



Evaluating the Efficacy of Telehealth-Based Treatments for Depression in Adults: A Rapid Review and Meta-Analysis

Behdin Nowrouzi-Kia^{1,2,3,4} · Ali Bani-Fatemi¹ · Tanya D. Jackson⁵ · Anson Kwok Choi Li^{1,6,7} · Vijay Kumar Chattu^{1,8,9} · Ellina Lytvyak⁵ · Danika Deibert⁵ · Liz Dennett¹⁰ · Martin Ferguson-Pell¹¹ · Reidar Hagtvedt⁵ · Charl Els^{5,12} · Quentin Durand-Moreau⁵ · Douglas P. Gross¹³ · Sebastian Straube^{5,14}

Accepted: 8 October 2024

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2024

Abstract

Purpose Major depressive disorder (MDD) is one of the leading causes of work-related disability, and accessing telehealth therapies can be a promising modality for workers with MDD. Barriers to accessing in-person mental healthcare, such as limited availability and accessibility in rural and remote communities, financial constraints, and stigma, have highlighted the need for alternative approaches like telehealth. This study investigated the efficacy of telehealth interventions including CBT for adults over 18 diagnosed with MDD.

Methods This rapid review and meta-analysis followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure a transparent methodology. Out of the 2549 studies screened, 19 were incorporated into the rapid review, and of those, 10 were included in the subsequent meta-analyses. Articles were screened independently by two reviewers, with the disagreements reconciled through discussion. A reviewer extracted data from eligible articles. Descriptive statistics and narrative syntheses were used to describe outcomes. Two meta-analyses were conducted to investigate the efficacy of cognitive behavioral therapy (CBT) delivered by telehealth (tCBT). The first compared tCBT to in-person CBT (pCBT). The second meta-analysis compared tCBT to a control group that did not receive CBT or another telehealth-based treatment. Non-CBT interventions investigated within the non-CBT group included somatic rhythm therapy, problem-solving therapy, psychiatry, behavioral activation, and interpersonal psychotherapy.

Results Overall, individuals with MDD who received tCBT showed significant improvement in depression symptoms. However, the efficacy of tCBT compared to non-telehealth control groups varied across studies. The first meta-analysis indicated the magnitudes of effect were similar for both interventions in reducing depression symptoms (0.023 (95% CI – 0.120 to 0.166); $p = 1.00$). In the second meta-analysis, the ratio of means comparing tCBT (0.51 ± 0.14 SD) to the control group (0.68 ± 0.12 SD) exhibited a statistically significant 25% reduction with regard to depression scores (one-sided $p = 0.002$), favouring tCBT to non-telehealth, non-CBT study groups.

Conclusions Telehealth-based CBT demonstrated positive effects on depression symptoms; it was generally superior when compared to control groups not receiving CBT and was on par with pCBT. The growing mental health burden in the community underscores the need for accessible telehealth services like tCBT. Effective policy formulation and implementation in national health agendas are essential to meet the increasing demand for mental health support.

Keywords Telehealth · Depression · Anxiety · Rapid review · Cognitive behavioral therapy · Mental health, psychology

Abbreviations

ACT	Acceptance and Commitment Therapy
BA	Behavioral Activation
BDI, BDI-II	Beck Depression Inventory; Beck Depression Inventory, Second Edition
CAU	Care as usual
CBT	Cognitive Behavioral Therapy

CM	Care management
COPD	Chronic Obstructive Pulmonary Disease
EFT	Emotion Focused Therapy
HAM-D	Hamilton Rating Scale for Depression
HIV	Human Immunodeficiency Virus
ICM	Intensive Clinical Management
IPT	Interpersonal Psychotherapy
MADRS	Montgomery-Asberg Depression Rating Scale

Extended author information available on the last page of the article

MDD	Major Depressive Disorder
MS	Multiple Sclerosis
pCBT	In-person Cognitive Behavioral Therapy
PHQ-9	Patient Health Questionnaire-9
PP	Positive Psychology
PST	Problem-Solving Therapy
PSY	Psychiatry
RCT	Randomized controlled trial
SF-36	36-Item Short Form Survey Instrument
SRT	Social Rhythm Therapy
TBI	Traumatic Brain Injury
tCBT	Telehealth Cognitive Behavioral Therapy

Introduction

Major depressive disorder (MDD) significantly contributes to work-related disability, and telehealth therapies present a hopeful treatment method for employees with MDD. Telehealth is here taken to mean treatment by a healthcare provider delivered synchronously one-on-one over telephone or video conference [1]. Although most Canadians continued to depend on in-person contact with doctors during the COVID-19 pandemic, nearly half have utilized alternative methods such as phone, email, videoconference, or text messages to access healthcare [1]. According to the Canadian Medical Association, individuals who connected with their healthcare professionals virtually during the pandemic reported positive care outcomes (e.g. convenience for patients, timeline of routine advice, cost of health system, timely access to specialists, access to timely tests, overall health of Canadians, and quality of care for routine needs) reaching 91%, which was higher than with in-person emergency room visits [2]. Of the Canadians that used virtual care during COVID-19, 46% said they would prefer virtual methods in the future as well [2].

According to the World Health Organization, approximately 280 million people worldwide are currently affected by depression [3]. In the fall of 2020, during the second wave of COVID-19, the lifetime prevalence of depression among Canadian adults was 15% (13% for males and 18% for females) [4]. Approximately half a million Canadians cannot work due to mental health problems each week [5]. Around 20% of the time, depression hinders an individual's capacity to fulfill physical job requirements, while cognitive performance experiences a decline of approximately 35% due to depression [6]. Depression imposes a significant burden on individuals struggling with it, their families, communities, and society [7–9]. The annual direct and indirect economic cost of mental illness in Canada in 2011 was around \$50 billion CAD [5].

Primary care serves as a crucial point of entry for initial depression treatment [10, 11]. Existing research indicates

over 80% of patients with depression seek care in general practice [12, 13]. However, the management of these patients is often suboptimal, with reports indicating nearly half of the individuals diagnosed with depression do not receive minimally adequate treatment [14]. Several complex factors have been identified as barriers to treatment for depression [15, 16]. Access to evidence-based psychotherapy is recognized as one of these challenges. Various factors, such as the training of professionals, time constraints, costs or workload, professionals' attitudes, and organizational factors as well as geographical and logistical difficulties can hinder the integration of psychotherapy in primary care.

Depression is a common work disability that negatively affects work performance [17]. Globally, Major Depressive Disorder (MDD) is the third leading cause of disability, and its rank is expected to increase over time [18]. A common theme in the literature is the cost of depression among employees in the workplace. A global burden of disease study identified an increase of 53.2 million cases of depression due to the COVID-19 pandemic, which is a 27.6% increase in 2020 compared to before the COVID-19 pandemic [7]. Evidently, the COVID-19 pandemic has exacerbated depression on a global scale, indicating the need to study this phenomenon in the context of therapy modalities.

Work and productivity are negatively impacted by depression. According to TELUS Health (2023), there are 55 and 53 working days lost per year in productivity among workers diagnosed with depression and anxiety, respectively [19]. Similarly, another study found individuals with MDD lose 5.6 h of productive time a week compared to their non-depressed counterparts [20], resulting in an estimated 225 million lost workdays annually in the United States associated with depression [21]. This is indicative of the impact depression can have on work performance. The economic burden of mental health in Canada is around \$12.3 billion CAD annually [22]. A national economic analysis in the United States found the estimated economic burden of American adults with MDD was over \$326.2 billion USD in the year 2020 [23]. Over the long term, cognitive behavioral therapy lowers health care sector costs by \$1800 USD and societal costs by \$2500 USD per patient [24]. Additionally, there is no significant difference in cost efficacy between cognitive behavioral therapy (CBT) and antidepressants, and given patients' preference for psychotherapy, increasing patient access to CBT is a cost-effective strategy [24]. Our study seeks to explore online-based CBT as a potential cost-effective strategy in comparison to traditional CBT.

There has been significant growth in the past decade of telehealth-based treatments that offer effective and cost-efficient brief psychotherapy for depression [25, 26]. In 2016, the Canadian Mental Health Association and the Canadian Psychiatric Association jointly recommended the development of telehealth and e-health services to ensure adequate

access to mental healthcare [26]. Although research in this area is still in its nascent stages, it is steadily expanding. Telehealth is a promising option as it mitigates certain barriers often hindering patients from accessing crucial treatment [27, 28]. These include transportation issues, financial constraints, child or family care, and limited availability of services in remote locations [29]. Telehealth also offers patients a chance to discuss their condition in detail, without the physical appearance of medical practitioners, which reduces the anxious feeling some patients feel when attending in-person treatments [30–32]. By eliminating the necessity to physically visit the provider's office, there is no need for transportation; additionally, avoiding crowded waiting rooms can reduce stress levels and the risk of infections.

Telehealth has shown to be helpful for Indigenous people living in rural and remote areas [29]. Particularly, virtual healthcare modalities are a potential solution to enhance access to and quality of primary healthcare in Indigenous communities.

However, barriers to the use of virtual healthcare have been identified such as a shortage of trained professionals [33, 34], difficulty in ensuring privacy and confidentiality, technological issues such as connectivity and internet speed, and geographical restrictions on practice and licensing [34]. Although telehealth allows patients to receive medical care conveniently, its delivery also introduces heightened risks, such as the uncertainty of a patient's exact location in case immediate access to emergency services is required [35]. Another challenge includes dealing with technical issues such as reliable internet service, image resolution, audio quality, and delays [36]. Between urban and rural regions, a digital divide has existed due to the costly nature of high-speed internet access and poor connectivity in rural areas, which includes many Indigenous communities [37]. Inequities in access to technology continue to intensify as persons with critical mental illnesses, including depression who need access to in-person therapy or require an extensive level of privacy and anonymity in regard to their matter, may not benefit from telehealth [38].

Data security merits consideration; to safeguard data, health care organizations should prioritize the establishment of a security-oriented culture as the initial step, where controls are in place to protect sensitive data, as advised by suitably qualified experts [39]. For individual practitioners, resources such as the American Psychological Association's Guidelines for the Practice of Telepsychology [40] and the Canadian Psychological Association Telepsychology Guidelines [41] provide guidance on best practices following updated regulations.

In this study, we build on previous work in this area. One published meta-analysis compared the efficacy of in-person CBT (pCBT) to CBT delivered by telehealth (tCBT) for psychiatric and somatic disorders [42]. Another meta-analysis

measured the efficacy of eHealth CBT on reducing depression and anxiety, and on quality-of-life measures [43]. A further meta-analysis investigated the utility of CBT, including CBT delivered by telehealth, for treating depression and anxiety in primary care [44]. Based on this previous work, we aim to provide an up-to-date review for this rapidly evolving field.

Further research is required to determine the clinical efficacy of telehealth in comparison to traditional in-person psychotherapy for individuals with depression. It remains uncertain if clinical outcomes are comparable between these two treatment modalities and whether telehealth significantly impacts the therapeutic process [36]. While telehealth may offer increased accessibility, there are challenges to providing remote psychotherapy. These challenges may include establishing a therapeutic alliance between the provider and patient, effectively managing intense emotions during virtual sessions, and managing termination.

With the potential for increased utilization of telehealth in delivering psychotherapy in the future, it is crucial to better comprehend how telehealth compares directly to traditional in-person delivery of the same psychotherapeutic interventions, such as CBT delivered as tCBT versus as pCBT. tCBT was found to be more effective than treatment as usual (TAU) for multiple psychological outcomes, and as efficient as face-to-face CBT in treating depression [45]. Therefore, the purpose of this rapid review was to search, filter, and synthesize the literature about the efficacy of telehealth treatment for patients with depression.

Methods: Rapid Review of Telehealth Treatments of Psychological Disorders

Overview

In this rapid review, we use the term telehealth to mean the provision of mental healthcare services using telecommunication technology, where a provider delivers treatment one-on-one remotely by phone or videoconference. The intervention had to be specifically tailored to individuals, excluding couples, family, or group therapy. The intervention had to encompass counseling/therapy focused on depression or a recognized modality effective for depression, such as: CBT [46], acceptance and commitment therapy (ACT) [47], or solution-focused therapy [48], as these are recommended psychotherapy interventions for the treatment of depression in adults.

