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Qualitative Result of Continuous Engagement Towards cCBT: User Engagement and Implications

Hasil Kualitatif Penglibatan Berterusan Terhadap cCBT: Keterlibatan Pengguna dan Implikasi

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ABSTRACT

Cognitive Behavioral Therapy (CBT) is crucial in traditional therapeutic settings where patients interact directly with psychologists to address emotional and physical health issues. The evolution of information technology has spurred the development of innovative therapeutic modalities like Computerised Cognitive Behavioral Therapy (cCBT). cCBT reduces face-to-face meetings with psychologists. This saves costs and allows psychologists to focus on more complex cases or patients. cCBT therapy uses a computer, smartphones, and other devices tailored to the patient's needs while following CBT guidelines and treatment protocols. This research focuses exclusively on conducting a comprehensive investigation into the theme of user engagement, encompassing various sub-themes. This study aimed to investigate user continuous engagement towards cCBT applications in healthcare, mainly focusing on mental health. This research examines three main themes related to cCBT: user engagement, dropout rates, and the interface design of cCBT. Twelve participants, averaging 33.9 years of age, were engaged in semi-structured interviews. Subsequently, the interviews were transcribed and analysed using a six-step thematic analysis methodology. Additionally, various sub-themes emerged during the analysis. However, this paper exclusively delves into an in-depth exploration of the user engagement theme. In the study, data saturation was attained, leading to the identification of six distinct sub-themes within the dataset. This is to ensure patient's continuous engagement towards cCBT applications by analysing user engagement themes and subthemes, identifying key factors that drive patient adherence, and optimising treatment outcomes.

Keywords**:** cCBT, CBT, computerised therapy, continuous engagement, user engagement

ABSTRAK

Terapi Tingkah Laku Kognitif (CBT) merupakan pendekatan yang amat penting dalam sesi terapi tradisional, di mana pesakit berinteraksi secara langsung dengan pakar psikologi bagi menangani isu-isu kesihatan emosi dan fizikal. Perkembangan teknologi maklumat telah mendorong kepada kemunculan kaedah terapeutik inovatif seperti Terapi Tingkah Laku Kognitif Berkomputer (cCBT). cCBT mengurangkan keperluan untuk pertemuan bersemuka dengan pakar psikologi. Ini dapat menjimatkan kos dan membolehkan pakar psikologi menumpukan perhatian kepada kes yang lebih kompleks. Terapi cCBT menggunakan komputer, telefon pintar, dan peranti lain yang disesuaikan dengan keperluan pesakit sambil mematuhi garis panduan serta protokol rawatan CBT. Kajian ini memfokuskan secara eksklusif terhadap penyelidikan menyeluruh mengenai tema penglibatan pengguna yang merangkumi pelbagai subtema. Kajian ini bertujuan untuk menyiasat penglibatan berterusan pengguna terhadap aplikasi cCBT dalam bidang kesihatan, dengan tumpuan utama kepada kesihatan mental. Kajian ini meneliti tiga tema utama yang berkaitan dengan cCBT, iaitu penglibatan pengguna, kadar pengunduran, dan reka bentuk antara muka cCBT. Seramai dua belas orang peserta dengan purata umur 33.9 tahun telah terlibat dalam temu bual separa berstruktur. Seterusnya, temu bual telah ditranskripsikan dan dianalisis menggunakan metodologi analisis tematik enam langkah. Selain itu, beberapa subtema turut muncul sepanjang proses analisis. Namun demikian, makalah ini hanya menumpukan kepada penerokaan mendalam terhadap tema penglibatan pengguna. Dalam kajian ini, ketepuan data telah dicapai, seterusnya membawa kepada pengenalpastian enam subtema yang berbeza dalam set data. Tujuan utama adalah untuk memastikan penglibatan berterusan pesakit terhadap aplikasi cCBT dengan menganalisis tema dan subtema penglibatan pengguna, mengenal pasti faktor utama yang mendorong pematuhan pesakit, serta mengoptimumkan hasil rawatan.

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

INTRODUCTION

Mental Depressive Disorder (MDD) is one of the most common psychiatric disorders (Bains & Abdijadid 2024) among individuals. It accounts for much of today's healthcare burden on medical professionals (Greenberg et al. 2021). MDD ranks among the most prevalent and severe mental health conditions, impacting an estimated 280 million individuals across all age groups globally (“Institute of Health Metrics and Evaluation” 2023).

The recent advancements in eHealth technology have facilitated the consistent provision of numerous effective interventions for depression to a broad population (Andersson & Cuijpers 2009). Computer-delivered therapies, commonly referred to as cCBT due to their foundation in CBT principles, offer greater accessibility to individuals who might perceive traditional mental health services as stigmatizing (Griffiths et al. 2014). Typically, patients who could benefit from cCBT find it a cost-effective and less confrontational alternative to face-to-face therapy, with the added advantage of being readily accessible through the increasing availability of infrastructure such as the Internet, smartphones and mobile devices (Wright et al. 2022). When implemented appropriately, cCBT can yield treatment outcomes comparable to traditional face-to-face therapy; however, interventions that include therapist interaction have demonstrated greater efficacy (Carlbring et al. 2018). According to (So et al. 2013), limited long-term gains from cCBT, along with an increased rate of participant withdrawal. This effect may be mitigated through the implementation of clinician support programs.

