et al. (Nelson et al. 2023).

According to the previous study, cCBT is influenced by a variety of factors, including technical barriers and adherence to therapy (Kenicer et al. 2012; Titov et al. 2010). Previous studies have shown that technical difficulties, such as limited internet access or software issues, can prevent patients from continuing to use cCBT (Luo et al. 2020; Murphy et al. 2020). In addition, the level of patient adherence plays a vital role in ensuring therapy success, where non-adherence can lead to the risk of treatment withdrawal (Treanor et al. 2021; Vigerland et al. 2014). Therefore, ensuring adequate infrastructural facilities and providing good technical support are essential to increase the continuity of cCBT treatment (Borghouts et al. 2021; Nelson et al. 2023).

Patients' active engagement in cCBT is also influenced by their ability to interact with the system and the level of ease of access to specialists (Maura & Kopelovich 2020; Naeem et al. 2019). Difficulty in connecting with specialists can reduce the effectiveness of therapy and make patients less interested in continuing treatment (Murphy et al. 2020; Wright & Mishkind 2020). In addition, cultural differences play a role in determining the effectiveness of cCBT, as cultural elements that are not aligned with the patient's values can reduce the attractiveness of the therapy (Kambeitz-Ilankovic et al. 2022; Nelson et al. 2023). Therefore, adapting the therapy content to be more sensitive to the patient's cultural background is essential to increase their engagement in cCBT programs (Lipschitz et al. 2023).

The effectiveness of cCBT also depends on the level of human support provided and the extent to which the program can complement traditional therapy (Charron & Gorey 2022; Treanor et al. 2021). Studies have shown that patients are more likely to continue to engage in cCBT if they receive continuous support from a health professional or support group (Borghouts et al. 2021; Lipschitz et al. 2023). In addition, the similarities between conventional CBT and cCBT also affect the level of patient acceptance of this therapy, where a similar approach can increase confidence in the effectiveness of the treatment (Nelson et al. 2023; Titov et al. 2010). By ensuring a balance between technological requirements, cultural elements, and human support, patient continued engagement in cCBT can be significantly increased (Kenicer et al. 2012; Maura & Kopelovich 2020).

A comprehensive analysis of the literature has revealed various studies conducted by multiple authors in different research areas related to mental health, as shown in Figure 2. This discussion covers several factors such as technical barriers, adherence, activity, infrastructure,

connecting with experts, CBT similarities, complementary, risk of withdrawal, limited use, human support, cultural difference, cultural sensitivity and cultural effectiveness.

TECHNICAL BARRIERS

Studies have found that technical issues, such as difficulty using cCBT applications, hinder continued engagement. These barriers include factors such as complex application navigation and recurring technical issues. Studies by (Luo et al. 2020) and (Charron & Gorey 2022) show the importance of overcoming these technical issues to improve therapy effectiveness. This highlights that good planning for the technical aspects is crucial for the long-term impact of cCBT.

ADHERENCE

The success of cCBT is often influenced by the level of user adherence to the prescribed program. Studies have shown that additional support can increase adherence, as suggested by (Treanor et al. 2021). This adherence depends on the individual's motivation and the clarity of the instructions in the application. In this context, ongoing support is needed to ensure users follow the therapy until completion.

ACTIVE

Studies report that active engagement is key to ensuring the effectiveness of cCBT. Interactive elements, such as gamification, have been shown to increase user interest and engagement. Titov et al. (Titov et al. 2010) and Murphy et al. (Murphy et al. 2020) suggest that these features help users stay focused and motivated throughout therapy. Therefore, this strategy is essential to ensure successful therapy outcomes.

