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REVIEW PAPER

Video call-based cognitive behaviour therapy for adults with common mental health conditions: a systematic review and meta-analysis

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Abstract

Implementation of video call-based cognitive behavioural therapy (CBT) has increased significantly since the COVID-19 pandemic, enabling more flexible delivery, but less is known about user experience and effectiveness. This systematic review and meta-analysis investigated feasibility, acceptability, and effectiveness of individual video call-based CBT for adults with mild to moderate mental health conditions (Prospero CRD42021291055). Medline, Embase, PsycINFO and Web of Science were searched until 4 September 2023. The Effective Public Health Practice Project Quality Assessment Tool (EPHPP) assessed methodological quality of studies. Meta-analysis was conducted in R. Thirty studies ($n = 3275$), published 2000 to 2022, mainly in the USA ($n = 22/30$, 73%), were included. There were 15 randomised control trials, one controlled clinical trial, and 14 uncontrolled studies. Findings indicated feasibility, acceptability and effectiveness (effect size range 0.02–8.30), especially in post-traumatic stress disorder (PTSD) for military populations. Other studies investigated depression, obsessive-compulsive disorder, panic with agoraphobia, insomnia, and anxiety. Studies indicated that initial challenges with video call-based CBT subsided as therapy progressed and technical difficulties were managed with limited impact on care. EPHPP ratings were strong ($n = 12/30, 40\%$), moderate ($n = 12/30, 40\%$), and weak ($n = 6/30$, 20%). Meta-analysis on 12 studies indicated that the difference in effectiveness of video call-based CBT and in-person CBT in reducing symptoms was not significant (SMD = 0.044; CI = –0.086; 0.174). Video calls could increase access to CBT without diminishing effectiveness. Limitations include high prevalence of PTSD studies, lack of standardised definitions, and limited studies, especially those since the COVID-19 pandemic escalated use of video calls.

Key learning aims

(1) This review assesses feasibility, acceptability, and effectiveness of individual video call-based CBT for adults with mild to moderate common mental health conditions, as defined by the ICD-11.
(2) Secondary aims were to assess if the therapeutic relationship is affected and identify any potential training needs in delivering video call-based CBT.
(3) The adjunct meta-analysis quantitatively explored whether video call-based CBT is as effective as in-person interventions in symptom reduction on primary outcome measures by pooling estimates for studies that compare these treatment conditions.

Keywords: anxiety; CBT; depression; digital mental health; healthtech; mild to moderate mental health conditions; online psychotherapy; psychological therapy; telehealth; videoconferencing

Introduction

Mental health services and service users have used technology in psychological therapy for many years (Magnavita, 2018). Since the COVID-19 pandemic (Corona Virus Infectious Disease 2019) emerged, video call-based interventions have been routinely provided (American Psychological Association, 2021). Video calls are a technology-based virtual communications platform that connects two or more people in real-time, independent of location. Compared with other technology-based communication platforms, such as app-, telephone- and text-based systems, video calls require a screen and camera, allowing for the exchange of non-verbal, visual and auditory communication and feedback (i.e. expression, body language, gestures, pitch, volume and tone; Oviedo & Fox Tree, 2021).

Mild to moderate common mental health conditions encompass a group of mental health conditions that include depression and anxiety disorders (including generalised anxiety disorder, panic disorder, phobias, social anxiety, obsessive-compulsive disorder (OCD)) and post-traumatic stress disorder (PTSD); National Institute for Health and Clinical Excellence (NICE 2011). It is a term commonly used within clinical practice and research, and is endorsed by The National Institute for Health and Care Excellence (NICE) guidelines. In their guidance for common mental health disorders, NICE state: '*a mild mental health condition is when a person has a small number of symptoms that have a limited effect on daily life, and a moderate mental health condition is when a person has more symptoms that can make daily life much more difficult than usual*'. In their clinical guidance (CG123) they recommend cognitive behavioural therapy (CBT) as the psychological treatment for adults with mild to moderate common mental health conditions (NICE, 2011).

CBT has embraced technology as a therapeutic adjunct or stand-alone intervention (Aguilera and Muench, 2012; Wilhelm *et al.*, 2022). It is an established, evidence-based treatment for psychological disorders (Richards *et al.*, 2017) and when delivered in-person, it is as efficacious in treating mood and anxiety disorders, and increasing the quality of life (David *et al.*, 2018; Fordham *et al.*, 2021; Zamiri-Miandoab *et al.*, 2022). Computer-, internet-based CBT (i.e. I-CBT, eCBT), and app-based CBT (accessed via smartphones and tablets, i.e. SilverCloud) also have an established evidence base and have been advocated by NICE guidelines in the treatment of mild to moderate common mental health conditions (Berry and Lai, 2014; Wilhelm *et al.*, 2022).