This review was conducted according to the Cochrane Rapid Reviews Methods Group evidence-informed guidance on the conduct of rapid reviews [49]. Literature search strategies were developed by Liz Dennett, a librarian on the project team, for the databases MEDLINE, PsycINFO, and

CINAHL. These three databases were chosen to produce a comprehensive search yield for this topic. MEDLINE provides a focus on biomedical aspects of therapy, PsycINFO focuses on psychological aspects of therapy, and the articles retrieved from CINAHL cover nursing and allied health.

Search Strategy and Study Selection

The searches were limited to peer-reviewed English language journal articles published after January 1, 2011, to incorporate the most recent findings from the advancement of telehealth services. The searches were executed on January 12, 2022. The specific searches for each database are reproduced in Appendices A–C. After duplicates were removed, title and abstract screening of each of the remaining articles were performed independently by two reviewers, with arbitration completed by a third, senior reviewer when necessary. Covidence, a web-based collaboration software platform, was used throughout the screening process [50]. The inclusion criteria for the rapid review specified participants be over the age of 18 at the onset of the study and diagnosed with MDD via a validated self-report measure of depression, a phone interview, or by a provider. The intervention had to be telehealth counseling/therapy with a focus on depression or a modality recognized as effective for depression. We only considered intervention studies with a control group, including in-person or telehealth interventions, remote communication methods (such as text, email, or internet chat), apps, AI-based interventions, or control groups with waitlists or no treatment. Studies with a measured outcome needed to report either validated measures of depression severity, quality of life, or missed work time. Studies which focused on veterans, a population which was not the focus of our investigation, were excluded. Case reports, case series, and studies without control groups were excluded from this review.

Data Extraction and Meta-Analysis

For the articles that met the inclusion criteria, data were extracted from each article by one of the authors. Extracted data included author names, publication year, title, study size, number of women, average age, mental condition, population demographics, ethnic group, economic group, type of therapy, method of delivery, provider qualifications, and outcome measures. In this review, two meta-analyses were performed. The first meta-analysis compared tCBT with a non-telehealth, non-CBT control group. The second meta-analysis compared tCBT with pCBT. Extracted data included ratings of MDD treatment efficacy, overall and work-specific functioning (when relevant), work time missed, adherence to comorbid medications and psychotherapy, satisfaction,

quality of life, therapeutic alliance, and interpersonal distress.

Statistical Analysis

The two meta-analyses performed pooled the questionnaire results of studies using the Patient Health Questionnaire-9 (PHQ-9) [51–53], Hamilton Rating Scale for Depression (HAM-D) [54–56], Montgomery-Asberg Depression Rating Scale (MADRS) [57, 58], and Beck Depression Inventory (BDI) [59, 60] to assess pre- and post-treatment efficacy in reducing depression symptoms. Higher scores indicate a higher risk of depression. Data from HAM-D were used in the analysis for studies that reported both PHQ-9 and HAM-D. A ratio of means approach [61] was used to analyze the continuous outcomes of the questionnaire results. A random effects model with the DerSimonian-Laird weights applied was used to compare the ratio of means. The I^2 statistic was used to assess the percentage of variability across studies attributable to heterogeneity.

Meta-Analysis

The first meta-analysis was performed to compare tCBT with pCBT. The second meta-analysis compared tCBT with a non-telehealth, non-CBT control group. A ratio of means approach [61] was used to analyze continuous outcomes of the pre- and post-therapy questionnaire results. A ratio of means < 1 indicates the post-treatment depression scores are lower than baseline scores. The same calculation was made to the standard deviation for both intervention groups. For the two studies that did not provide a standard deviation [62, 63], it was imputed by taking the average post-treatment standard deviations across the other studies [64].

An independent one-sided *t*-test was also conducted to determine any significant differences in the pre- and post-intervention ratio of means between the tCBT and the non-telehealth intervention groups. The weighted mean of the effect size was calculated using the formula $1/(\text{standard error})^2$. Studies with a low standard error or those with a large sample size contributed more to the overall mean [65]. Where a study was entered as more than one row into a meta-analysis, the weighting of those entries was adjusted accordingly. All analyses were performed with IBM SPSS Statistics 28.0 (Armonk, United States of America) [66].

Results

Overall Summary of All Relevant Articles

The database searches retrieved 3949 articles, with 1400 duplicates removed. This resulted in 2549 articles for

the title and abstract screening. Out of these, 141 articles were selected for full-text screening as well as one additional study identified from a website, and 19 from the 142 screened full-texts were included in this review. The study flow and reasons for excluding full-text records are shown in the PRISMA diagram in Fig. 1.

All 19 of the selected studies utilized an RCT study design with two or more study groups, with the sample size of each varying between 34 and 442 participants. Most articles provided a breakdown based on either the sex ($n=7$) or gender ($n=10$) of the study population. In the studies where sex was collected, women accounted for 37%–100% of the total sample. In the studies where gender was collected, people identifying as women accounted for 50% to 78% of the study population. There were two studies that did not indicate whether sex or gender was collected or used the two terms interchangeably within the article.

Most studies ($n=14$) evaluated interventions that either solely utilized CBT or combined CBT with another telehealth intervention (Table 1). Specifically, there were four articles where other modalities were also incorporated into the use of a tCBT intervention. This included ACT [67]; care management [68]; behavioral activation [69]; and care coordination and work coaching [70].

The study population consisted of patients who were diagnosed with MDD; nine studies also had participants with

comorbid conditions, including: alcohol use [79], chronic obstructive pulmonary disease (COPD) [76], COVID-19 [67], diabetes [63], HIV/AIDS [71, 78], multiple sclerosis [74], and traumatic brain injury [77].

Most of the articles measured more than one outcome; these, and the results, are summarized in Tables 2 and 3. Overall, 95% ($n=19$) of the articles measured the efficacy of psychological therapy in reducing MDD. The other outcomes measured included: improvements in quality of life or severity of comorbid conditions ($n=6$); efficacy in reducing anxiety symptoms ($n=3$); satisfaction with telehealth treatment compared to non-telehealth treatment ($n=5$); therapeutic alliance between patient and provider ($n=4$); adherence to the telehealth therapy ($n=2$); work-specific functioning ($n=2$); work time missed ($n=2$); overall functioning ($n=2$); and cost-effectiveness ($n=1$).

Summary of Telehealth Cognitive Behavioral Therapy Results

Efficacy of tCBT in Comparison with pCBT in Reducing Depression Symptoms

We summarized the results of the articles ($n=14$) examining CBT and their corresponding outcomes and the non-telehealth control groups (Table 2). In general, there were

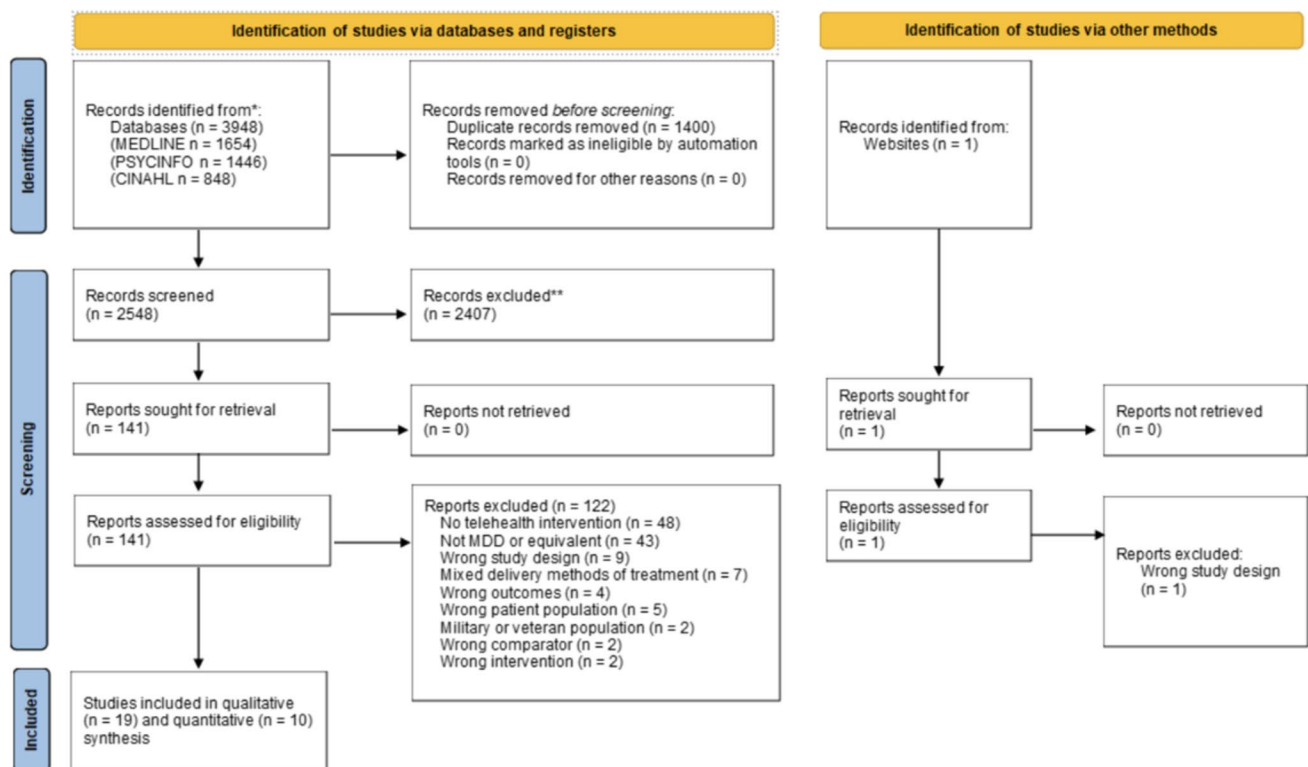


Fig. 1 PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources

Table 1 Summary of the study characteristics included in this rapid review and meta-analysis

No	Authors, Year, Country	Telehealth Intervention	Sample Size (% Female)	Telehealth Modality	Outcome Measures Meta-Analyzed
1	Al-Alawi et al., 2021, Oman [67]	ACT CBT	<i>n</i> = 46 (78%)	Videoconferencing	–
2	Algeria et al., 2014, USA [68]	CM CBT	<i>n</i> = 257 (82%)	Telephone	–
3	Anderson et al., 2018, USA [71]	IPT	<i>n</i> = 147 (38%)	Telephone	–
4	Chong and Moreno, 2012, USA [72]	PSY	<i>n</i> = 167 (89%)	Videoconferencing	–
5	Corruble et al., 2016, France [73]	ICM SRT	<i>n</i> = 442 (70%)	Telephone	–
6	Cosio et al., 2011, USA [74]	CBT EFT	<i>n</i> = 127 (77%)	Telephone	–
7	Dennis et al., 2020, Canada [75]	IPT	<i>n</i> = 241 (100%)	Telephone	–
8	Doyle et al., 2017, Australia [76]	CBT	<i>n</i> = 110 (65%)	Telephone	PHQ-9
9	Dwight-Johnson et al., 2011, USA [69]	BA CBT	<i>n</i> = 101 (78%)	Telephone	PHQ-9
10	Fann et al., 2015, USA [77]	CBT	<i>n</i> = 100 (37%)	Telephone	HAM-D
11	Himelhoch et al., 2013, USA [78]	CBT	<i>n</i> = 34 (74%)	Telephone	HAM-D
12	Kafali et al., 2014, USA [62]	CBT	<i>n</i> = 257 (87%)	Telephone	PHQ-9
13	Kalapatapu et al., 2014, USA [79]	CBT	<i>n</i> = 103 (87%)	Telephone	HAM-D
14	Lam et al., 2013, Canada [80]	CBT	<i>n</i> = 99 (55%)	Telephone	MADRS
15	Lerner et al., 2015, USA [70]	CBT	<i>n</i> = 421 (73%)	Telephone	PHQ-9
16	Marti et al., 2021, USA [81]	BA PST	<i>n</i> = 277 (70%)	Telephone	–
17	Mohr et al., 2012, USA [82]	CBT	<i>n</i> = 325 (78%)	Telephone	HAM-D
18	Nicholas et al., 2021, USA [83]	CBT	<i>n</i> = 312 (41%)	Telephone; Internet	–
19	Piette et al., 2011, USA [63]	CBT	<i>n</i> = 291 (50%)	Telephone	BDI