An increasing body of evidence indicates that clinician-assisted computerised cCBT significantly improves patients with MDD (Andersson & Cuijpers 2009; Vernmark et al. 2010), with results comparable with those obtained from face-to-face treatment. Given the increasing healthcare costs, clinical guidelines have recommended implementing cCBT programs to alleviate the financial burden on primary and secondary healthcare services. According to the National Institute for Clinical Excellence (NICE), cCBT has been incorporated as a first-step intervention in stepped-care treatment models (NICE 2006). In these models, initial efforts prioritise lower-cost interventions, reserving more intensive and expensive interventions for cases where the initial measures prove insufficient (Sobell & Sobell 2000). These models have demonstrated cost-effectiveness in treating depression (Straten et al. 2010).

In practice, numerous computer-based cognitive behavioural therapy programs are frequently employed as supplementary treatments in conjunction with traditional face-to-face therapy sessions or even therapies delivered via telephone (Gilbody et al. 2015). This approach contrasts with the model where clinicians function as secondary support to the cCBT programs. These hybrid treatment modalities leverage the benefits of both technological and human elements to enhance therapeutic outcomes, providing a more comprehensive and flexible framework for addressing psychological issues (Bai 2023). Evidence suggests that adjunctive eHealth programs can improve the effectiveness of existing therapeutic interventions. For instance, (Danaher et al. 2015) research demonstrated that integrating a web-based tobacco cessation program with the use of nicotine lozenges effectively promoted long-term abstinence from both tobacco and smokeless tobacco.

Similar observations have been noted in other medical contexts, including improving diabetes self-management as a supplementary approach to standard clinical care and the enhanced outcomes of internet-based toilet training programs for children with encopresis (Ritterband et al. 2003). With high levels of multimorbidity and the diverse manifestations of psychiatric disorders, exploring eHealth treatments as supplementary approaches to traditional face-to-face therapies could enhance outcomes. These treatments target comorbidities or depression symptoms, offering a promising avenue for improvement. MDD is a frequently reported likely, as expected, be found to have significantly less cognitive impairment (Harvey et al. 2019).

Recent studies have shown that addressing MDD by using cCBT for MDD patients can improve depression outcomes (Moloud et al. 2022). There are now efficacious cCBT for MDD interventions (Lungu et al. 2021), with evidence that they have additional benefits on continuous engagement (Akramin, Dalbir, Mohd, et al. 2018). A recent research investigation focusing on cCBT demonstrated a substantial reduction in depressive symptoms among patients diagnosed with MDD (Wright et al. 2022). The findings of this study highlight the efficacy and promise of cCBT as an intervention tool in alleviating the burden of depression in individuals diagnosed with MDD. Integrating cCBT treatments into routine clinical practice necessitates focusing on process and logistical considerations. The factors that may limit the acceptability and feasibility of the effects observed in cCBT trials when applied in clinical practice need to be better understood. A study on patients' adherence to the intervention techniques provided by the cCBT program specifically examined the timing, frequency, and duration of their active engagement with therapy from initiation to completion (Ghosh et al. 2023). Qualitative research has identified personal, design, and environmental factors as influential in adherence to and persistence with cCBT for depression (Ghosh et al. 2023).

Adherence to cCBT programs is associated with improved outcomes for individuals with depression (Wright & Mishkind 2020). Additionally, clinician referrals or recommendations for cCBT may enhance patient adherence to the program, indicating that clinician interaction could influence therapy outcomes (Wright et al. 2022). This study investigated the continuous engagement associated with implementing the cCBT program for patients with MDD alongside clinical care. The following sections delve into the background, detailing aspects such as the cCBT process, benefits of cCBT and continuous engagement towards cCBT.

BACKGROUND

cCBT PROCESS

The cCBT method is a structured therapy that offers suitable steps and self-management strategies. It is broken up into many modules and is meant to be finished in a specific time. Therapy techniques used in cCBT include goal-setting, problem-identification, psychological education, and assessment (Wright & Mishkind 2020). This methodology process demands computer hardware supplied in a multimedia format. Additionally, a user-friendly interface is designed to promote ongoing participation in cCBT (Norliza et al. 2017). Patients can generally find cognitive, emotional, behavioural, and physiological links with this method. The patient must recognise the reality test, adjust their skewed thinking, and weigh their cognitive ideas against how reality is interpreted (Stearns-Yoder et al. 2022). As a result, patients who exhibit high levels of motivation, diligence, and independence frequently employ cCBT successfully due to their ongoing engagement efforts.

BENEFITS OF cCBT

The benefit of instant access without scheduling a psychologist's visit is something that cCBT can offer. Thanks to technology, patients may receive cCBT therapy anyplace. According to research, patients who live far away in the country or have trouble accessing CBT services can get cCBT therapy from anywhere using computers and cell phones (Keltner, D., Sauter, D., Tracy, J., Cowen 2019). The flexibility of cCBT therapy offers patients the advantage of supplementing treatment outside of work hours, family time, and social commitments. The modular design allows patients to engage in therapy repeatedly at their convenience, making it possible to undergo treatment in the privacy of their own homes. This confidentiality can help reduce the stigma of seeking counselling (Vigerland et al. 2014). Discomfort may arise during therapy sessions with psychologists when discussing sensitive topics, compared to therapy delivered through cCBT, which allows patients to remain anonymous (Wickersham et al. 2022). As cCBT is a self-management approach, it can enhance patient efficacy and treatment outcomes.

cCBT has been shown to reduce the frequency of face-to-face sessions with psychologists, thereby lowering costs and allowing psychologists to dedicate more time to complex cases. cCBT involves using computers, smartphones, and other digital devices to deliver therapy tailored to individual patient needs while adhering to established CBT guidelines and treatment protocols. Unlike human psychologists, computer programs do not suffer from memory lapses or fatigue. To address this challenge, patients are provided with a cCBT program for self-guided therapy, aiming to alleviate this issue (Ghosh et al. 2023). The effectiveness of the therapy a patient undergoes is influenced by their dynamic motivation towards cCBT and the decisions made to achieve their therapeutic goals (Lv et al. 2021).
cCBT has been demonstrated as an effective non-pharmacological intervention for alleviating symptoms of depression and anxiety, especially among patients impacted by COVID-19 (Liu

et al. 2021). Another study conducted during the lockdown period demonstrated the effectiveness of cCBT in reducing anxiety and depression, particularly among young people (Lv et al. 2021).

cCBT is a suitable and effective form of computer-based therapy, but user disparities among patients need to be addressed (Jonassaint et al. 2020) The influence of engagement, delivery, and interface factors on continuous engagement with cCBT applications varies according to the design guidelines appropriate for each country (Stawarz et al. 2020).