Since the COVID-19 pandemic, psychologists have continued to provide video call-based interventions (Bestsennyy *et al.*, 2021). Mental health service users report that it offers greater choice and convenience than in-person and telephone-based care (Cordina *et al.*, 2022; Severe *et al.*, 2020). Young people have adopted technology-based interventions, naming accessibility, choice and convenience as key factors in their choice (Pew Research Centre, 2019; Tridiuum, 2022). The NHS Long Term Plan (NHS England, 2019) and Topol review (Topol, 2019) have also stressed the importance of preparing the workforce for, and increasing the availability of, digital mental healthcare, including delivering video call-based interventions.

Initial studies comparing video call-based interventions to in-person therapy have indicated benefits to service users, clinicians and services in terms of cost and time (Baumann *et al.*, 2020; Mitchell *et al.*, 2021; Paganini *et al.*, 2018); saving service users an average of 145 miles and 142 minutes per session (Russo *et al.*, 2016), and reducing some of the physical and psychological barriers associated with in-person interventions in accessing mental health services, such as stigma, fear of being seen accessing mental health services, mobility issues and location (Bellanti *et al.*, 2022; Fernández-Álvarez and Fernández-Álvarez, 2021; Siegel *et al.*, 2021; Simpson *et al.*, 2021). Recent meta-analyses have also investigated video call-based interventions, including CBT. In a meta-analysis of 22 randomised controlled trials (RCTs), Salazar de Pablo *et al.* (2023) found that remotely delivered CBT was more efficacious than non-CBT control conditions for OCD symptoms. Greenwood *et al.* (2022) examined 12 RCTs and found no significant differences in

symptom severity, overall improvement, function, working alliance client, working alliance therapist, and client satisfaction between telehealth and face-to-face therapy immediately after treatment or at any follow-up. Norwood *et al.* (2018) published a meta-analysis of 12 studies of individual CBT in adults and reported that video-delivered CBT was not inferior to in-person CBT in the reduction of target symptoms. Fernandez *et al.* (2021) compared 27 studies using CBT with an equivalent number of studies using non-CBT and found that the effect size of video delivered therapy was much larger for CBT than for non-CBT studies. Yet research into CBT delivered by video call has received less attention compared with in-person CBT and app-based CBT (British Psychological Society, 2020; James *et al.*, 2022). Despite these findings, the literature also highlights clinicians' concerns about technological disruptions, detracting from the emotional saliency of therapy, security and confidentiality, the therapeutic relationship, containment, and blurring boundaries when delivering video call-based psychological interventions (Bisseling *et al.*, 2019; Glueckauf *et al.*, 2018; Kotera *et al.*, 2021; Lopez *et al.*, 2019; Sagui-Henson *et al.*, 2022; Sampaio *et al.*, 2021; Stefan *et al.*, 2021; Tremain *et al.*, 2020).

Previous systematic reviews and meta-analyses have tended to group virtual modalities together, such as video call-based, web-based, text-based, and telephone interventions, and have included self-help or app-based interventions. Reviews have also been population or condition-specific, primarily focusing on anxiety, depression and PTSD. In their rapid umbrella review of systematic reviews on the implementation of telemental health services before the COVID-19 pandemic, Barnett *et al.* (2021) found that most of the 15 studies reviewed were assessed to be of low quality. Therefore, the primary aim of this systematic review was to assess feasibility, acceptability and effectiveness of individual video call-based CBT for adults with mild to moderate common mental health conditions, as defined by the ICD-11 (World Health Organization, 2019a) where CBT is the recommended psychological treatment intervention (NICE, 2011). It aimed to do this by solely focusing on video call-based CBT and including a comprehensive range of studies that encompass a variety of study designs and comparison groups to provide a comprehensive synthesis of the literature. Secondary aims were to assess if the therapeutic relationship is affected and identify any potential training needs in delivering video call-based CBT. An adjunct meta-analysis was conducted to quantitatively explore whether video call-based CBT is as effective as in-person interventions in symptom reduction on primary outcome measures by pooling estimates for studies that compare these treatment conditions.