ACT Acceptance and Commitment Therapy, BA Behavioral Activation, CBT Cognitive Behavioral Therapy, CM Care management, EFT Emotion Focused Therapy, ICM Intensive Clinical Management, IPT Interpersonal Psychotherapy, PST Problem-Solving Therapy, PSY Psychiatry, SRT Social Rhythm Therapy, PHQ-9 Patient Health Questionnaire—9, BDI-II, BDI Beck Depression Inventory, HAM-D Hamilton Rating Scale for Depression, MADRS Montgomery-Asberg Depression Rating Scale

statistically significant improvements in depression symptoms in patients who received tCBT when baseline and post-treatment levels were compared. However, the results were mixed when comparing the efficacy of tCBT with a non-telehealth control group in reducing depression symptoms at post-treatment time points. Overall, seven studies showed that tCBT resulted in more improvement than pCBT [62, 63, 68–70, 76, 77]. For one study, there was not as much improvement with tCBT as with pCBT [82]. Finally, both modalities were found to be comparably efficacious regarding depression symptoms in the remaining five studies [63, 78–80, 82], with significant improvements demonstrated from baseline levels [78, 79, 82]. While Mohr et al. (2012) observed no difference in the efficacy between tCBT and pCBT at the end of the treatment, at the 6-month follow-up, those who received pCBT were statistically significantly less depressed than those who received tCBT; however, the magnitude of the group difference missed thresholds for clinical significance [82]. Nicholas et al. (2011) found tCBT and

internet-based treatment both reduced MDD symptoms after five weeks of treatment; the same study found no significant differences between the efficacy of either type of treatment [83]. Another study found tCBT to be more effective in decreasing MDD symptoms than an email newsletter with self-help information and tips [67].

Efficacy of tCBT in Comparison with Care as Usual in Reducing Depression Symptoms

In three of the five articles where care as usual (CAU) or enhanced care as usual was used as the control arm, significantly higher levels of improvement in depression symptoms were observed with tCBT [62, 68, 69]. The randomized control trial from Alegria et al. assessing the efficacy of the Engagement and Counseling for Latinos (ECLA), which is CBT with care management, showed the telephone version of ECLA was more effective than usual care; they also found high treatment initiation for the telephonic mode

Table 2 Outcomes of CBT interventions (*n* = 14) compared to the control groups or baseline scores

Authors, Year, Country	Telehealth CBT Intervention Group	Control Group 1	Control Group 2	Comorbid Condition	Comorbid Condition Severity	Efficacy (MDD)	Efficacy (Anxiety)	QoL	Work Time Missed	Treatment Intensity	Follow-up
Al-Alawi et al., 2021, Oman [67]	CBT/ACT	Email newsletters	COVID-19	-	-	↑C	↑C	-	-	6 sessions over 6 weeks, 60 min each	Week 6
Alegria et al., 2014, USA [68]	CBT + CM	CBT + CM (f2f)	CAU	-	-	↑C	-	-	-	6-8 sessions over 6-8 weeks	Week 8, 16
Cosio et al., 2011, USA [74]	CBT	EFT (Tel-ehealth)	-	MS	-	-	-	↑B ↑T	-	16 weeks, 50 min each	-
Doyle et al., 2017, Australia [76]	CBT	Befriending	-	COPD	ØB ↓C	↑B ↑C	ØB ↓C	ØB ↓C	-	8 sessions over 8 weeks	Week 8
Dwight-Johnson et al., 2011, USA [69]	CBT + BA	Enhanced usual care	-	-	-	↑B ↑C	-	-	-	8 sessions over 8 weeks	Week 6, 12, 24
Fann et al., 2015, USA [77]	CBT	pCBT	CAU	TBI	ØC	↑C	-	ØC	-	12 sessions over 12 weeks, 30 to 60 min each	Week 8, 16, 24
Himelhoch et al., 2013, USA [78]	CBT	pCBT	-	HIV	↑C	↑B ØC	-	↑C	-	5 sessions of BA, 5 sessions of cognitive restructuring over 14 weeks, 45 min each	Week 7, 14
Kafali et al., 2014, USA [62]	CBT	pCBT	CAU	-	-	↑C	-	-	-	6-8 sessions over 4 months, 1 h each	Month 2, 4
Kalapatapu et al., 2014, USA [79]	CBT	pCBT	-	Alcohol use	↑B ØC	↑B ØC	-	↑B ØC	-	18 sessions over 18 weeks, 45 min each	Month 3, 6
Lam et al., 2013, Canada [80]	CBT	Adherence reminder calls	-	-	-	↑B ØC	-	-	ØB ØC	8 sessions over 8-10 weeks, 45 min each	Month 2, 4, 8, 12
Lerner et al., 2015, USA [70]	CBT strategy development + care coordination	CAU	-	-	-	↑B ↑C	-	-	↑B ↑C	8 sessions over 4 months, 50 min each	Month 4

Table 2 (continued)

Authors, Year, Country	Telehealth CBT Intervention Group	Control Group 1	Control Group 2	Comorbid Condition	Comorbidity Severity	Efficacy (MDD)	Efficacy (Anxiety)	QoL	Work Time Missed	Treatment Intensity	Follow-up
Mohr et al., 2012, USA [82]	CBT	-	pCBT	-	-	↑B ∅/↓C	-	-	-	18 sessions over 18 weeks, 18 to 45 min each	Month 3, 6
Nicholas et al., 2021, USA [83]	CBT	-	CBT (internet-based)	-	-	↑B ∅T	-	-	-	5 sessions over 5 weeks, 45–50 min each	Month 5
Piette et al., 2011, USA [63]	CBT	-	CAU	Diabetes	↑∅B ↑∅C	↑B ↑∅C	-	↑∅B ↑∅C	-	12 sessions over 12 months, length n/a	Month 12

ACT Acceptance and Commitment Therapy, BA Behavioral Activation, CBT Cognitive Behavioral Therapy, CM Care management, EFT Emotion Focused Therapy, CAU care as usual, MS Multiple Sclerosis, COPD Chronic Obstructive Pulmonary Disease, TB/Traumatic Brain Injury, HIV Human Immunodeficiency Virus

↑B improvement compared to baseline, ↓B worse than baseline, ↑∅B mix of improvements and no change compared to baseline, ∅B no change/difference compared to baseline, ↑C improvement compared to control group, ↓C worse than control group, ↑∅C mix of improvements and no change compared to control, ∅C no change/difference compared to control group. ↑T improvement compared to other telehealth group, ↓T worse than other telehealth group, ∅T no change/difference between two telehealth psychotherapies. “-” indicates not applicable or not assessed

suggesting an improvement in access and quality of care [68]. One exception was Piette et al. (2011) who observed varying degrees of efficacy in tCBT when compared against both baseline levels and the control group (CAU) [63]. The overall study population was stratified based on the complexity level of the patients' diabetes. The lower complexity study group had higher levels of improvement from their baseline depression symptoms compared to the medium and high complexity patients. Similarly, when efficacy was compared between the tCBT and control group, a significant improvement was found in the low-complexity patients but not in the medium and high-complexity groups.

Efficacy of tCBT in Comparison with non-CBT Telehealth Interventions in Reducing Depression Symptoms

Cosio et al. examined changes in depression and its effect on quality of life [74]. Interestingly, when compared to telephone administered supportive emotion focused therapy, tCBT provided greater improvement in quality of life which controlled for non-specific treatment components [74]. This study further suggests tCBT procedures specific to the management of depression and positive affect, were useful in improving quality of life.

Summary of Other Telehealth Psychotherapy Results

Efficacy of Non-CBT Interventions in Comparison with Other Telehealth Interventions and Non-Telehealth Control Groups in Reducing Depression Symptoms

A similar review process for the articles assessing one or more non-CBT telehealth interventions ($n = 5$) was performed and the results are summarized in Table 3. While the number of articles assessing each of the various psychotherapies was limited ($n = 1$ or 2), collectively there was a general positive impact in reducing depression symptoms when the telehealth intervention group was compared to either the control group (100%; $n = 4$) or its baseline levels (100%; $n = 5$). When comparing the efficacy between different telehealth interventions ($n = 2$), no significant differences between groups were found [73, 81].

Efficacy of Non-CBT Telehealth Psychotherapies in Comparison with Usual Care in Reducing Depression Symptoms

In the studies where CAU or enhanced usual care was used as the control group ($n = 4$), all telehealth-delivered interventions had significantly higher levels of improvement in depression symptoms, suggesting the overall efficacy of telehealth psychotherapies is better than CAU [71–73, 75].

Table 3 Outcomes of non-CBT interventions (*n* = 5) compared to the control group (non-telehealth administered intervention) or baseline scores

Authors, Year, Country	Non-CBT Intervention 1	Non-CBT Intervention 2	Non-Telehealth Control	Comorbid Condition	Comorbid Condition Severity	Efficacy (MDD)	Efficacy (Anxiety)	QoL	Work Time Missed	Treatment Duration	Follow-up
Anderson et al., 2018, USA [71]	IPT	-	CAU	HIV/AIDS	-	↑B ↑C	-	-	-	9 sessions over 9 weeks, 60 min each	Week 9
Chong and Moreno, 2012, USA [72]	PSY	-	CAU	-	-	↑B ↑C	-	-	∅C	6 sessions over 6 months, 30 min each	Month 3, 6
Corruble et al., 2016, France [73]	SRT	ICM	CAU	-	-	↑B ↑C ∅T	-	-	-	8 sessions over 8 weeks, 30–45 min each	Week 2, 8
Dennis et al., 2020, Canada [75]	IPT	-	CAU	-	↑B ↑C	↑B ↑C	↑B ↑C	-	-	12 sessions over 12 weeks, 60 min each	Week 12, 24, 36
Marti et al., 2021, USA [81]	BA	PST	Support calls	Disability	↑B ∅T	↑B ∅T	-	-	-	5 sessions over 5 weeks, 60 min each	Week 12, 24, 36

ACT Acceptance and Commitment Therapy, *BA* Behavioral Activation, *CBT* Cognitive Behavioral Therapy, *CM* Care management, *EFT* Emotion Focused Therapy, *ICM* Intensive Clinical Management, *IPT* Interpersonal Psychotherapy, *EFT* Emotion Focused Therapy, *PP* Positive Psychology, *PST* Problem-Solving Therapy, *PSY* Psychiatry, *ICM* Intensive Clinical Management, *SRT* Social Rhythm Therapy, *BA* Behavioral Activation, *PST* Problem-Solving Therapy

↑B improvement compared to baseline, ↓B worse than baseline, ↑∅B mix of improvements and no change compared to baseline, ∅B no change/difference compared to baseline. ↑C improvement compared to control group, ↓C worse than control group, ↑∅C mix of improvements and no change compared to control, ∅C no change/difference compared to control group. ↑T improvement compared to other telehealth group, ↓T worse than other telehealth group, ∅T no change/difference between two telehealth psychotherapies. “-” indicates either not applicable or not assessed

Meta-Analysis – Results

Meta-Analysis Comparing tCBT with pCBT

In the meta-analysis that compared tCBT with pCBT, the overall effect size of the pooled results from the six studies on depression scores was 0.023 (95% CI – 0.120 to 0.166); $p = 1.00$ (Fig. 2). Therefore, there was no significant difference between the ratio of means for the tCBT and the control group.

Meta-Analysis Compared tCBT with a Non-Telehealth, Non-CBT Control Group

In the meta-analysis that compared tCBT with a non-telehealth, non-CBT control group, the overall effect size of the pooled results from the seven studies was – 0.155 (95% CI – 0.27 to – 0.04) (Fig. 3). There was a 25% reduction in the ratio of means between the tCBT (0.51 ± 0.14 SD) and the control group (0.68 ± 0.12 SD) with regard to depression scores, which was statistically significant (one-sided $p = 0.002$).