CONTINUOUS ENGAGEMENT TOWARDS cCBT

The utilisation of cCBT is on the rise, with specialists incorporating it into treatment protocols and enhancing it to help patients acquire essential knowledge and skills in CBT (Wright & Mishkind 2020). Concerns have been raised regarding the limited ongoing engagement of patients with cCBT applications (Jonassaint et al. 2017). Investigating the factors that influence continuous engagement is essential for researchers and developers of cCBT applications to enhance support for mental health (Borghouts et al. 2021). Continuous engagement refers to individuals or groups' sustained and active involvement in particular activities, processes, or relationships. Research on continuous engagement spans various domains, including the workplace, healthcare, customer experience, and community participation (Akramin, Dalbir, Mohamad, et al. 2018).

Several studies have investigated continuous engagement models within the context of implementing cCBT. Notable contributions to this research include the development of models by (Tyler & Blader 2003), (Fuller et al. 2009), (Hu et al. 2012), (O'Brien & Toms 2008), (Barazzone et al. 2012), (Cavanagh & Millings 2013), (Shepherd et al. 2015), (Giordani et al. 2015) and (Jaeggi et al. 2011). The model's effectiveness for continuous engagement in cCBT applications across diverse countries, races, and cultures is still being determined. This uncertainty arises from the varying levels of encouragement for patients to remain engaged with 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 efficacy of cCBT therapy is influenced by the individual's motivation, which can vary based on differences in the patient's will and prior experiences. Patient preferences for cCBT applications vary depending on the specific combination of functions and modules provided (Alanzi et al. 2014; Treanor et al. 2021). Moreover, research by (Gilbody et al. 2015) and (Stawarz et al. 2020) suggests that differences in application interface design significantly impact sustained engagement with cCBT, emphasising the need to consider these design factors carefully. A potential factor contributing to patient withdrawal from cCBT may be the application's high text density, complex interface, lack of responsiveness, insufficient constructive feedback, and a perceived lack of enjoyment or utility (Lawler et al. 2021; Wright et al. 2019).

Numerous studies have investigated methods to promote continuous engagement in cCBT, particularly on interface design (Wright & Mishkind 2020; Yusof & Riaza 2014). The interface design of cCBT, a topic rarely addressed, has received limited attention in studies that predominantly focus on guidelines, technological issues, and treatment efficacy (Keyworth et al. 2018). Furthermore, the limited attention to the factors influencing motivation for continuous engagement in cCBT underscores the need for comprehensive research and discussion on this issue (Roldan 2023).

This study aims to explore the multifaceted aspects of the effectiveness and implications of sustained patient involvement in therapy, specifically focusing on implementing cCBT. By analysing the degree of patient engagement throughout their therapeutic journey, this research seeks to illuminate the complex relationship between patient participation and the success of cCBT interventions. Additionally, it examines the potential outcomes and benefits of consistent patient involvement in cCBT, offering insights into optimising therapeutic practices and improving mental health outcomes. Through rigorous investigation and analysis, this study aspires to significantly contribute to the growing digital mental health interventions field, providing valuable guidance for clinicians, researchers, and policymakers. In the subsequent sections, we will explore the method in detail, detailing aspects such as recruitment, participants, procedure, interviews and analysis.

METHODOLOGY

This research comprehensively investigates the experiences and perceptions of individuals diagnosed with MDD and investigates users' continuous engagement with cCBT applications in healthcare. This research examines three main themes related to cCBT: user engagement, dropout rates, and the interface design of cCBT. Additionally, various sub-themes emerged during the analysis. However, this paper exclusively delves into an in-depth exploration of the user engagement theme. Qualitative interviews employ purposive sampling techniques to achieve a diverse and representative participant sample, ensuring comprehensive coverage across relevant demographic and experiential categories for research purposes.

The recruitment period for this study began on 19 November 2019. In the subsequent months, a range of potential informants were found and contacted by different means, taking care to obtain a representative sample in accordance with the aims of the study. The recruitment phase aimed to engage informants willing to provide in-depth insights and share their experiences relevant to the research topic. After a year of active recruitment at the location, the end of process concluded on 20 November 2020. By this time, a sufficient number of informants had been secured, allowing the research to proceed with the following phases of data collection and analysis.

RECRUITMENT

Patients diagnosed with MDD were exclusively invited to participate in the interview, ensuring the inclusion of individuals who maintained regular attendance at their scheduled appointments. This recruitment strategy aimed to gather insights from patients committed to ongoing clinical engagement. Advertisements were strategically positioned on various notice boards frequented by psychologists, accompanied by the distribution of brochures. These materials aimed to encourage psychologists to actively inform their patients about the study and extend personal invitations for their participation. Additionally, detailed flyers were distributed to potential participants, providing comprehensive information about the study to encourage their consideration for interviews.