Method

This review, its search terms, and inclusion and exclusion criteria is registered on the PROSPERO database (CRD42021291055). The review followed the preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page *et al.*, 2021).

Search criteria and procedure

Table 1 outlines the search terms and Boolean operators within the PICO framework: population, intervention, control and outcome. Researchers agreed search terms following a review of the ICD-11 for common mental health terms, NICE guidelines for the treatment of mild to moderate mental health conditions, the thesaurus function on OvidSP, and common synonyms of 'video calls'. Studies were identified following a database search of Medline, Embase, PsychINFO and Web of Science up to 4 September 2023, which used search terms and Boolean operators as per the PICO framework. Truncations and wild cards were used to account for alternative spellings and word endings of terms.

Databases were searched for keyword, title, and abstract information by the first author (A.E.). Key subject headings (indicated in Table 1) were explored and searches, where possible, were

Table 1. Search terms and Boolean operators within the PICO framework: population, intervention, control and outcome

P search terms	(mental?illness* OR mental?disorder* OR mental?condition* OR mood* OR depressi* OR dysthymi* OR affective?disorder* OR anxi* OR GAD OR panic* OR agoraphobia OR phobi* OR SAD OR separation OR selective?mut* OR obsessive?compulsiv* OR OCD OR body? dysmorp* OR hypochondr* OR hoard* OR trauma* OR PTSD OR stress* OR fear* OR grief* OR insomnia OR exp mental disease/ OR exp Mental Disorders/px OR exp mental disorders/)
AND	
I search terms	(video?call?based interv* OR videothera* OR telethera* OR virtual* OR telemed* OR telepsyc* OR telehealth* OR e?thera* OR videoconferenc* OR telecounsel* OR internet?base thera* OR online?thera* OR web?base* OR computer* OR e?health* OR e?mental* OR remote?ther OR remote?interv* OR internet?base nterv* OR exp telepsychotherapy/ OR exp Internet-Based Intervention/ OR exp video-based interventions/) **AND** (CBT OR cognitive behavio* OR psychological thera* OR psychothera* OR psychological interven* OR i?CBT OR acceptance?commitment* OR ACT OR dialectical OR activation* OR DBT OR trauma?focused* OR TF?CBT OR exposure* OR interoceptive OR imagery OR ERP OR rescript* OR schema?focus* OR SFT OR compassion?focus* OR CFT OR restructure* OR CRT OR solution?focus* OR interpersonal thera* OR mindfulness OR MBCT OR metacog* OR positive psychol* OR exp psychotherapy/ OR exp Cognitive Behavioral Therapy/ OR exp cognitive behavior therapy/)
AND	
O search terms	(feasibi* OR exp treatment outcome/ OR exp Treatment Outcome/ OR exp treatment effectiveness evaluation/)

P, patient or population; I, intervention or exposure; O, outcome; key subject headings indicated by the prefix 'exp'.

limited to English, adult participants, and peer-reviewed journals. Reference management software Zotero was used to extract data, and abstracts without a locatable full text were excluded. Reference lists of key papers were manually screened and included in the search. A second researcher (L.H.) independently carried out 20% of all screening and data extraction using data extraction sheets including sample demographics, study characteristics, outcome measures and primary outcome data. All papers were independently rated by A.E. and L.H. on quality assessment; 100% agreement was found of all study inclusion and quality assessment ratings, and 93% agreement was reached on data extraction. For the two studies where discrepancies were indicated, agreement was reached at discussion stage, under the supervision of S.R. In both cases discrepancies were a result of one rater incorrectly extracting sample data.

Inclusion and exclusion criteria

Studies were included if they described a live, individual video call-based CBT intervention; treated adults (>18 years) experiencing mild to moderate common mental health disorders; included original data; used an experimental design; were written in English, and published in a peer-reviewed journal. Studies were excluded if the primary diagnosis was a severe mental health condition; or where physical illness, neurocognitive disorders, learning difficulties, neurodevelopmental disorders or learning disabilities were the primary focus of the intervention; if they delivered group, couple- or family-based interventions; if the intervention was web-, app- or self-help-based; only had a qualitative methodology; used a sample size of fewer than five participants; or was a non-empirical study (i.e. review papers, conference proceedings, book chapters, editorials, newspaper and forms of popular media articles, or theses).