Fig. 2 Random effects model comparing the ratio of means of pre- and post-intervention depression scores between tCBT and pCBT study groups

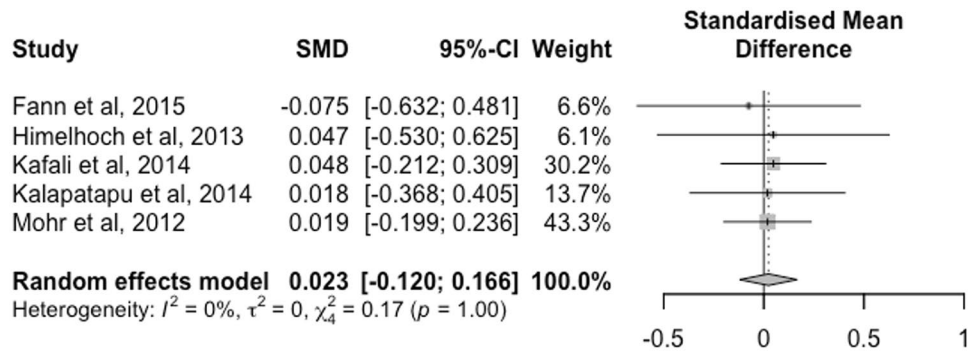
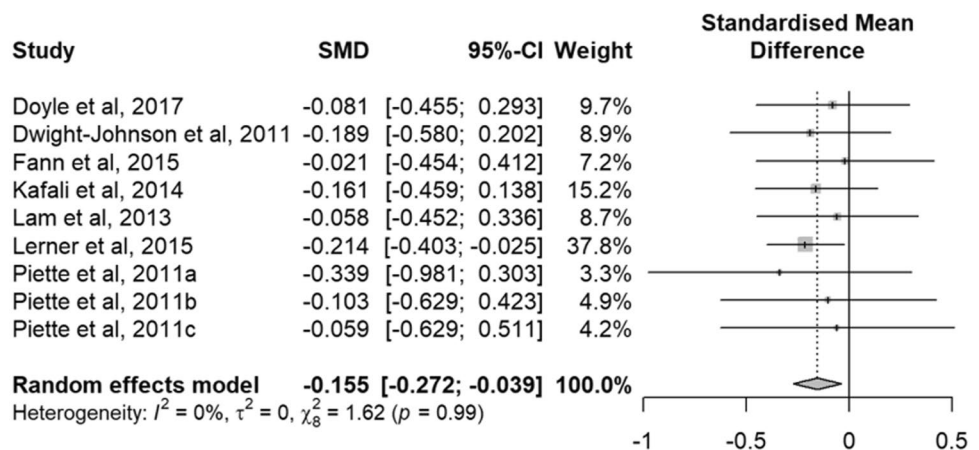


Fig. 3 Random effects model comparing the ratio of means of pre- and post-intervention depression scores between tCBT and non-telehealth, non-CBT study groups. Piette et al., 2011 a, b, c represents the Low, Medium, and High clinical complexity study groups



Publication Bias Assessments—Results

Funnel Plots Compared Depression Scores Between Both tCBT and Non-Telehealth, CBT Study Groups, and Non-Telehealth, Non-CBT Study Groups

Funnel plots, shown in Figs. 4, 5, were used as a visual representation to assess publication bias for depression scores between both tCBT and non-telehealth, CBT study groups, and tCBT and non-telehealth, non-CBT study groups. Results suggest no evidence of publication bias. The center line on both figures, which denotes no influence (Standardized Mean Difference = 0), is surrounded by the data points (shown as circles) rather evenly, in contrast to an asymmetric plot where points would concentrate primarily on one side, indicating potential publication bias. Even though there are a few outliers presented, this variation may be due to true heterogeneity or variations in the study methodology.

Egger's Tests Compared Depression Scores Between Both tCBT and Non-Telehealth, CBT Study Groups, and Non-Telehealth, Non-CBT Study Groups

The Egger's test was included to offer more comprehension related to the overall conclusions of bias (refer to Appendix D and Appendix E). Assuming the null hypothesis is

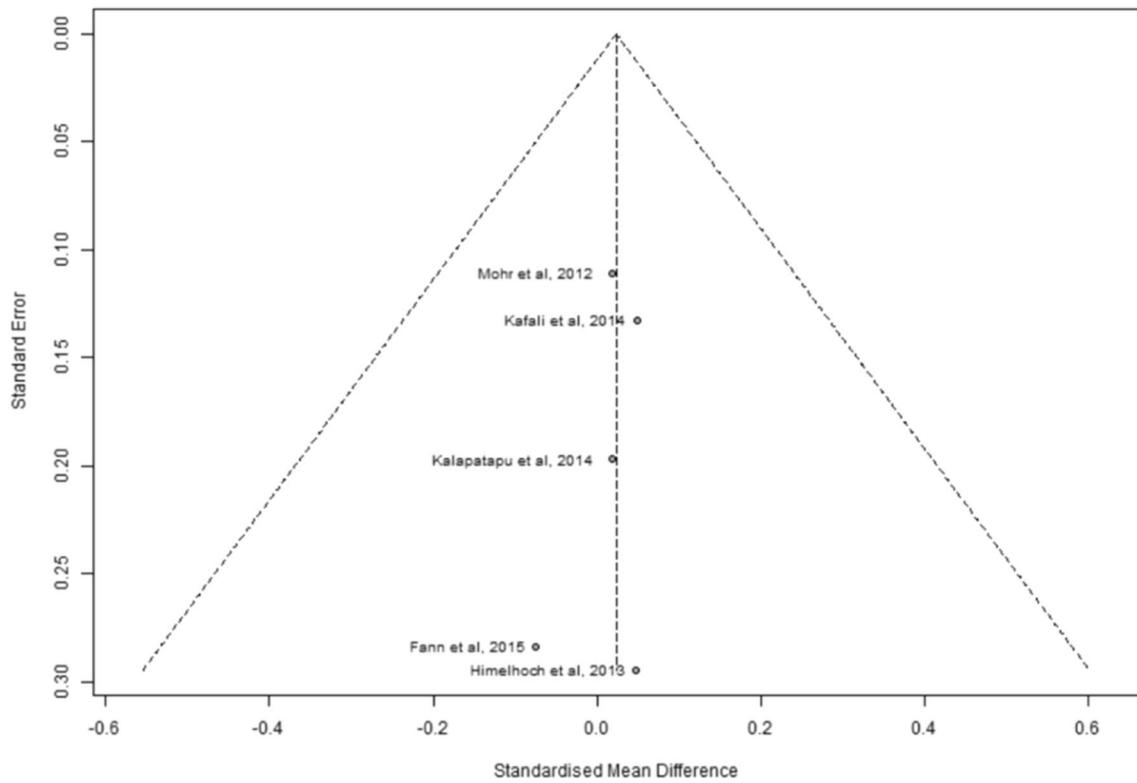
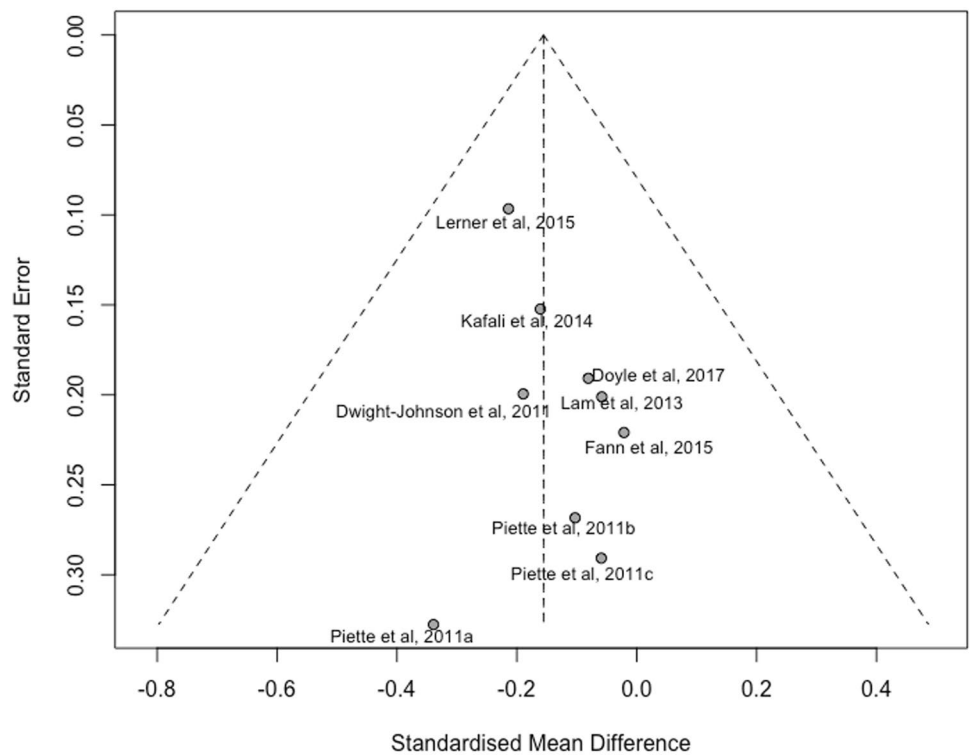


Fig. 4 Funnel Plot Assessment Model among depression scores between tCBT and non-telehealth, CBT study groups

Fig. 5 Funnel Plot Assessment Model among depression scores between tCBT and non-telehealth, non-CBT study groups



true, it implies no publication bias. Based on the p -value of 0.48 in Appendix D and the p -value of 0.22 in Appendix E, both values are greater than the significance level of 0.05; therefore, we fail to reject the null hypothesis, indicating no dependable evidence of publication bias, in agreement with the results of the funnel plots.

Discussion

We reviewed the literature on telehealth treatments for depression. Although there is a longstanding theoretical foundation and empirical evidence to demonstrate the efficacy of telehealth interventions for psychological disorders [25, 84], this is the first rapid review focused explicitly on adults experiencing MDD.

Our research plan centered on telehealth approaches to mental healthcare for several reasons. Firstly, due to COVID-19 restrictions, telehealth methods were extensively utilized in recent years as an alternative to in-person visits. Secondly, telehealth has the potential to facilitate easier access to treatment, allowing clients to connect with providers who specialize in specific areas and thus address systemic inequities in access to health services. Lastly, it is anticipated telehealth will continue to be increasingly integrated into therapeutic practices in Canada. Of the 19 papers reviewed, most of the papers ($n = 14$) examined tCBT. Identified studies included individual telehealth interventions to reduce depression symptoms or work time missed or increase the quality of life.

The significance of this analysis lies in its practical implications, considering the growing emphasis on psychological well-being in the workplace at both national and international levels. Stakeholders have joined forces to prioritize the mental health of employees, recognizing that when workers experience mental health issues, it leads to substantial costs for both employers and the overall system. In Canada alone, the estimated indirect costs attributed to depression and anxiety disorders for working adults in 2015 amounted to \$51.6 billion CAD [5, 85]. For example, the annual cost of untreated depression (related to barriers in accessing care) for a single small corporation in British Columbia is estimated to be close to \$1.4 million CAD [86]. Factors contributing to untreated depression include mental health stigma, long wait times for mental health services, and patients being unaware of the presence of their condition (i.e., depression), all of which can create reluctance to seek counseling or other treatment modalities [86]. These indirect costs encompass various factors such as absenteeism and pathological presenteeism, resulting in decreased

productivity, diminished work quality, and reduced levels of engagement and morale.

We conclude there were statistically significant improvements in depression symptoms in patients who received tCBT when baseline and post-treatment levels were compared, underscoring the efficacy of telehealth interventions in addressing mental health issues. These findings also align with those observed in existing literature. For instance, a systematic review conducted by Hao et al. (2023) found that telehealth interventions, including tCBT, were effective in reducing anxiety, stress, and loneliness, as well as improving quality of life among adults during the COVID-19 pandemic [87].

Moreover, we assessed tCBT in comparison with CAU in reducing depression symptoms and found Wright et al. on remote treatment delivery and computer-assisted CBT (e.g. where a computer program is used for building CBT knowledge and skills, thus reducing the amount of provider time needed for treatment) have found face-to-face interventions (either in-person or online) and self-help online resources produce effective results [88, 89]. However, Carlbring et al. highlighted no differences in outcomes have been documented in studies comparing computer-assisted CBT to face-to-face treatment [42].