PARTICIPANTS

Thirteen months into the field study at the medical centre, 65 participants were randomly selected and provided with a detailed explanation of the study. A purposive sampling approach was employed, and fifteen participants met the selection criteria were invited to participate in the interviews (Campbell et al. 2020). This is similar to research using purposive sampling on patients' experiences with tailored Internet-based cognitive behavioural therapy (CBT), which

reduces depressive symptoms (Westas et al. 2022). Fourteen participants initially agreed to participate in the interviews conducted for this study. However, two participants withdrew at the last minute, resulting in twelve individuals whose interviews were included in the final analysis.

Additionally, one interview could not be transcribed due to poor recording quality, which excluded that particular data point from the analysis. The study included male and female participants, with a mean age of 33.9 years (range = 28-50 years), who met the criteria for MDD as assessed by standardised clinical interviews and diagnostic criteria. Participants exhibited early to mild severity levels of MDD. The duration of their depressive disorders ranged from 1 year to 3 years, as confirmed through thorough clinical assessments and medical records review.

PROCEDURE

This research selects a medical centre in the country's capital city as the focal organisation for qualitative data collection via interviews with patients diagnosed with MDD. The initial step involves registering via the National Medical Research Registry (NMRR). Researchers are required to complete their information using the NMRR website's online application form. Additionally, they must identify a collaborating researcher from the Department of Psychiatry and Mental Health to conduct the study. Once the collaborator is identified and approval is obtained, researchers will complete their registration on the NMRR website. Following ethical approval, the initiation of data collection can proceed, adhering to the established research protocols and ethical guidelines.

The consent letters were part of document that thoroughly vetted by the research committee of the NMRR prior to obtaining ethical approval. Informants were asked whether they provided informed consent, ensuring their voluntary participation in the study. Both verbal and signed consent forms were obtained from all informants, confirming their understanding and willingness to participate in the research. This process was conducted to safeguard participants' rights and well-being in accordance to ethical guidelines.

THE INTERVIEWS

After obtaining informed consent from participants, the researcher conducted semi-structured interviews at the medical centre. The researcher facilitated these interviews and recorded them using a digital recording device to ensure accurate documentation of responses and enable thorough analysis of gathered data. The average duration of interviews reveals that the mean duration, calculated at 89 minutes, serves as a pivotal metric for understanding the depth and extent of engagement between interviewers and participants in the study context.

The interview protocol developed in this study contains semi-structured and open-ended questions (Weller et al. 2018). Conducting semi-structured interviews increases interactivity, allowing a deeper exploration of the actual experiences of the individual being interviewed (Reuther et al. 2024). At the initial stage, the interview protocol was developed based on the data obtained from the theoretical study that aligned the research questions. Semi-structured questions were designed to confirm the factors and constructs derived from the theoretical study (Lundgren et al. 2023). Similar to several studies aimed at gaining a deeper understanding of information needs and the challenges in assessing patient progress, this research investigates how to provide effective and personalised feedback within the context of cCBT (Mäkinen et al. 2022; Thieme et al. 2023). In addition, open-ended questions aim to

identify new constructs and relationships between factors based on informants' knowledge and experience. The interview protocol process is illustrated in Figure 1.

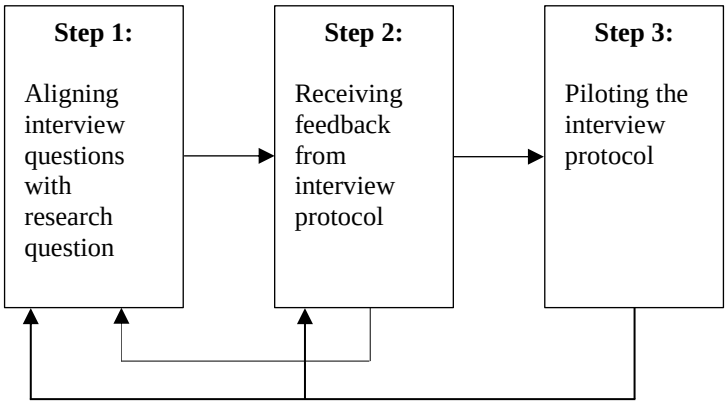

FIGURE 1. Interview Protocol Processes

As depicted in Figure 1, the interview protocol follows a structured three-step approach adapted from (Yeong et al. 2018). In Step 1, the interview questions are aligned with the overarching research objectives. Step 2 involves soliciting feedback on the initial draft of the interview protocol. Step 3 focuses on piloting the revised protocol, incorporating the feedback to enhance it further. This iterative cycle of refinement, piloting, and retesting proved essential for optimising the interview protocol.

The questions were organised into an interview questions matrix presented in Table 1. The constructed questions are subsequently analysed to identify any potential gaps. The researchers may address gaps by incorporating additional relevant questions into the protocol in alignment with their research objectives (Castillo-Montoya 2016; Yeong et al. 2018)

The interview protocol begins with the introductory questions, which extricate background information such as demographic data of patients (e.g., age, gender, etc.). The interview will be followed by questions based on themes and subthemes related to continuous engagement towards cCBT. The interview incorporates semi-structured and open-ended questions aimed at exploring the emergence of new themes and subthemes. The introductory and probing questions were carefully designed to foster conversational interaction, with the interview session aimed at exploring and identifying potential factors influencing continuous engagement.

Data collection was carried out through individual interviews and interviews with experts. Both interview approaches were chosen to increase the data source, in line with the specific situation and social context (Pahwa et al. 2023). Interviews focused on the individual's practices in maintaining continuous engagement with CCBT applications. Interviews proceeded in stages until no further changes in the data were identified, indicating that the data had reached saturation (Hennink & Kaiser 2022). Interview data were analyzed using content analysis methods. The results from the analysis obtained from examining the case studies reinforced the study results. They were illustrated through factors and constructs related to continuous engagement with CCBT applications.