Quality assessment

The Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies (EPHPP, 2010) assessed the quality of studies. EPHPP assesses eight methodological dimensions

(selection bias, study design, confounders, blinding to the assigned condition or task, data collection methods, withdrawals and drop-outs, intervention integrity and analysis). Global ratings are computed using the ratings of the first six dimensions. Studies are considered 'strong' if there are no 'weak' dimension ratings, 'moderate' if there is one 'weak' dimension rating, or 'weak' if there are two or more 'weak' dimension ratings. EPHPP has good content, construct validity, and inter-rater reliability (Armijo-Olivo *et al.*, 2012). EPHPP ratings were calculated in accordance with the instructions on the EPHPP tool and dictionary, and the information reported in the studies. Ratings and studies were regularly discussed with the research team.

Statistical strategy for meta-analysis

RCTs that included in-person comparison groups were included in the meta-analysis allowing for comparison of these treatment conditions. Group differences in scores on post-treatment primary outcome measures were extracted from relevant studies. Table 2 outlines the post-intervention means, number of participants and standard deviation for the video call-based CBT intervention group and in-person comparison group with corresponding effect sizes, confidence intervals and standard error scores. Standard errors and confidence intervals were converted to standard deviation scores. Emails were sent to four authors to obtain outcome data where it was not reported. Three authors provided data in response. One author did not respond, and this study was excluded from the meta-analysis but included in the systematic review.

Data analyses using a random-effects model was conducted using R's (v.2021.09.1+372) metafor package (v.3.8-1; R Core Team, 2021; Viechtbauer, 2010). To account for the different measures used, standardised mean difference scores between conditions were translated as Hedges' *g* effect sizes, calculated with 95% confidence intervals and standard errors between conditions; see Table 2. Heterogeneity was assessed by computing between study variance and interpreted using the I^2 metric (Higgins and Thompson, 2002). Typically, I^2 values of 25%, 50% and 75% correspond to small, moderate and large degrees of between- versus within-group variance or heterogeneity, respectively. Leave-one-out sensitivity analysis was conducted to identify potentially influential studies, the exclusion of which would change the findings by producing an exaggerated effect size.

Results

Information extraction

The search identified 4799 titles (4781 titles from the systematic search and 18 further titles from searching reference lists of key papers). After removing duplicates, conference proceedings, case reports and review papers, 3038 titles were identified for screening. Following screening, 30 studies, published between 2000 and 2022 ($n = 3275$), were included in the review; see Fig. 1.

Study design and sample characteristics

Table 3 includes full details of the study characteristics on individual video call-based CBT for adults with mild to moderate common mental health conditions, country of research, sample characteristics, number of participants (including percentage of male participants, mean age and standard deviation and ethnicity), study design and comparison group, video call platform used and location of the participant during the intervention, therapeutic model use (including the language sessions were delivered in), number of session and primary outcome measures administered, attrition rates and key findings. The most common diagnosis studied was PTSD ($n = 14/30$, 47%). Other common mental health disorders that were tested included depression ($n = 2/30$, 7%), OCD ($n = 3$, 10%), panic (PD) with agoraphobia ($n = 2/30$, 7%), social anxiety disorder (SAD; $n = 1/30$, 3%), generalised anxiety disorder (GAD; $n = 1/30$, 3%) and insomnia

Table 2. Post-intervention means, number of participants and standard deviation for the video call-based CBT intervention group and in-person comparison group with corresponding effect sizes, confidence intervals and standard error scores