Regarding the efficacy of tCBT in comparison with pCBT telehealth interventions and non-telehealth control group(s) in reducing depression symptoms, our review showed a general positive impact in reducing depression symptoms when the telehealth intervention group was compared to the control group. Telephonically delivered psychotherapy showed no reduction in efficacy compared to in-person therapy and a benefit for telephonic treatment in terms of completion rate [82]. Finally, our meta-analysis compared tCBT with pCBT and found no statistically significant difference, suggesting both interventions have a similar impact in reducing depression symptoms. For the studies where patients completed more than one questionnaire, each of the questionnaire results were included in the corresponding meta-analyses and weighted according to the study's standard error and sample size. Thus, the results of different questionnaires for the same patient population were included [79, 82].

As shown in our review, telehealth interventions for depression such as cognitive behavioral therapy are efficacious. Overall, there appears to be no significant difference in efficacy between pCBT and tCBT in treating depression [82]. Both pCBT and tCBT can be used to address depression [63, 78–80, 82]. In addition, tCBT can address other accessibility issues by removing physical barriers such as cost of transportation, mode of transportation, time to travel to clinic, and facilitating childcare arrangements at home

[90]. Moreover, tCBT has the potential to be used in the return-to-work process to support workers' mental health. This is especially important for workers who also have work-related (or other) physical injuries affecting mobility [91]. tCBT could be especially convenient and economical for those employees who work from home/remotely with access to the internet [90].

In the context of reducing anxiety symptoms, our review results were mixed when comparing the tCBT and control groups. In one study, tCBT was found to be less effective than the control [76], while in one it was more effective [67]. In the single study comparing baseline and post-treatment levels of anxiety for the tCBT group, no significant change was found [76]. The efficacy of tCBT in the improvement of quality of life and comorbid symptoms also showed mixed results in our review. The results were mixed when comparing baseline levels within the tCBT group ($n=3$) with some studies observing an improvement and one other study observing no change [76].

Furthermore, 10 of the 19 (53%) reviewed papers included patients with comorbid conditions. This has implications because when there are comorbidities, the response to treatment may be weaker than participants without comorbidities due to the complexity of managing simultaneous medical conditions [92]. Increased complexity in disease management is associated with more trial and error in treatment strategies [93]. When a treatment plan proves ineffective, further trials of alternative measures are often necessary. These repeated interventions can place additional strain on patients, especially those already weakened by their underlying conditions. In such cases, it may be beneficial to continue incorporating telehealth as part of the therapeutic approach. Telehealth not only provides easily accessible healthcare options but also allows patients to connect with specialists outside their geographical area, which can be particularly helpful when local resources are exhausted. However, it is essential for mental health practitioners to remain vigilant; if a patient does not benefit from telehealth, clinicians should consider transitioning to in-person or other alternative treatment options where feasible [94].

Future Research

The reader should be mindful of the limitations of our rapid review process, which only considered literature published in English. Future reviews may contemplate incorporating studies published in languages other than English. Further, we recommend the inclusion of a measure of perceived disability to provide a more fine-grained analysis into the impacts of MDD and CBT on

work-related functioning. A measure of perceived disability can allow for a more nuanced understanding of how MDD impacts the ability to perform work-related tasks. Experimental and observational studies should consider assessing work time missed and utilizing measures of perceived disability to capture the impact MDD and tCBT has on work, school, and daily life functioning. Finally, our study descriptively captures comorbid condition severity and QoL measures. Currently, comorbid condition severity and QoL measures are not consistently reported in the literature. Future research should aim for consistent reporting. These are potential avenues for future analysis as more studies become available.

Conclusions

This rapid review explored the efficacy of tCBT in comparison with a non-telehealth control group in reducing depression symptoms, anxiety, and in improving quality of life and functioning. Our results highlight the potential of tCBT in delivering efficacious treatment, as telehealth-delivered interventions had significantly higher levels of improvement in depression symptoms compared to a control group as well as being superior to CAU. Our meta-analysis results also indicate both tCBT and pCBT have a similar impact in reducing depression symptoms. Availability of tCBT and other telehealth services may help meet the demands of increasing mental health challenges.

Appendix A

MEDLINE Search Strategy

1	mood disorders/ or depressive disorder/
2	depression/
3	(depressive disorder* or depressive symptom* or depression or ((Peripartum or peri partum or perinatal or peri natal or antenatal or ante natal or antepartum or ante partum or postpartum or post partum or postnatal or post natal or postnatal or prenatal or pre natal or pregnan* or puerper*) adj5 depress*)).mp
4	1 or 2 or 3

5	(telepsych* or ((Online or virtual or remote* or video or digital or telephone or phone or tele) adj4 (Psychotherap* or psychodynamic therap* or counseling or counseling or CBT or CBASP or behavior* therap* or behavior* activation therap* or behavior* bibliotherapy or cognitive therap* or supportive therap* or problem-solving therap* or attention-control or life-review therapy or "Acceptance and commitment therapy" or Narrative therapy or Solution-Focused Therapy or accelerated resolution therap* or adaptive disclosure therap* or ADP))).mp	15	((humanistic or existential or client-cent* or person-cent* or Rogerian or integrative or eclectic) adj4 (therap* or treatment* or intervention* or counseling or counseling)).mp
6	((Online or virtual or remote* or video or digital or telephone or phone or tele) adj4 (humanistic or existential or client-cent* or person-cent* or Rogerian or integrative or eclectic) adj4 (therap* or treatment* or intervention* or counseling or counseling)).mp	16	13 or 14 or 15
7	5 or 6	17	7 or (12 and 16)
8	telemedicine/ or remote consultation/ or Videoconferencing/	18	4 and 17
9	(teletherap* or telehealth or telemedicine or teleconsult* or mobile-health* or mhealth or m-health or distance health* or electronic-health* or ehealth or e-health or virtual health or Remote delivery or electronic-delivery or digital health or video conferenc* or videoconferenc* or teleconferenc* or teleconferen* or video-to-home or video-visit* or video-technology).mp	19	limit 18 to english language
10	((Online or virtual or remote* or video or digital or telephone or phone or tele) adj4 (therapy or treatment* or counseling or intervention* or program* or diagnos* or assessment or evaluation or follow-up or care or health or consult* or communicat* or medicine)).mp	20	limit 19 to yr= "2011 -Current"
11	((remote or online or virtual* or electronic* or digital* or distan*) adj2 deliver*).mp	21	(pubmed or medline or cochrane or scopus or web-of-science or cinahl). tw. or (technology assessment or hta). jw,mp. or ((systematic* or evidence-based or scoping or umbrella or integrative or rapid) adj3 (review* or overview*).mp.pt.jw. or meta-analy*. pt,mp. or (meta-analy* or meta analy* or metaanalys* or research-synthesis). tw. or search*.ab
12	8 or 9 or 10 or 11	22	exp Clinical trial/ or clinical study/ or comparative study/ or exp cohort studies/ or controlled before-after studies/ or interrupted time series analysis/ or (randomi* or randomly or (random adj4 (allocat* or distribut* or assign*)) or placebo or trial or groups or subgroups or (phase adj1 ("3" or "2" or "1" or III or II or I)) or quasirandom* or control group or interventional study or interventional design or clinical study or experimental study or experimental design or "pre/post" or "pre-post" or "pre and post" or "before and after" or interrupted time series or cohort* or longitudinal or prospective* or retrospective* or follow-up or "between group*").mp. or rct.ti
13	psychotherapy/ or behavior therapy/ or cognitive behavioral therapy/ or "acceptance and commitment therapy"/ or dialectical behavior therapy/	23	("Clinical Assessment of Depression" or "Reynolds Depression Screening" or "Firestone Assessment of Self-Destructive Thoughts" or "Firestone Assessment of Suicide Intent" or Beck Depression or "BDI-II" or Patient Health Questionnaire or "PHQ-9" or Hamilton Depression Rating Scale or HAM-D or Short Form Health Survey or "SF-36" or Zung Self-Rating Depression Scale or Psychometric questionnaire or (valid* adj8 (tool or tools or questionnaire* or inventor* or scale*)) or self report* or structured interview* or ((Decreas* or lower* or reduc* or increas* or higher or improv* or worsen*) adj8 (suicidal intent or suicidal ideation or suicidal thoughts or suicidality))).mp
14	(psychotherap* or psychodynamic therap* or CBT or CBASP or behavior* therap* or behavior* activation therap* or behavior* bibliotherapy or cognitive therap* or supportive therap* or problem-solving therap* or attention-control or life-review therapy or "Acceptance and commitment therapy" or Narrative therapy or Solution-Focused Therapy or accelerated resolution therap* or adaptive disclosure therap* or ADP).mp	24	21 or 22 or 23
		25	exp "Sexual and Gender Minorities"/

26	(afab or assigned female at birth or agender* or amab or assigned male at birth or bigender or bisexual* or bi-sexual* or dfab or designated female at birth or dmab or designated male at birth or enby or gay or gender binary or gender blended or gender dysphori* or gender expression* or gender identit* or gender non-conform* or gender presentation* or gender varia* or genderfluid or genderqueer or homosexual* or intersex or lesbian* or LGBTQ* or 2SLGBTQ* or non-binary or nonbinary or pansexual* or queer* or sexual orientation* or transgender* or trans-gender* or transsexual* or trans-sexual* or Two-Spirit*).mp
27	20 and (21 or 22 or 23)
28	20 and (25 or 26)
29	27 or 28
31	29 not 30

Appendix B

PsycINFO Search Strategy

1. affective disorders/ or exp major depression/
2. (depressive disorder* or depressive symptom* or depression or ((Peripartum or peri partum or perinatal or peri natal or antenatal or ante natal or antepartum or ante partum or postpartum or post partum or postnatal or post natal or postnatal or prenatal or pre natal or pregnan* or puerper*) adj5 depress*).mp.
3. 1 or 2.
4. telepsychiatry/ or telepsychology/
5. (telepsych* or ((Online or virtual or remote* or video or digital or telephone or phone or tele) adj4 (Psychotherap* or psychodynamic therap* or counseling or counseling or CBT or CBASP or behavio* therap* or behavio* activation therap* or behavio* bibliotherapy or cognitive therap* or supportive therap* or problem-solving therap* or attention-control or life-review therapy or "Acceptance and commitment therapy" or Narrative therapy or Solution-Focused Therapy or accelerated resolution therap* or adaptive disclosure therap* or ADP))).mp.
6. ((Online or virtual or remote* or video or digital or telephone or phone or tele) adj4 (humanistic or existential or client-cent* or person-cent* or Rogerian or integrative or eclectic) adj4 (therap* or treatment* or intervention* or counseling or counseling)).mp.
7. 4 or 5 or 6.
8. telemedicine/ or online therapy/ or exp teleconferencing/ or teleconsultation/
9. (teletherap* or telehealth or telemedicine or teleconsult* or mobile-health* or mhealth or m-health or distance health* or electronic-health* or ehealth or e-health or virtual health or Remote delivery or electronic-delivery or digital health or video conferenc* or videoconferenc* or teleconferenc* or tele-conferen* or video-to-home or video-visit* or video-technology).mp.
10. ((Online or virtual or remote* or video or digital or telephone or phone or tele) adj4 (therapy or treatment* or counseling or intervention* or program* or diagnos* or assessment or evaluation or follow-up or care or health or consult* or communicat* or medicine)).mp.
11. ((remote or online or virtual* or electronic* or digital* or distan*) adj2 deliver*).mp.
12. 8 or 9 or 10 or 11.
13. 13.psychotherapy/ or brief psychotherapy/ or client centered therapy/ or eclectic psychotherapy/ or exp humanistic psychotherapy/ or individual psychotherapy/ or narrative therapy/
14. behavior therapy/ or dialectical behavior therapy/
15. exp cognitive behavior therapy/
16. 16.cognitive therapy/
17. (psychotherap* or psychodynamic therap* or CBT or CBASP or behavio* therap* or behavio* activation therap* or behavio* bibliotherapy or cognitive therap* or supportive therap* or problem-solving therap* or attention-control or life-review therapy or "Acceptance and commitment therapy" or Narrative therapy or Solution-Focused Therapy or accelerated resolution therap* or adaptive disclosure therap* or ADP).mp.
18. ((humanistic or existential or client-cent* or person-cent* or Rogerian or integrative or eclectic) adj4 (therap* or treatment* or intervention* or counseling or counseling)).mp.
19. 13 or 14 or 15 or 16 or 17 or 18.
20. 7 or (12 and 19).
21. 3 and 20.
22. limit 21 to (english language and yr = "2011 -Current").
23. (pubmed or medline or cochrane or scopus or web-of-science or cinahl).tw. or (technology assessment or hta).jx,mp. or ((systematic* or evidence-based or scoping or umbrella or integrative or rapid) adj3 (review* or overview*)).mp,pt,jx. or meta-analy*.pt,mp. or (meta-analy* or meta analy* or metaanalys* or research-synthesis).tw. or search*.ab.
24. exp clinical trials/
25. exp experimental design/
26. (randomi* or randomly or (random adj4 (allocat* or distribut* or assign*)) or placebo or trial or groups or

subgroups or (phase adj1 ("3" or "2" or "1" or III or II or I)) or quasirandom* or control group or interventional study or interventional design or clinical study or experimental study or experimental design or "pre/post" or "pre-post" or "pre and post" or "before and after" or interrupted time series or cohort* or longitudinal or prospective* or retrospective* or follow-up or "between group*").mp. or rct.ti.