TABLE 1. Interview Questions Matrix

Themes	Questions	Research Question	Reference
Engagement towards cCBT	• Can you explain your experience using cCBT? If yes, why, and what is the role? • Do patients need to use cCBT? If yes, why, and what is the role? • Is involvement necessary in undergoing therapy for cCBT? • If Yes/No, why and state the role? • Is engagement necessary to increase patients' willingness to continue engaging in cCBT? • Can you explain the constructs/criteria required by engagement? • If Yes/No, why and state the role?	RQ1: cCBT increases continuous engagement	(Arrieya & Dyson 2015) (Stawarz et al. 2020)
	• Are there new themes? Please discuss. • Are there new subthemes? Please discuss.		
Sub-themes	**Questions**		
Knowledge	• Is knowledge necessary in undergoing cCBT therapy? • If Yes/No, why and state the role? • Is knowledge needed to increase patients' willingness to continue engaging in cCBT? • Do you agree that the construct of knowledge plays a role in increasing the patient's tendency? • If Yes/No, why and state the role?	RQ2: Identify themes and subthemes RQ3: Efficacy of continuous engagement towards cCBT	(Kuosmanen et al. 2018)
Support	• Is support needed in undergoing cCBT therapy? • If Yes/No, why and state the role? • Is support needed to increase patients' willingness to continue engaging in cCBT? • Do you agree that support constructs play a role in increasing the patient's tendency? • If Yes/No, why and state the role?	RQ2: Identify themes and subthemes RQ3: Efficacy of continuous engagement towards cCBT	(Rost et al. 2017) (Ramadiani et al. 2017)
Effectiveness	• Is effectiveness necessary in undergoing cCBT therapy? • If Yes/No, why and state the role? • Is efficacy needed to increase patients' willingness to continue engaging in cCBT? • Do you agree that the efficacy construct plays a role in increasing the patient's inclination? • If Yes/No, why and state the role?	RQ2: Identify themes and subthemes RQ3: Efficacy of continuous engagement towards cCBT	(Topooco et al. 2017)

Gamification	• Is gamification necessary in undergoing cCBT therapy? • If Yes/No, why and state the role?	RQ2: Identify themes and subthemes RQ3: Efficacy of continuous engagement towards cCBT	(Dedert et al. 2013) (Ghosh et al. 2023)
	• Are games necessary to increase patients' willingness to continue engaging in cCBT? • Do you agree that the game's construction plays a role in increasing the patient's tendency? • If Yes/No, why and state the role?		
Motivational quotes	• Are motivational quotes necessary in undergoing cCBT therapy? • If Yes/No, why and state the role?	RQ2: Identify themes and subthemes RQ3: Efficacy of continuous engagement towards cCBT	(Geirhos et al. 2021)
	• Are motivational quotes needed to increase patients' willingness to continue engaging in cCBT? • Do you agree that the construct of motivational quotes plays a role in increasing the patient's inclination? • If Yes/No, why and state the role?		
Comics	• Is comic necessary in undergoing cCBT therapy? • If Yes/No, why and state the role?	RQ2: Identify themes and subthemes RQ3: Efficacy of continuous engagement towards cCBT	(Zhang-Kennedy et al. 2017) (Kearns & Kearns 2020)
	• Are comics necessary to increase patients' willingness to continue engaging in cCBT? • Do you agree that comic constructs play a role in increasing the patient's tendency? • If Yes/No, why and state the role?		

This approach can replicate the respondent's described experiences as examples to encourage them to elaborate further on their thoughts. This process facilitates a deeper exploration and comprehension of the respondent's perceptions during the interview session. The same approach is utilised to investigate each systematically identified positive and negative experience to understand how these factors influenced and impacted continuous engagement.

ANALYSIS

The interview recordings were meticulously transcribed verbatim and subsequently analysed employing Creswell's comprehensive five-step inductive thematic analysis methodology (Creswell & Creswell 2018). This process involved: (1) organising and preparing the data for analysis, ensuring all materials were systematically arranged; (2) thoroughly reading and examining all the collected data to gain an initial understanding; (3) coding the entire dataset by identifying and labelling relevant pieces of information; (4) generating detailed descriptions and identifying overarching themes that encapsulate the core messages; and (5) representing these descriptions and themes in a coherent and meaningful manner, thus providing a structured framework for interpreting the qualitative data. This method of analysis was selected due to its reliance on data-driven identified themes. Thus, themes are identified without attempting to fit them into a pre-design coding framework.

Data collected through interviews with MDD patients need to be coded. According to (Huberman & Miles 2002), coding is part of qualitative research analysis. It aims to detail, sort, focus, remove, and organize data from which the conclusions of the analysis can be produced and confirmed. A set of predetermined codes was identified at the beginning of this study. However, the codes were refined as the analysis progressed. The coding process allows the identification of main themes and compare them with the codes. Therefore, the coding process reduces the amount of data. The results of the analysis of triangulation of data from different sources allow for increased reliability of the study findings. The coding process is carried out through three stages. The first stage, existing or proposed constructs in the coding of data in addition to searching for new constructs. The second stage, analysis of the data coding in the first stage to determine the suitability of the categories. The third stage, at this stage, the AtlasTi application is used to identify keywords stated in each construct.