	Population	Primary outcome	Mean	*n*	Standard deviation	Mean	*n*	Standard deviation	Hedges' *g*†	Standard error‡	*Z*	CI (95%)
			Video call-based			**In-person**						
Acierno *et al.* (2017)	PTSD	PCL	44.35	74	13.35	42.5	76	13.32	0.138	0.134	0.035	−0.182; 0.158
Arnedt *et al.* (2021)	Chronic insomnia	ISI	8.6	33	5.5	7.9	32	3.4	0.151	0.248	0.062	−0.336; 0.638
Bouchard *et al.* (2022)	Anxiety	PSWQ	51.51	69	11.99	53.62	79	11.93	−0.176	0.165	0.027	−0.499; 0.148
Choi *et al.* (2014)	Depression	HAMD	13.7	49	7	14.1	54	6.91	−0.057	0.197	0.039	−0.444; 0.330
Liu *et al.* (2020)	PTSD	CAPS	62.1	103	27.5	53.4	104	26.2	0.323	0.140	0.020	0.049; 0.597
Luxton *et al.* (2016)	Depression	BDI	13.8	45	12.0	11.7	42	12.1	0.173	0.215	0.046	−0.249; 0.594
Maieritsch *et al.* (2016)	PTSD	CAPS	51.2	25	28.3	50.7	26	22.1	0.019	0.280	0.079	−0.530; 0.568
Morland *et al.* (2015)	PTSD	CAPS	53.6	49	15.6	50.5	43	15.0	0.201	0.209	0.202	−0.210; 0.611
Morland *et al.* (2019)	PTSD	CAPS	21.6	65	14.9	20.6	40	12.9	0.070	0.201	0.040	−0.324; 0.464
Peterson *et al.* (2022)§	PTSD	PCL	23.1	44	15.84	27.55	76	16.63	−0.270	0.190	0.036	−0.643; 0.102
Stubbings *et al.* (2013)	Depression, anxiety	DASS¶	10.10	13	8.02	13.95	10	9.96	−0.416	0.425	0.181	−1.249; 0.417
Yuen *et al.* (2015)	PTSD	CAPS	35.9	23	17.7	38.3	29	22.3	−0.116	0.279	−0.118	−0.664; 0.432

n, number of participants; CI, confidence intervals.
†Rule of thumb for interpreting Hedges' *g*: 0.2 = small effect size, 0.5 = medium effect size, 0.8 = large effect size; positive values favour in-person treatment.
‡Standard error of E.S. estimate.
§Average scores computed from both in-person conditions (home-based and clinic-based).
¶Average scores, computed from anxiety, stress and depression subscales.