27. ("Clinical Assessment of Depression" or "Reynolds Depression Screening" or "Firestone Assessment of Self-Destructive Thoughts" or "Firestone Assessment of Suicide Intent" or Beck Depression or "BDI-II" or Patient Health Questionnaire or "PHQ-9" or Hamilton Depression Rating Scale or HAM-D or Short Form Health Survey or "SF-36" or Zung* Self-Rating Depression Scale or Psychometric questionnaire or (valid* adj8 (tool or tools or questionnaire* or inventor* or scale*)) or self report* or structured interview* or ((Decreas* or lower* or reduc* or increas* or higher or improv* or worsen*) adj8 (suicidal intent or suicidal ideation or suicidal thoughts or suicidality))).mp.
28. 23 or 24 or 25 or 26 or 27.
29. exp gender identity/
30. exp sexual orientation/
31. sexual minority groups/
32. (afab or assigned female at birth or agender* or amab or assigned male at birth or bigender or bisexual* or bi-sexual* or dfab or designated female at birth or dmab or designated male at birth or enby or gay or gender binary or gender blended or gender dysphori* or gender expression* or gender identit* or gender non-conform* or gender presentation* or gender varia* or genderfluid or genderqueer or homosexual* or intersex or lesbian* or LGBTQ* or 2SLGBTQ* or non-binary or nonbinary or pansexual* or queer* or sexual orientation* or transgender* or trans-gender* or transsexual* or trans-sexual* or Two-Spirit*).mp.
33. 29 or 30 or 31 or 32.
34. 20 and (28 or 33).
35. 22 and (28 or 33).
36. limit 35 to ("0120 non-peer-reviewed journal" or "0200 book" or "0240 authored book" or "0280 edited book" or "0300 encyclopedia" or "0400 dissertation abstract").
37. limit 35 to (abstract collection or "column/opinion" or dissertation or editorial or letter or obituary or poetry or review-book or review-media or review-software & other).
38. 35 not (36 or 37)

Appendix C

MEDLINE Search CINAHL

1	affective disorders/ or exp major depression/
2	((depressive disorder* or depressive symptom* or depression or ((Peripartum or peri partum or perinatal or peri natal or antenatal or ante natal or antepartum or ante partum or postpartum or post partum or postnatal or post natal or post-natal or prenatal or pre natal or pregnan* or puerper*) adj5 depress*))).mp
3	1 or 2
4	telepsychiatry/ or telepsychology/
5	((telepsych* or ((Online or virtual or remote* or video or digital or telephone or phone or tele) adj4 (Psychotherap* or psychodynamic therap* or counseling or counseling or CBT or CBASP or behavio* therap* or behavio* activation therap* or behavio* bibliotherapy or cognitive therap* or supportive therap* or problem-solving therap* or attention-control or life-review therapy or "Acceptance and commitment therapy" or Narrative therapy or Solution-Focused Therapy or accelerated resolution therap* or adaptive disclosure therap* or ADP))).mp
6	((Online or virtual or remote* or video or digital or telephone or phone or tele) adj4 (humanistic or existential or client-cent* or person-cent* or Rogerian or integrative or eclectic) adj4 (therap* or treatment* or intervention* or counseling or counseling)).mp
7	4 or 5 or 6
8	telemedicine/ or online therapy/ or exp teleconferencing/ or teleconsultation/
9	((teletherap* or telehealth or telemedicine or teleconsult* or mobile-health* or mhealth or m-health or distance health* or electronic-health* or ehealth or e-health or virtual health or Remote delivery or electronic-delivery or digital health or video conferenc* or videoconferenc* or teleconferenc* or teleconferen* or video-to-home or video-visit* or video-technology)).mp
10	((Online or virtual or remote* or video or digital or telephone or phone or tele) adj4 (therapy or treatment* or counseling or intervention* or program* or diagnos* or assessment or evaluation or follow-up or care or health or consult* or communicat* or medicine)).mp

11	((remote or online or virtual* or electronic* or digital* or distan*) adj2 deliver*).mp	27	("Clinical Assessment of Depression" or "Reynolds Depression Screening" or "Firestone Assessment of Self-Destructive Thoughts" or "Firestone Assessment of Suicide Intent" or Beck Depression or "BDI-II" or Patient Health Questionnaire or "PHQ-9" or Hamilton Depression Rating Scale or HAM-D or Short Form Health Survey or "SF-36" or Zung* Self-Rating Depression Scale or Psychometric questionnaire (valid* adj8 (tool or tools or questionnaire* or inventor* or scale*)) or self report* or structured interview* or ((Decreas* or lower* or reduc* or increas* or higher or improv* or worsen*) adj8 (suicidal intent or suicidal ideation or suicidal thoughts or suicidality))).mp
12	8 or 9 or 10 or 11	28	23 or 24 or 25 or 26 or 27
13	psychotherapy/ or brief psychotherapy/ or client centered therapy/ or eclectic psychotherapy/ or exp humanistic psychotherapy/ or individual psychotherapy/ or narrative therapy/	29	exp gender identity/
14	behavior therapy/ or dialectical behavior therapy/	30	exp sexual orientation/
15	exp cognitive behavior therapy/	31	sexual minority groups/
16	cognitive therapy/	32	(afab or assigned female at birth or agender* or amab or assigned male at birth or bigender or bisexual* or bi-sexual* or dfab or designated female at birth or dmab or designated male at birth or enby or gay or gender binary or gender blended or gender dysphori* or gender expression* or gender identit* or gender non-conform* or gender presentation* or gender varia* or genderfluid or genderqueer or homosexual* or intersex or lesbian* or LGBTQ* or 2SLGBTQ* or non-binary or nonbinary or pansexual* or queer* or sexual orientation* or transgender* or trans-gender* or transsexual* or trans-sexual* or Two-Spirit*).mp
17	(psychotherap* or psychodynamic therap* or CBT or CBASP or behavior* therap* or behavio* activation therap* or behavio* bibliotherapy or cognitive therap* or supportive therap* or problem-solving therap* or attention-control or life-review therapy or "Acceptance and commitment therapy" or Narrative therapy or Solution-Focused Therapy or accelerated resolution therap* or adaptive disclosure therap* or ADP).mp	33	29 or 30 or 31 or 32
18	((humanistic or existential or client-cent* or person-cent* or Rogerian or integrative or eclectic) adj4 (therap* or treatment* or intervention* or counseling or counseling)).mp	34	20 and (28 or 33)
19	13 or 14 or 15 or 16 or 17 or 18	35	22 and (28 or 33)
20	7 or (12 and 19)	36	limit 35 to ("0120 non-peer-reviewed journal" or "0200 book" or "0240 authored book" or "0280 edited book" or "0300 encyclopedia" or "0400 dissertation abstract")
21	3 and 20	37	limit 35 to (abstract collection or "column/ opinion" or dissertation or editorial or letter or obituary or poetry or review-book or review-media or review-software & other)
22	limit 21 to (english language and yr="2011 -Current")	38	35 not (36 or 37)
23	(pubmed or medline or cochrane or scopus or web-of-science or cinahl).tw. or (technology assessment or hta).jx.mp. or ((systematic* or evidence-based or scoping or umbrella or integrative or rapid) adj3 (review* or overview*)).mp.pt.jx. or meta-analy*.pt.mp. or (meta-analy* or meta analy* or metaanalys* or research-synthesis).tw. or search*.ab		
24	exp clinical trials/		
25	exp experimental design/		
26	(randomi* or randomly or (random adj4 (allocat* or distribut* or assign*)) or placebo or trial or groups or subgroups or (phase adj1 ("3" or "2" or "1" or III or II or I)) or quasirandom* or control group or interventional study or interventional design or clinical study or experimental study or experimental design or "pre/post" or "pre-post" or "pre and post" or "before and after" or interrupted time series or cohort* or longitudinal or prospective* or retrospective* or follow-up or "between group*").mp. or rct.ti		

Appendix D

Egger's Test: Depression Scores Between tCBT and non-telehealth, CBT study groups

Linear regression test of funnel plot asymmetry

Test result: $t = -0.81$, $df = 3$, $p\text{-value} = 0.4789$

Bias estimate: -0.2113 (SE = 0.2620)

Details:

- multiplicative residual heterogeneity variance ($\tau^2 = 0.0453$)
- predictor: standard error
- weight: inverse variance
- reference: Egger et al. (1997), BMJ

```
> forest(res_piette)
> funnel(res_piette, studlab = FALSE)
> text(x = -0.15, y = 0.31, labels = "Fann et al, 2015", cex = 0.8, pos = 2)
> text(x = 0.18, y = 0.3, labels = "Himmelhoch et al, 2013", cex = 0.8, pos = 2)
> text(x = 0.15, y = 0.14, labels = "Kafali et al, 2014", cex = 0.8, pos = 2)
> text(x = 0.02, y = 0.2, labels = "Kalapatapu et al, 2014", cex = 0.8, pos = 2)
> text(x = 0.02, y = 0.1, labels = "Mohr et al, 2012", cex = 0.8, pos = 2)
```

Appendix E

Egger's Test: Depression Scores Between tCBT and non-telehealth, non-CBT study groups

Linear regression test of funnel plot asymmetry

Test result: $t = 1.34$, $df = 7$, $p\text{-value} = 0.2233$

Bias estimate: 0.5157 (SE = 0.3860)

Details:

- multiplicative residual heterogeneity variance ($\tau^2 = 0.1839$)
- predictor: standard error
- weight: inverse variance
- reference: Egger et al. (1997), BMJ

```
> forest(res_piette)
> funnel(res_piette)
> text(x = 0.17, y = 0.19, labels = "Doyle et al, 2017", cex = 0.8, pos = 2)
> text(x = -0.12, y = 0.21, labels = "Dwight-Johnson et al, 2011", cex = 0.8, pos = 2)
> text(x = 0.15, y = 0.23, labels = "Fann et al, 2015", cex = 0.8, pos = 2)
> text(x = -0.05, y = 0.16, labels = "Kafali et al, 2014", cex = 0.8, pos = 2)
> text(x = 0.1, y = 0.205, labels = "Lam et al, 2013", cex = 0.8, pos = 2)
> text(x = -0.08, y = 0.105, labels = "Lerner et al, 2015", cex = 0.8, pos = 2)
> text(x = 0.05, y = 0.3, labels = "Piette et al, 2011c", cex = 0.8, pos = 2)
> text(x = -0.25, y = 0.335, labels = "Piette et al, 2011a", cex = 0.8, pos = 2)
> text(x = 0.02, y = 0.275, labels = "Piette et al, 2011b", cex = 0.8, pos = 2)
```


Authors' Contributions All authors substantially contributed to the conception of the work and the interpretation of the data. Furthermore, all authors substantially contributed to the drafting and revising of the work. All authors are in agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved. All authors approve of the final version to be published. On behalf of my co-author, I submit the enclosed manuscript for consideration by the journal. It has not been published in this or a substantially similar form (in print or electronically, including on a website), nor accepted for publication elsewhere, nor is it under consideration by another publication.