The coding and identification of themes were conducted to limit the subjective nature of the analysis, thereby enhancing its validity. Utilising the initial set of codes, a comprehensive analysis was conducted to identify and categorise overarching themes. Upon completing this stage, the identified themes were discussed, and consensus was reached on the final themes to be utilised. The subsequent sections and subsections present findings encompassing the results, user engagement with cCBT, knowledge, support, effectiveness, integration of gamification, motivational quotes, and comics.

RESULTS

The analysis of the interview transcripts revealed predominant themes and sub-themes, which are comprehensively detailed in Table 2. This table elucidates the essential findings and provides a structured overview of the thematic patterns that emerged from the data. The thematic patterns identified in the data will be examined in detail in the subsequent section. The overarching theme centres on continuous engagement, while the sub-themes encompass knowledge, support, effectiveness, gamification, motivational quotes, and comics.

ENGAGEMENT TOWARDS cCBT

Role engagement significantly contributes to patients with MDD symptoms by fostering a positive inclination towards the utilisation of cCBT. Engagement can enhance adherence to cCBT protocols, improving treatment outcomes and patient well-being. The construct of knowledge is multifaceted, encompassing various perspectives and opinions elucidated by informants. Mainly, these informants provide insights into the requisite knowledge deemed essential within their respective domains, with a specific emphasis on technological expertise. "We should possess knowledge of cCBT handling to ensure the effective implementation of therapy" (Informant 4).

Active patient engagement in cCBT plays a significant role in increasing adherence to treatment protocols and subsequently producing more positive therapeutic outcomes for individuals experiencing MDD symptoms. The findings also highlight that knowledge of various aspects, especially technological expertise among facilitators, is an important construct that needs to be emphasized to ensure effective implementation of this therapy. Therefore, efforts to optimize patient engagement should be combined with increasing technological competence of health professionals to maximize the benefits of this digital intervention.

TABLE 2. Themes and subthemes were identified in the interviews

Themes	**Sub-themes**	**Informants**
Engagement towards cCBT	Knowledge	4,5,13
	Support	1,3,4,5,7,8,9
	Effectiveness	1,5,8,10,11
	Gamification	1,3,5,11
	Motivational quotes	4,5
	Comics	4,6

KNOWLEDGE

Several statements were made concerning the trends in patient awareness and literacy towards technology. “I might require comprehensive knowledge, encompassing not only technological aspects and current trends but also the details of the services provided” (Informant 5). “Technological literacy is essential for attracting patients' attention to the use of cCBT” (Informant 9). Apart from that, "a basic level of knowledge and literacy in the use of technology is required to use the cCBT application effectively" (Informant 13). In addition, experience and skills are also identified as knowledge. According to the informant, "the experience of using technology provides added value to the knowledge to handle cCBT" (Informant 4). Furthermore, Informant 1 and Informant 2 stated that technology handling skills are needed to increase knowledge on the use of cCBT. Through skills, an informant said, "Engagement will be of higher quality and enable the informant to determine whether the therapy objective is achieved" (Informant 5).

Patient awareness and literacy of technology, particularly in the use of cCBT, requires comprehensive knowledge encompassing technological aspects, current trends, and service details. Basic technological literacy is essential to engage patients and enable them to use cCBT applications effectively. In addition, experience and skills in operating technology add value to knowledge, thereby improving the quality of engagement and achievement of therapy objectives.

SUPPORT

Through good support, "the patient's goal of completing therapy will be achieved" (Informant 1). To enable patients to achieve the goals of therapy, support plays a vital role in cCBT therapy. According to an informant, "support from the family is important to ensure the patient can continuously engage towards cCBT therapy" (Informant 3). Furthermore, "families can provide emotional support, encouragement, and motivation to cCBT users, which can help maintain consistent engagement with the application" (Informant 7). In some circumstances, “family support can help reduce the stigma associated with seeking mental health treatment. If family members are understanding and supportive, this may encourage consumers to be more open about their mental health challenges and treatment” (Informant 8).

Technological support also plays an important role (Informant 5). Along with the statement of Informant 3, "Without the support of technology, the goals of therapy will not be achieved, and the informant will continue to rely on face-to-face therapy". It also coincides with the patient's responsibility to "ensure the success of therapy depends on the patient's support; without support, the patient will rely on face-to-face therapy based on appointment dates that take a long time" (Informant 7). Issue of limited experience with technology or may encounter technical problems when using the cCBT application. "I need support with downloads, troubleshooting, or navigating the application" (Informant 9). In addition, informant 6 believes that technological support encompasses several categories, including internet connection, cCBT applications, smartphones, and financial resources. In addition, finances need to be stable to provide infrastructural support; without a stable workforce, the objective of therapy will not be achieved: "….involves a financial commitment to provide technological support such as smartphones and internet connection" (Informant 4).

In ensuring the success of cCBT therapy, it is divided into two main domains, namely family support and technological support. Strong support from family members not only provides motivation and reduces stigma, but also ensures consistent patient engagement throughout the treatment process. Meanwhile, technological support that includes aspects of infrastructure stability, technical assistance, and financial resources is equally important to prevent patients from relying on slower face-to-face therapy.

EFFECTIVENESS

Achieving the objectives of cCBT therapy depends on the informant's commitment to ensure the effectiveness of engagement. Support and guidance from a psychologist are necessary for patients: "…psychologists need to give advice as well as guidance and monitoring using cCBT therapy" (Informant 5). Monitoring a psychologist is essential to ensure the informant's success in implementing cCBT therapy: "…we need monitoring from our psychologist” (Informant 8). Informants 8 and 10 supported: "a sense of confidence in the progress of recovery through cCBT therapy with monitoring from a psychologist". The effectiveness of cCBT is influenced by several elements, including the user's engagement with the application. The cCBT application is available for download on a cell phone: "...the success in achieving the goals varies among users” (Informant 11). This is supported by informant 8: “…the effectiveness of the informant in achieving the goal of implementing therapy is contingent upon the cCBT application”. The readiness of patients to engage with cCBT was also identified as a barrier to access: "…. exhibit a preference for cCBT applications that are user-friendly and easy to navigate" (Informant 1). Thus, implementing cCBT with a user-friendly interface will enhance sustained user engagement.