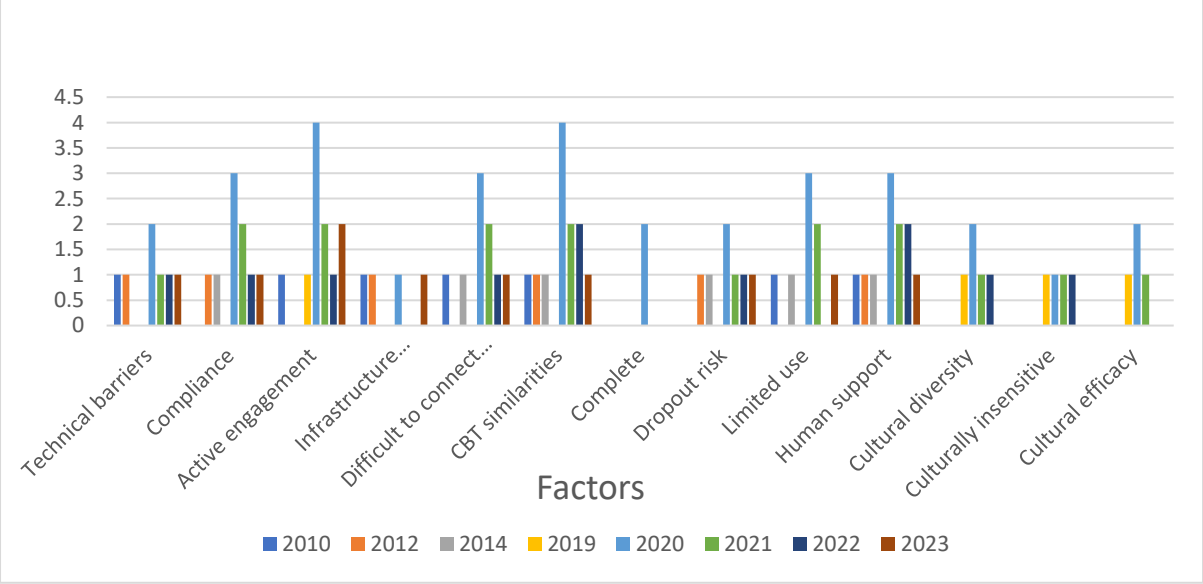

FIGURE 2. Comprehensive analysis of research trends

INFRASTRUCTURE

User-friendly infrastructure influences access to cCBT. This includes access to stable internet and appropriate therapy application devices. Kenicer et al. (Kenicer et al. 2012) asserted that

without adequate infrastructure, the effectiveness of cCBT will be reduced. These facilities are essential for users to engage in therapy consistently.

CONNECTING WITH EXPERTS

Constraints in accessing expert services make it difficult to implement cCBT therapy effectively. Studies by Lipschitz et al. (Lipschitz et al. 2023) show the need for expert involvement to provide guidance and support. In addition, this issue emphasises the need for automated support systems or virtual coaching to assist users. This approach can help overcome this challenge more effectively.

CBT SIMILARITIES

Studies have shown that cCBT, which resembles traditional CBT therapy, is more effective in engaging users. Elements such as a structured approach and explicit therapeutic content play an important role. Nelson et al. (Nelson et al. 2023) suggest that the integration of these elements increases user acceptability of cCBT. These similarities make the therapy more relevant and easier for users to accept.

COMPLEMENTARY

Studies show that cCBT can complement traditional therapy, especially for users who need additional support. Maura & Kopelovich (Maura & Kopelovich 2020) outline that this app is helpful as an additional support tool. This therapy allows users to access support outside of physical sessions. In this way, cCBT increases the flexibility and accessibility of therapy.

RISK OF WITHDRAWAL

cCBT users face the risk of withdrawal due to loss of motivation or lack of ongoing support. A study by Vigerland et al. (Vigerland et al. 2014) showed that this risk can be reduced by providing ongoing support mechanisms. Strategies such as goal setting and periodic reminders help users stay in the program. These risks must be addressed to ensure the long-term success of the therapy.

LIMITED USE

Although beneficial, the use of cCBT is still limited to specific groups. Kenicer et al. (Kenicer et al. 2012) (Kenicer et al. 2012)suggested that this problem stems from users' lack of technological knowledge and skills. Therefore, efforts should be made to increase digital literacy and user awareness. This step can expand the reach of therapy to various levels of society.

HUMAN SUPPORT

Studies have shown that human support, such as expert guidance or social interaction, is essential to the effectiveness of cCBT. Murphy et al. (Murphy et al. 2020) and Borghouts et al. (Borghouts et al. 2021) show that this support increases motivation and adherence. This element provides trust and a sense of care to the user. Therefore, integrating human support into cCBT is critical to the effectiveness of the therapy.

CULTURAL DIFFERENCE

Cultural differences play an essential role in the acceptance and effectiveness of cCBT. Naeem et al. (Naeem et al. 2019) emphasise the importance of adapting therapy to the cultural context of the user. Users may find it difficult to accept the therapy content without this adaptation. Studies have shown the need for a culturally sensitive approach to ensure cCBT is relevant and practical.

CULTURALLY SENSITIVE

cCBT needs to be designed with sensitivity to the client's cultural needs. This includes language, social norms, and cultural values in the design of the therapy. Luo et al. (Luo et al. 2020) show that this cultural sensitivity increases client acceptability. With this approach, the therapy can impact the community more.

CULTURAL EFFECTIVENESS

Studies have shown that the effectiveness of cCBT depends on the adaptation of therapy to the cultural values of the client. Treanor et al. (Treanor et al. 2021) suggest that this approach influences engagement and therapy outcomes. This adaptation ensures that clients feel the therapy is relevant to their needs. Therefore, cultural elements need to be integrated into the design and implementation of cCBT.

This study revealed that the factors of continuous engagement in cCBT do not operate in isolation, but rather form a complex relational structure (Andersson et al. 2019; Borghouts et al. 2021) Two key findings emerged: first, the existence of factors that are necessary but not sufficient, where the availability of technical infrastructure and human support alone does not guarantee long-term engagement without the presence of user agency and personal relevance (Kenicer et al. 2012; Luo et al. 2020) Second, there is a dynamic interaction between different domains, particularly between cultural sensitivity and interface design, where misalignment between the two creates cognitive barriers that reduce the attractiveness of the therapy (Charron & Gorey 2022; Naeem et al. 2019) Additionally, conflicting evidence is identified on the role of human support, which simultaneously serves as an important complementary factor and as a major cause of engagement gaps when its availability is not responsive to user needs (Murphy et al. 2020; Wright & Mishkind 2020).