Funding This research was supported by the Workers' Compensation Board – Alberta.

Data Availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing Interest The authors have no relevant financial or non-financial interests to disclose.

References

1. NEJM Catalyst. What Is Telehealth? [Internet]. 2018. Available from: <https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0268>
2. Canadian Medical Association. Virtual care is real care: National poll shows Canadians are overwhelmingly satisfied with virtual health care [Internet]. Available from: <https://www.cma.ca/news-releases-and-statements/virtual-care-real-care-national-poll-shows-canadians-are>
3. Institute of Health Metrics and Evaluation. Global health data exchange (GHDx) [Internet]. Available from: <https://vizhub.healthdata.org/gbd-results>
4. Shields M, Tonmyr L, Gonzalez A, Weeks M, Park SB, Robert AM, et al. Symptoms of major depressive disorder during the COVID-19 pandemic: results from a representative sample of the Canadian population. *Health Promot Chronic Dis Prev Can.* 2021;41(11):340–58.
5. Deloitte Insights. The ROI in workplace mental health programs: Good for people, good for business, a blueprint for workplace mental health programs [Internet]. Deloitte Development LLC. 2019. Available from: <https://www2.deloitte.com/ca/en/pages/about-deloitte/articles/mental-health-roi.html>
6. Lerner D, Henke RM. What does research tell us about depression, job performance, and work productivity? *J Occup Environ Med.* 2008;50(4):401–10.
7. Santomauro DF, Mantilla Herrera AM, Shadid J, Zheng P, Ashbaugh C, Pigott DM, et al. Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *The Lancet.* 2021;398(10312):1700–12.
8. Kessler RC. The costs of depression. *Psychiatr Clin North Am.* 2012;35(1):1–14.
9. Cardila F, Martos A, Barragan AB, del Pérez-Fuentes M, C, Gazquez JJ. Prevalence of depression in Spain: analysis of the last 15 years. *Eur J Investig Health Psychol Educ.* 2015;5(2):267–79.
10. Pence BW, O'Donnell JK, Gaynes BN. The depression treatment cascade in primary care: a public health perspective. *Curr Psychiatry Rep.* 2012;14(4):328–35.
11. Craven MA, Bland R. Depression in primary care: Current and future challenges. *Can J Psychiatry.* 2013;58(8):422–8.
12. Kessler RC, Berglund P, Demler O, Jin R, Koretz D, Merikangas KR, et al. The epidemiology of major depressive disorder: Results from the National Comorbidity Survey Replication (NCS-R). *JAMA.* 2003;289(23):3095.
13. Verhaak PFM, Prins MA, Spreeuwenberg P, Draisma S, van Balkom T, Bensing JM, et al. Receiving treatment for common mental disorders. *Gen Hosp Psychiatry.* 2009;31(1):46–55.
14. Puyat JH, Kazanjian A, Goldner EM, Wong H. How often do individuals with major depression receive minimally adequate treatment? a population-based data linkage study. *Can J Psychiatry.* 2016;61(7):394–404.
15. Barley EA, Muray J, Walters P, Tylee A. Managing depression in primary care: a meta-synthesis of qualitative and quantitative research from the UK to identify barriers and facilitators. *BMC Fam Pract.* 2011;12(1):47.
16. Mohr DC, Hart SL, Howard I, Julian L, Vella L, Catledge C, et al. Barriers to psychotherapy among depressed and nondepressed primary care patients. *Ann Behav Med.* 2006;32(3):254–8.
17. Birnbaum HG, Kessler RC, Kelley D, Ben-Hamadi R, Joish VN, Greenberg PE. Employer burden of mild, moderate, and severe major depressive disorder: mental health services utilization and costs, and work performance. *Depress Anxiety.* 2010;27(1):78–89.
18. GBD 2015 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet.* 2016;388(10053):1545–602.
19. Hossack M. TELUS Mental Health Index reveals workers lose 55 working days per year due to workplace conflict [Internet]. TELUS Health; 2023 Nov. Available from: <https://www.telus.com/en/about/news-and-events/media-releases/telus-mental-health-index-reveals-workers-lose-55-working-days-per-year-due-to-workplace-conflict>
20. Stewart WF, Ricci JA, Chee E, Hahn SR, Morganstein D. Cost of lost productive work time among US workers with depression. *JAMA.* 2003;289(23):3135–44.
21. Kessler RC, Akiskal HS, Ames M, Birnbaum H, Greenberg P, Hirschfeld RMA, et al. The prevalence and effects of mood disorders on work performance in a nationally representative sample of US workers. *Am J Psychiatry.* 2006;163(9):1561–8.
22. Public Health Agency of Canada. Economic burden of illness in Canada, 2005–2008. Ottawa, ON: Public Health Agency of Canada; 2014.
23. Greenberg PE, Fournier AA, Sisitsky T, Simes M, Berman R, Koenigsberg SH, et al. The economic burden of adults with major depressive disorder in the United States. *Adv Ther.* 2023;40:4460–79.
24. Ross EL, Vijan S, Miller EM, Valenstein M, Zivin K. The cost-effectiveness of cognitive behavioral therapy versus second-generation antidepressants for initial treatment of major depressive disorder in the United States: a decision analytic model. *Ann Intern Med.* 2019;171(11):785–95.
25. Paganini S, Teigelkötter W, Buntrock C, Baumeister H. Economic evaluations of internet- and mobile-based interventions for the treatment and prevention of depression: a systematic review. *J Affect Disord.* 2018;225:733–55.
26. Canadian Psychiatric Association. Joint statement on access to mental health care from the Canadian Medical Association and Canadian Psychiatric Association [Internet]. Ottawa, ON: Canadian Medical Association and Canadian Psychiatric Association; 2016 p. 20. Available from: <https://www.cpa-apc.org/wp-content>


- [nt/uploads/CMA-CPA-Joint-Statement-on-Access-to-Mental-Health-Care-2016.pdf](#)
27. Lupton D, Maslen S. Telemedicine and the senses: a review. *Sociol Health Illn*. 2017;39(8):1557–71.
 28. Wilson LS, Maeder AJ. Recent directions in telemedicine: Review of trends in research and practice. *Healthc Inform Res*. 2015;21(4):213.
 29. Fitzpatrick KM, Ody M, Goveas D, Montesanti S, Campbell P, MacDonald K, et al. Understanding virtual primary healthcare with Indigenous populations: a rapid evidence review. *BMC Health Serv Res*. 2023;23(1):303.
 30. Chiauzzi E, Clayton A, Huh-Yoo J. Videoconferencing-based telemental health: important questions for the COVID-19 era from clinical and patient-centered perspectives. *JMIR Ment Health*. 2020;7(12): e24021.
 31. Speyer R, Denman D, Wilkes-Gillan S, Chen YW, Bogaardt H, Kim JH, et al. Effects of telehealth by allied health professionals and nurses in rural and remote areas: a systematic review and meta-analysis. *J Rehabil Med*. 2018;50(3):225–35.
 32. Vitacca M, Montini A, Comini L. How will telemedicine change clinical practice in chronic obstructive pulmonary disease? *Thorax*. 2018;73(12):1753–60.
 33. Attridge M. The business value of employee assistance: A review of the art and science of ROI. In: Keynote address at the meeting of the Employee Assistance Professional Association [Internet]. Phoenix, AZ; 2013. Available from: <http://hdl.handle.net/10713/3905>
 34. Marton K, Kanas N. Telehealth modalities for group therapy: comparisons to in-person group therapy. *Int J Group Psychother*. 2016;66(1):145–50.
 35. Gilmore AK, Ward-Ciesielski EF. Perceived risks and use of psychotherapy via telemedicine for patients at risk for suicide. *J Telemed Telecare*. 2019;25(1):59–63.
 36. Turgoose D, Ashwick R, Murphy D. Systematic review of lessons learned from delivering tele-therapy to veterans with post-traumatic stress disorder. *J Telemed Telecare*. 2018;24(9):575–85.
 37. Goodwin SL, Lints-Martindale A, Conan MC, Kinley J, Rahman T. Rural psychology and the COVID-19 pandemic: highlighting strengths and future directions. *Canadian Psychology / Psychologie Canadienne*. 2023;64(1):57–65.
 38. Madigan S, Racine N, Cooke JE, Korczak DJ. COVID-19 and telemental health: Benefits, challenges, and future directions. *Canadian Psychology / Psychologie canadienne*. 2021;62(1):5–11.
 39. University of Illinois Chicago. Cybersecurity: How Can It Be Improved in Health Care? [Internet]. 2021 [cited 2021 Jun 12]. Available from: https://www.paynewest.com/wp-content/uploads/risk-control/Cybersecurity_April-2021.pdf
 40. American Psychological Association. Guidelines for the practice of telepsychology. *Am Psychol Assoc*. 2013;68(9):791–800.
 41. Canadian Psychological Association. CPA Releases Telepsychology Guidelines (September 2023) - Canadian Psychological Association [Internet]. 2023 [cited 2024 Apr 5]. Available from: <https://cpa.ca/cpa-releases-telepsychology-guidelines-september-2023/>
 42. Carlbring P, Andersson G, Cuijpers P, Riper H, Hedman-Lagerlöf E. Internet-based vs face-to-face cognitive behavior therapy for psychiatric and somatic disorders: an updated systematic review and meta-analysis. *Cognitive Behav Ther*. 2018;47(1):1–18.
 43. Chan M, Jiang Y, Lee CYC, Ramachandran HJ, Teo JYC, Seah CWA, et al. Effectiveness of eHealth-based cognitive behavioural therapy on depression: A systematic review and meta-analysis. *J Clin Nurs*. 2022;31(21–22):3021–31.
 44. Zhang A, Borhneimer LA, Weaver A, Franklin C, Hai AH, Guz S, et al. Cognitive behavioral therapy for primary care depression and anxiety: a secondary meta-analytic review using robust variance estimation in meta-regression. *J Behav Med*. 2019;42(6):1117–41.
 45. Altieri M, Sergi MR, Tommasi M, Santangelo G, Saggino A. The efficacy of telephone-delivered cognitive behavioral therapy in people with chronic illnesses and mental diseases: a meta-analysis. *J Clin Psychol*. 2024;80(1):223–54.
 46. American Psychological Association. Depression Treatments for Adults [Internet]. Clinical Practice Guidelines for the Treatment of Depression. 2019. Available from: <https://www.apa.org/depression-guideline/adults>
 47. Apolinario-Hagen J, Druge M, Hennemann S, Bernhard B. Acceptance and Commitment Therapy for Major Depressive Disorder: Insights into a New Generation of Face-to-Face Treatment and Digital Self-Help Approaches. In: Kim Y-K, editor. *Major Depressive Disorder: Rethinking and Understanding Recent Discoveries*. Singapore: Springer Singapore; 2021. p. 311–32.
 48. Aminnasab A, Mohammadi S, Zareinezhad M, Chatrouz T, Mirghafari SB, Rahmani S. Effectiveness of Solution-Focused Brief Therapy (SFBT) on depression and perceived stress in patients with breast cancer. *Tanaffos*. 2018;17(4):272–9.
 49. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. statement: An updated guideline for reporting systematic reviews. *BMJ*. 2020;2021:71.
 50. Covidence. Covidence systematic review software [Internet]. Melbourne, Australia. Veritas Health Innovation. [cited 2023 Jul 14]. Available from: <https://www.covidence.org/>
 51. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16(9):606–13.
 52. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatr Ann*. 2002;32(9):509–15.
 53. Kroenke K, Spitzer RL, Williams JBW. The Patient Health Questionnaire-2: Validity of a two-item depression screener. *Med Care*. 2003;41(11):1284–92.
 54. Hamilton M. Development of a rating scale for primary depressive illness. *Br J Soc Clin Psychol*. 1967;6(4):278–96.
 55. Hamilton M. A rating scale for depression. *J Neurol Neurosurg Psychiatry*. 1960;23(1):56–62.
 56. Williams JB. A structured interview guide for the Hamilton Depression Rating Scale. *Arch Gen Psychiatry*. 1988;45(8):742–747cxcxcz.
 57. Montgomery SA, Asberg M. A new depression scale designed to be sensitive to change. *Br J Psychiatry*. 1979;134(4):382–9.
 58. Schulte-van Maaren YWM, Carlier IVE, Zitman FG, van Hemert AM, de Waal MWM, van der Does AJW, et al. Reference values for major depression questionnaires: The Leiden Routine Outcome Monitoring Study. *J Affect Disord*. 2013;149(1–3):342–9.
 59. Beck AT, Steer RA, Carbin MG. Psychometric properties of the Beck Depression Inventory: twenty-five years of evaluation. *Clin Psychol Rev*. 1988;8(1):77–100.
 60. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry*. 1961;8(1):77–100.
 61. Friedrich JO, Adhikari NKJ, Beyene J. Ratio of means for analyzing continuous outcomes in meta-analysis performed as well as mean difference methods. *Clin Epidemiol*. 2011;64(5):556–64.
 62. Kafali N, Cook B, Canino G, Alegria M. Cost-effectiveness of a randomized trial to treat depression among Latinos. *J Ment Health Policy Econ*. 2014;17(2):41–50.
 63. Piette JD, Valenstein M, Himle J, Duffy S, Torres T, Vogel M, et al. Clinical complexity and the effectiveness of an intervention for depressed diabetes patients. *Chronic Illn*. 2011;7(4):267–78.
 64. Higgins JP, Li T, Deeks JJ. Chapter 6: Choosing effect measures and computing estimates of effect. In: *Cochrane Handbook for Systematic Reviews of Interventions* version 63 [Internet]. [cited 2023 Jul 14]. Available from: <https://training.cochrane.org/handbook/current/chapter-06>