The effectiveness of cCBT therapy depends on patient commitment and ongoing support and monitoring from a psychologist to ensure optimal recovery progress. In addition, user-friendly and easy-to-navigate application design plays an important role in increasing patient engagement on an ongoing basis, thus influencing the achievement of therapy goals. Thus, the combination of professional guidance and an effective application interface are key factors in maximizing the benefits of cCBT.

GAMIFICATION

cCBT is an intervention that employs computer programs or digital platforms to administer cognitive-behavioural therapy techniques to patients. An informant pointed out the importance of games in cCBT: "…integration of gamification elements into the cCBT application to enhance user engagement and treatment efficacy" (Informant 1). User-friendly interface is expected to enhance user engagement: "…incorporating interactive elements and games into cCBT can enhance its engagement and effectiveness" (Informant 3). Apart from that: "...therapy can be made more engaging and enjoyable, thereby encouraging increased user participation" (Informant 5). Games can be designed to teach and reinforce cognitive-behavioural skills and techniques, enabling learners to practice and apply them engagingly and interactively (Informant 11). Games can visually represent a patient's progress: "…it potentially motivates individuals and aids in visualising our developmental trajectory" (Informant 5). Moreover, most informants concurred that gamification design should be user-friendly and accessible to a diverse population of patients diagnosed with MDD.

The integration of gamification elements into cCBT applications plays a key role in increasing user engagement and treatment effectiveness by making therapy more interactive and enjoyable. This approach not only allows patients to learn and practice cognitive-behavioral skills in an engaging way, but can also visually represent their progress to increase motivation. Therefore, user-friendly and accessible gamification designs are essential to ensure that they can be utilized by a diverse population of patients diagnosed with MDD.

MOTIVATIONAL QUOTES

Motivational quotes may be incorporated into the content of cCBT user interfaces to help encourage and inspire patients. Using motivational quotes can serve as a means to offer positive reinforcement: "…can enhance my motivation, and remind me of the therapeutic benefits" (Informant 5). In addition: "…motivational quotes may catalyse informants to persist with their therapy and undertake the requisite measures to enhance their mental health". The most common response identified by most informants was increasing emotion: "Enhance our mood and boost motivation to participate in therapy…" (Informants 4 and 5). The strategic selection of motivational quotes can enhance the informant's engagement with the cCBT application, thereby increasing its overall engagement and effectiveness. In summary, incorporating motivational quotes into cCBT applications may improve the user experience and offer supplementary support and motivation throughout the therapeutic process.

Integrating motivational quotes into cCBT applications serves as a strategic positive reinforcement tool to enhance the user's therapeutic experience. This element has been proven effective in improving patients' mood and motivation to remain engaged with the digital therapy intervention provided. Thus, the selection of the right quotes not only acts as a catalyst for therapy continuation but also directly contributes to increasing the overall effectiveness of the cCBT application.

COMICS

Comics represent a visual art medium wherein images are integrated with text, arranged in juxtaposed sequences to communicate narratives or convey information, spanning from concise single-panel cartoons to intricate, multi-page storylines. Comics can be used as: " Can visualise an interactive medium to convey information and therapy concepts…" (Informant 6). This approach can potentially enhance the engagement and accessibility of therapy for patients: "…particularly for us who perceive conventional text-based methods as less engaging or efficacious" (Informant 4). Comics can be used to provide information about mental health conditions: "Easy for our treatment strategies and coping skills in a visually appealing and easy-to-understand format" (Informants 4 and 6). Apart from that, "…comics can be used to provide information on mental health conditions, treatment strategies, and coping skills through visual engagement" (Informant 6).

In therapeutic contexts, depicting characters and narratives in comic form facilitates patients' connection with and comprehension of their experiences and challenges. Comics can be used to help patients think through visuals, emotions, and behaviours: "…this would allow us to understand better and manage aspects of our mental health" (Informants 4 and 6). In therapeutic sessions, comics may incorporate interactive components: "Fill-in-the-blank segments or decision-making scenarios, to engage us actively…" (Informants 4 and 6). Comics serve as a valuable tool for patients to visualise their thoughts, emotions, and behaviours, thereby aiding in their comprehension and management of various aspects related to mental health. In the following sections and subsections, this research encompasses comprehensive discussions, summaries, analyses of critical findings, and an exploration of its limitations.

Comics are a visual art medium that sequentially integrates images and text to convey narratives or information, ranging from simple cartoons to complex storylines. The medium has the potential to increase engagement and accessibility in therapy, especially for individuals who are less responsive to conventional text-based methods. In the context of mental health, comics can be used to convey information about conditions, treatment strategies, and coping skills through a more easily understood visual approach.

Active patient engagement in cCBT therapy is a key factor determining treatment effectiveness, and it is reinforced by comprehensive awareness and technological literacy among patients and facilitators. The success of this intervention, in turn, depends on strong support from families and technological infrastructure, in addition to user-friendly application design to ensure continued compliance. To increase motivation, elements such as inspirational quotes serve as positive reinforcement, while gamification approaches make the therapy process more interactive and enjoyable. Finally, the use of comics as a visual medium facilitates understanding of the therapy concepts, thus increasing accessibility and involvement of various patient groups.