Based on this analytical synthesis, a conceptual model of continuous engagement in cCBT is proposed, the Multilayered Continuous Engagement Model (Nelson et al. 2023; Treanor et al. 2021) This model outlines three interdependent layers: a foundational layer that encompasses necessary factors such as technical connectivity and human support (Borghouts et al. 2021; Lipschitz et al. 2023); an adaptation layer that represents the interaction between interface design and cultural adaptation to produce meaningful experiences that promote user agency (Kambeitz-Ilankovic et al. 2022; Maura & Kopelovich 2020); and a catalytic layer consisting of adaptive support systems that resolve the contradiction between dependence and lack of human support (Murphy et al. 2020; Titov et al. 2010). This model offers an integrative framework that emphasizes that sustained engagement is not simply the result of individual factors, but a dynamic balance across a responsive ecosystem of technology, culture, and support (Kenicer et al. 2012; Nelson et al. 2023).

LIMITATION

In line with the study's objective of synthesizing the factors of continuous engagement in cCBT and developing an integrative conceptual model, the findings of this review go beyond a purely descriptive approach by identifying a structure of conditional relationships previously implicit in the literature. The emerging new understanding is that continuous engagement is not simply the result of the presence of individual factors such as human support, technical facilities, or cultural adaptation in isolation, but rather is shaped by a dynamic balance between three interdependent layers: a foundational layer that provides technical prerequisites and support, an adaptive layer that integrates interface design with the user's cultural context, and a catalytic layer that creates an adaptive support system. This review also resolves a significant discrepancy in the literature regarding the dual role of human support which has been identified as both an important complementary factor and a primary cause of the engagement gap by proposing that the effectiveness of human support depends on its responsiveness and adaptability to the user's changing needs throughout the treatment period. By explicitly linking the interactions between the domains of culture, technology, and support, this review offers a new analytical framework that emphasizes that continuous engagement is only achieved when all three layers are harmoniously aligned.

However, several limitations need to be acknowledged in this review. A major limitation is that the scope of the study was limited to literature published between 2010 and 2023, potentially excluding early or very recent findings that may offer different perspectives on engagement in cCBT. In addition, high heterogeneity in study design, engagement measures, and target populations makes direct comparisons across studies difficult and limits the ability to generalize across different clinical contexts. In addition, most of the studies synthesized relied on short-term data, so understanding of the factors that support continued engagement beyond six months remains limited. Finally, there is the potential for publication bias in which studies with positive findings are more likely to be published than studies reporting challenges or failure to engage, which may result in a less comprehensive picture of barriers. These limitations suggest that the proposed conceptual model requires further empirical testing through more controlled longitudinal studies and meta-analyses to ensure its validity and applicability across diverse populations and clinical settings.

CONCLUSION

This study explores the growing field of cCBT in psychotherapy, with a focus on user engagement with this digital therapeutic tool. Apart from that, identifiying essential insights that can contribute to a better understanding of this field through a structured review that includes background, analysis of findings, and in-depth discussion. This study emphasises the importance of exploring the continuous engagement of users with cCBT, as it plays a fundamental role in determining their level of engagement and subsequently influencing the effectiveness of therapeutic outcomes. Through an analysis of various cCBT platforms, this study provides insight into the importance of user-centred design and the need to investigate user engagement dynamics comprehensively.

In line with the study's objective to synthesize factors of continuous engagement in cCBT and develop an integrative conceptual model, the findings of this review go beyond categorization of issues by identifying conditional relationships that explain the failure of interventions to sustain long-term engagement. The new understanding offered is that continuous engagement is not driven by individual factors in isolation, but rather by a dynamic balance across three

interdependent layers: basic infrastructure, experiential adaptation, and adaptive support systems. This review further reveals that the contradictions in the literature regarding the dual roles of human support can be resolved through a hybrid approach that is responsive to changing user needs. By explicitly linking the interaction between cultural sensitivity and interface design, this review introduces a new analytical framework that emphasizes coherence across technological domains and user contexts. This justification reinforces that the proposed conceptual model not only integrates existing findings but also provides a new orientation for the design of cCBT interventions that prioritize sustained engagement as a holistic ecosystem outcome.

In conclusion, this research highlights the transformative potential of cCBT in improving mental health care delivery and the importance of continuing to investigate the dynamics of user engagement. This study explores various factors to provide a more comprehensive understanding of the impact of cCBT, including aspects of access, user attitudes, distance delivery, effectiveness, and levels of engagement in the intervention. This evaluation aims to examine the extent to which cCBT is effective in addressing mental health issues. In addition, the investigation and analysis conducted assess participants' engagement level in cCBT programs to understand how user interactions influence therapy outcomes. By exploring the landscape of cCBT and its implications for psychotherapy, this study contributes to a deeper understanding of how technology can be integrated with traditional therapeutic modalities. Future research is planned to broaden the scope of the study to include a variety of demographic groups and user backgrounds. Digital intervention approaches will continue to be explored with an emphasis on interactive elements, gamification, and continuous support. It is hoped that the findings from this research will contribute to the development of more inclusive, accessible, and sustainable digital therapies.

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