65. Sen S, Yildirim I. A tutorial on how to conduct meta-analysis with IBM SPSS Statistics. *Psych.* 2022;4(4):640–67.
66. IBM Corp. IBM SPSS Statistics for Windows. Armonk, NY: IBM Corp. 2021.
67. Al-Alawi M, McCall RK, Sultan A, Al Balushi N, Al-Mahrouqi T, Al Ghailani A, et al. Efficacy of a six-week-long therapist-guided online therapy versus self-help internet-based therapy for COVID-19-induced anxiety and depression: open-label, pragmatic, randomized controlled trial. *JMIR Ment Health.* 2021;8(2): e26683.
68. Alegría M, Ludman E, Kafali N, Lapatin S, Vila D, Shrout PE, et al. Effectiveness of the engagement and counseling for Latinos (ECLA) intervention in low-income Latinos. *Med Care.* 2014;52(11):989–97.
69. Dwight-Johnson M, Aisenberg E, Golinelli D, Hong S, O'Brien M, Ludman E. Telephone-based cognitive-behavioral therapy for Latino patients living in rural areas: a randomized pilot study. *Psychiatr Serv.* 2011;62(8):936–42.
70. Lerner D, Adler DA, Rogers WH, Chang H, Greenhill A, Cymerman E, et al. A randomized clinical trial of a telephone depression intervention to reduce employee presenteeism and absenteeism. *Psychiatr Serv.* 2015;66(6):570–7.
71. Anderson T, McClintock AS, McCarrick SS, Heckman TG, Heckman BD, Markowitz JC, et al. Working alliance, interpersonal problems, and depressive symptoms in tele-interpersonal psychotherapy for HIV-infected rural persons: evidence for indirect effects. *J Clin Psychol.* 2018;74(3):286–303.
72. Chong J, Moreno F. Feasibility and acceptability of clinic-based telepsychiatry for low-income Hispanic primary care patients. *Telemed e-Health.* 2012;18(4):297–304.
73. Corruble E, Swartz HA, Bottai T, Vaiva G, Bayle F, Llorca PM, et al. Telephone-administered psychotherapy in combination with antidepressant medication for the acute treatment of major depressive disorder. *J Affect Disord.* 2016;190:6–11.
74. Cosio D, Jin L, Siddique J, Mohr DC. The effect of telephone-administered cognitive-behavioral therapy on quality of life among patients with multiple sclerosis. *Ann Behav Med.* 2011;41(2):227–34.
75. Dennis CL, Grigoriadis S, Zupancic J, Kiss A, Ravitz P. Telephone-based nurse-delivered interpersonal psychotherapy for postpartum depression: nationwide randomised controlled trial. *Br J Psychiatry.* 2020;216(4):189–96.
76. Doyle C, Bhar S, Fearn M, Ames D, Osborne D, You E, et al. The impact of telephone-delivered cognitive behaviour therapy and befriending on mood disorders in people with chronic obstructive pulmonary disease: a randomized controlled trial. *Br J Health Psychol.* 2017;22(3):542–56.
77. Fann JR, Bombardier CH, Vannoy S, Dyer J, Ludman E, Dikmen S, et al. Telephone and in-person cognitive behavioral therapy for major depression after traumatic brain injury: a randomized controlled trial. *J Neurotrauma.* 2015;32(1):45–57.
78. Himelhoch S, Medoff D, Maxfield J, Dihmes S, Dixon L, Robinson C, et al. Telephone based cognitive behavioral therapy targeting major depression among urban Dwelling, low income people living with HIV/AIDS: results of a randomized controlled trial. *AIDS Behav.* 2013;17(8):2756–64.
79. Kalapatapu RK, Ho J, Cai X, Vinogradov S, Batki SL, Mohr DC. Cognitive-behavioral therapy in depressed primary care patients with co-occurring problematic alcohol use: effect of telephone-administered vs face-to-face treatment—A secondary analysis. *J Psychoactive Drugs.* 2014;46(2):85–92.
80. Lam RW, Parikh SV, Ramasubbu R, Michalak EE, Tam EM, Axler A, et al. Effects of combined pharmacotherapy and psychotherapy for improving work functioning in major depressive disorder. *Br J Psychiatry.* 2013;203(5):358–65.
81. Marti CN, Kunik ME, Choi NG. The reciprocal relationship between depression and disability in low-income homebound older adults following tele-depression treatment. *Int J Geriatr Psychiatry.* 2021;36(6):802–10.
82. Mohr DC, Ho J, Duffecy J, Reifler D, Sokol L, Burns NN, et al. Effect of telephone-administered vs face-to-face cognitive behavioral therapy on adherence to therapy and depression outcomes among primary care patients. *JAMA.* 2012;307(21):2278–85.
83. Nicholas J, Knapp AA, Vergara JL, Graham AK, Gray EL, Lattie EG, et al. An exploratory brief head-to-head non-inferiority comparison of an internet-based and a telephone-delivered CBT intervention for adults with depression. *J Affect Disord.* 2021;281:673–7.
84. Karyotaki E, Ebert DD, Donkin L, Riper H, Twisk J, Burger S, et al. Do guided internet-based interventions result in clinically relevant changes for patients with depression? An individual participant data meta-analysis. *Clin Psychol Rev.* 2018;63:80–92.
85. Jacobs M, Pienaar J. Stress, coping and safety compliance in a multinational gold mining company. *Int J Occup Saf Ergon.* 2017;23(2):152–61.
86. Attwell D, Garland J, Kamani R, Milliken A (Don), Ross S, Bugis S, et al. Stepping out of the Shadows: Collaborating to Improve Services for Patients with Depression [Internet]. British Columbia Medical Association; 2009. Available from: https://www.doctorsofbc.ca/sites/default/files/depression_paper_aug13.pdf
87. Hao X, Qin Y, Lv M, Zhao X, Wu S, Li K. Effectiveness of telehealth interventions on psychological outcomes and quality of life in community adults during the COVID-19 pandemic: a systematic review and meta-analysis. *Int J Ment Health Nurs.* 2023;32(4):979–1007.
88. Wright JH, Caudill R. Remote treatment delivery in response to the COVID-19 pandemic. *Psychother Psychosom.* 2020;89(3):1–3.
89. Wright JH, Mishkind M, Eells TD, Chan SR. Computer-assisted cognitive-behavior therapy and mobile apps for depression and anxiety. *Curr Psychiatry Rep.* 2019;21(7):62.
90. Luo C, Sanger N, Singhal N, Pattrick K, Shams I, Shahid H, et al. A comparison of electronically-delivered and face to face cognitive behavioural therapies in depressive disorders: A systematic review and meta-analysis. *eClinicalMed.* 2020;24:100442.
91. Longhurst P, Full W. Disabled people's perceptions and experiences of accessing and receiving counselling and psychotherapy: a scoping review protocol. *BMJ Open.* 2023;13(6): e069204.
92. Valderas JM, Starfield B, Sibbald B, Salisbury C, Roland M. Defining comorbidity: implications for understanding health and health services. *Ann Fam Med.* 2009;7(4):357–63.
93. Nicholson B, Verma S. Comorbidities in chronic neuropathic pain. *Pain Med.* 2004;5(suppl_1):S9–27.
94. Shore JH, Yellowlees P, Caudill R, Johnston B, Turvey C, Mishkind M, et al. Best practices in videoconferencing-based telemental health April 2018. *Telemedicine and e-Health.* 2018;24(11):827–32.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.

Authors and Affiliations

Behdin Nowrouzi-Kia^{1,2,3,4}  · Ali Bani-Fatemi¹ · Tanya D. Jackson⁵ · Anson Kwok Choi Li^{1,6,7} · Vijay Kumar Chattu^{1,8,9} · Ellina Lytvyak⁵ · Danika Deibert⁵ · Liz Dennett¹⁰ · Martin Ferguson-Pell¹¹ · Reidar Hagtvedt⁵ · Charl Els^{5,12} · Quentin Durand-Moreau⁵ · Douglas P. Gross¹³ · Sebastian Straube^{5,14}

✉ Behdin Nowrouzi-Kia
behdin.nowrouzi.kia@utoronto.ca

¹ ReSTORE Lab, Department of Occupational Science and Occupational Therapy, Temerty Faculty of Medicine, University of Toronto, 160-500 University Avenue, Toronto, ON M5G 1V7, Canada

² Krembil Research Institute-University Health Network, 60 Leonard Ave, Toronto, ON M5T 0S8, Canada

³ Centre for Research in Occupational Safety & Health, Laurentian University, 935 Ramsey Lake Rd, Sudbury, ON P3E 2C6, Canada

⁴ Centre for Addiction and Mental Health, Institute for Mental Health Policy Research, 250 College St, Toronto, ON M5T 1R8, Canada

⁵ Division of Preventive Medicine, Department of Medicine, Faculty of Medicine & Dentistry, College of Health Sciences, University of Alberta, 5-30 University Terrace, 8303 112 Street NW, Edmonton, AB T6G 2T4, Canada

⁶ Institute of Health Policy, Management and Evaluation, University of Toronto, 155 College Street, Suite 425, Toronto, ON M5T 3M6, Canada

⁷ Department of Biology, University of Western Ontario, 1151 Richmond Street, London, ON N6A 3K7, Canada

⁸ Center for Global Health Research, Saveetha Medical College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, India

⁹ Department of Community Medicine, Faculty of Medicine, Datta Meghe Institute of Medical Sciences (DMIMS), Wardha, India

¹⁰ Geoffrey and Robyn Sperber Health Sciences Library, University of Alberta, Edmonton, AB T6G 1C9, Canada

¹¹ Faculty of Rehabilitation Medicine, College of Health Sciences, University of Alberta, 2-545 Edmonton Clinic Health Academy, Edmonton, AB T6G 1C9, Canada

¹² Department of Psychiatry, Faculty of Medicine & Dentistry, College of Health Sciences, University of Alberta, 4-142 KATZ, Edmonton, AB T6G 2R3, Canada

¹³ Department of Physical Therapy, Faculty of Rehabilitation Medicine, College of Health Sciences, University of Alberta, 2-50 Corbett Hall, 8205 114 St NW, Edmonton, AB T6G 2G4, Canada

¹⁴ School of Public Health, College of Health Sciences, University of Alberta, Edmonton, AB, Canada