CONCLUSION

IMPLICATION TOWARDS USER ENGAGEMENT

This study aimed to analyse user engagement towards the cCBT application. This qualitative research contributes substantially to the expanding literature on patients' engagement experiences with the computerised self-help package cCBT application (Siti Fadzilah et al. 2024). Similar to previous studies that have explored digital mental health interventions, this research provides in-depth insights into how patients interact with and benefit from cCBTs,

offering a nuanced understanding of the user experience and its impact on treatment outcomes (Mayer et al. 2022). Participants were recruited from a medical centre located in the country's capital city. Their depressive disorders, with durations ranging from 1 to 3 years, were confirmed through comprehensive clinical assessments and review of medical records, indicating a range from moderate to mild severity. In a previous study, this method demonstrated efficacy in the context of cCBT for depression (Wright et al. 2022). Participants exhibited diverse attitudes towards seeking help, with their adverse past experiences reinforcing assertions from prior research. In researching the engagement towards cCBT applications for treating mental health issues, success is attributed to knowledge, support, effectiveness, gamification, motivational quotes and comics.

Understanding the principles and benefits of cCBT, as well as its comparison to traditional therapy, is pivotal for users. Providing appropriate knowledge, clear explanations, and accessible information can significantly boost engagement with cCBT applications (Cavanagh & Millings 2013). cCBT implementations incorporate support mechanisms like chatbots, forums, or direct therapist interactions. Timely responses and guidance can enhance user trust and engagement (Wright & Mishkind 2020). It is crucial to establish research-supported evidence demonstrating the efficacy of cCBT in addressing diverse mental health conditions such as depression and anxiety. Patients' likelihood of engagement increases when they perceive the therapy as effective (Liu et al. 2021). Integrating gamification elements such as progress tracking, rewards, and challenges into cCBT applications has bolsters motivation and engagement, making therapy sessions more interactive and enjoyable (Fleming et al. 2021). Motivational quotes integrated into cCBT applications have the potential to inspire and uplift users during difficult times. Thoughtfully selected quotes can evoke emotional resonance and cultivate a constructive mental outlook (Beck et al. 2020). Visual aids such as comics or infographics have the potential to elucidate intricate concepts, enhancing accessibility and engagement for patients (Kearns & Kearns 2020). Furthermore, employing visual storytelling can effectively communicate therapeutic messages.

Enhancing engagement towards cCBT applications requires utilising strategies such as disseminating knowledge effectively, establishing support systems, validating effectiveness through research, integrating motivational elements like quotes and visual aids, and applying gamification principles thoughtfully to foster a supportive and engaging therapeutic environment.

LIMITATIONS

The research encountered certain limitations. Initially, the sample size was relatively small, and randomisation for interviews occurred before the completion of recruitment, precluding interviews with individuals who joined the study at a later stage. In this qualitative study with anticipated small sample size, achieving saturation, rather than generalizability, emerges as the critical concern, which was successfully attained. The study sample comprised participants from a medical centre in the country's capital city who volunteered to participate in research on engagement towards cCBT applications. Consequently, they exhibited more favourable attitudes towards this approach than individuals seeking specialised therapies. This study aimed to explore patients' experiences and engagement with the cCBT application, which is supported remotely. This delivery approach could offer significant support to individuals at a medical centre in the capital city. Subsequent research should evaluate the adoption and effectiveness of cCBT in clinical settings to enhance understanding of its potential as a treatment for patients with MDD. The final section includes the conclusion, which synthesises

findings and highlights critical outcomes, and future work, which discusses the research findings' broader significance and potential applications.

FUTURE WORKS

The study investigated the sustained engagement of patients with MDD towards cCBT applications when used alongside standard clinical care. This research uses semi-structured interviews and thematic analysis to identify critical factors influencing patient engagement, such as knowledge, support, effectiveness, gamification, motivational quotes, and comics.
The critical finding highlights that technological literacy and awareness significantly influence patient engagement. Appropriate knowledge and skills in utilising cCBT applications are essential for effective therapy. Additionally, emotional and technological support from family members and healthcare professionals significantly enhances patient adherence towards cCBT applications. Additionally, the effectiveness of cCBT applications, enhanced by psychologist supervision and guidance, promotes patient confidence and commitment. Furthermore, integrating interactive elements and games into cCBT applications can improve user experience, engagement and enjoyment, thereby increasing the appeal of therapy. Moreover, positive reinforcement through motivational quotes can enhance and sustain patient motivation throughout therapy sessions. Finally, using comics as a medium for presenting therapy concepts and strategies may enhance comprehension and engagement, especially among patients who perceive traditional text-based approaches as less compelling.

This research highlights the critical role of a multifaceted strategy in developing and deploying cCBT programs. To enhance patient engagement and therapeutic effectiveness, these applications should feature intuitive interfaces, robust support systems, and motivational and interactive components. The results support integrating cCBT into standard clinical care as an adjunctive therapy, presenting a cost-effective and accessible substitute for conventional treatments. Moreover, the research underscores cCBT's potential as a viable intervention for MDD. By addressing user engagement sub-themes such as knowledge acquisition, support mechanisms, effectiveness, gamification, motivational cues, and interactive elements like comics, cCBT programs can improve patient adherence and treatment outcomes. Ongoing research and development efforts in this domain are crucial for optimising the incorporation of cCBT into clinical settings, thereby enhancing the accessibility and effectiveness of mental health care. Future research and development are essential for optimising the integration of cCBT into clinical practice, focusing on enhancing user engagement. These advancements are vital to improving the accessibility and therapeutic outcomes of mental health interventions, thereby ensuring more effective treatment for a broader range of individuals.

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