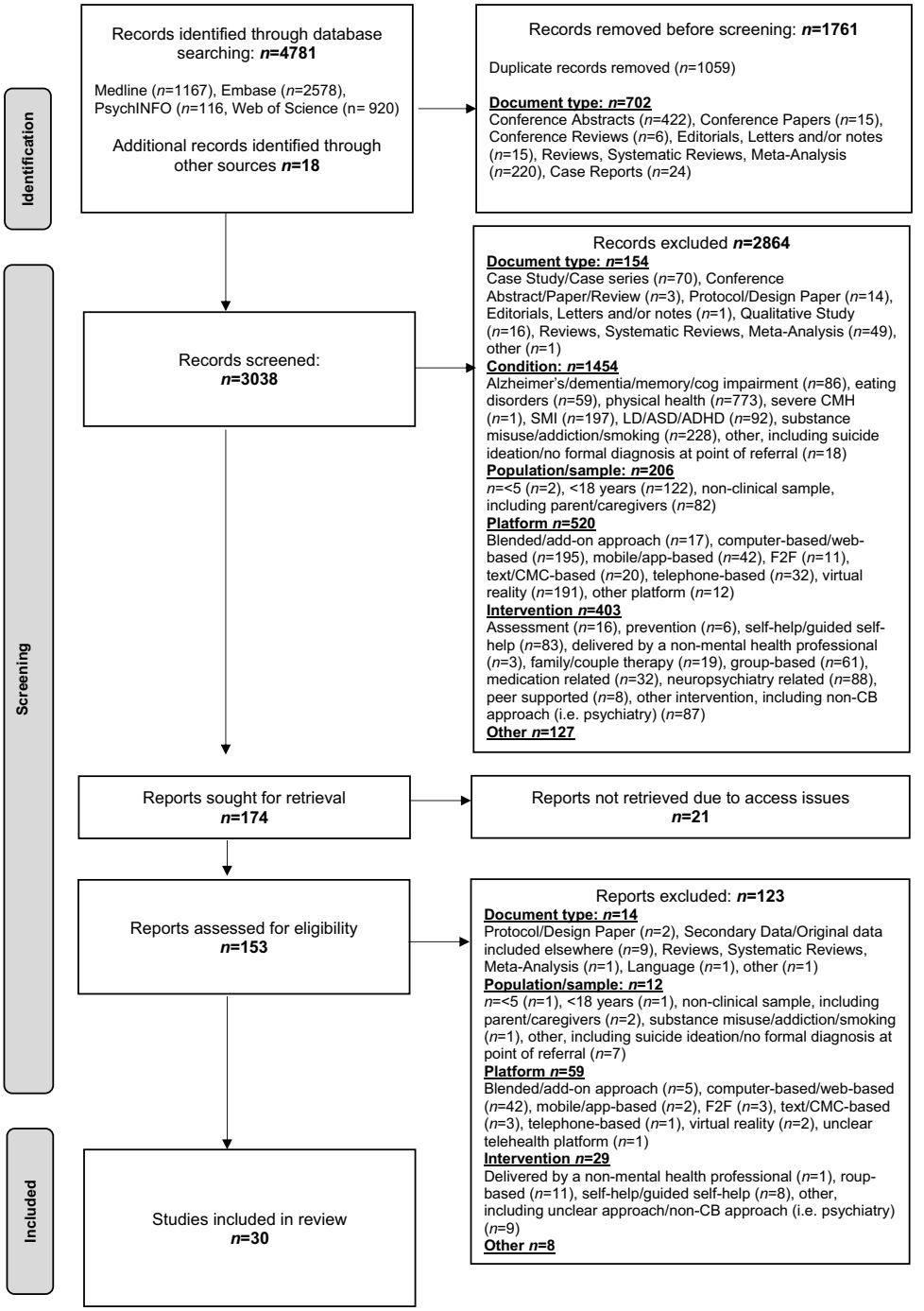

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) diagram of studies using videoconferencing platforms to provide a CBT informed psychological intervention to adults with a common mental health disorder.

Table 3. Study characteristic of included studies on individual video call-based CBT for adults with mild to moderate common mental health conditions

Study	Country	Sample	*n** (% male)	Mean age (*SD*)	Ethnicity % Caucasian	Design, comparison group	Video call platform
Acierno *et al.* (2016)	USA	PTSD; USA Veterans	**TS** 265 (94%) **VC** 134 (95%) **IP** 131 (94%)	**TS** 45.6 (14.9) **VC** 46.9 (14.5) **IP** 44.5 (15.1)	**TS** White 50%, Black 47%, Hispanic 1%, other 1% **VC** White 52%, Black 46%, Hispanic 0%, Other 2% **IP** White 49%, Black 49%, Hispanic 2%, other 1%	RCT, IP	Various VC options
Acierno *et al.* (2017)	USA	PTSD; USA Veterans	**TS** 150 (96%) **VC** 74 (98%) **IP** 76 (94%)	**TS** 41.8 (14.5) **VC** 40.7 (14.9) **IP** 42.9 (14.1)	**TS** White 61%, Black 33%, Hispanic 5%, other 1% **VC** White 61%, Black 33%, Hispanic 6%, other 0% **IP** White 60%, Black 34%, Hispanic 45%, other 2%	RCT, IP	Various VC options
Al-Alawi *et al.* (2021)	Oman	Depression, anxiety; Community	**TS** 46 (22%) **VC** 22 (9%) **SH** 24 (33%)	**TS** 28.51 (8.7) **VC** 27.0 (8.7) **SH** 29.96 (8.6)	Not recorded	RCT, SH	Zoom
Arnedt *et al.* (2021)	USA	Chronic insomnia; Community	**TS** 65 (29%) **VC** 33 (30%) **IP** 32 (28%)	**TS** 47.2 (16.3) **VC** 43.7 (17.4) **IP** 50.9 (14.5)	**TS** Hispanic/Latino 3%, Not Hispanic/Latino 95%, unknown 2%, **VC** Hispanic/Latino 6%, not Hispanic/Latino 91%, unknown 3% **IP** Hispanic/Latino 0%, not Hispanic/Latino 100%, unknown 0%	RCT, IP	AASM SleepTM
Bouchard *et al.* (2000)	Canada	PD with agoraphobia; Community	8 (38%)	30[a] (–)	Not recorded	Pre–post, none	Tandberg 2000 VC system
Bouchard *et al.* (2004)	Canada	PD with agoraphobia; Community	**TS** 21 (–) **VC** 11 (36%) **IP** 10 (20%)	**TS** Not recorded **VC** 38.8 (15.5) **IP** 37.1 (8.2)	Not recorded	Pre–post, IP	Tanburg 2500 VC system
Bouchard *et al.* (2022)	Canada	Generalised anxiety disorder	**TS** 148 **VC** 69 (17%) **IP** 79 (17%)	**TS** Not recorded **VC** 41.35 (14.80) **IP** 39.38 (16.23)	**TS** White 100%	RCT, IP	Tandberg MXP60 VC system

(*Continued*)

Table 3. (*Continued*)

Study	Country	Sample	*n** (% male)	Mean age (*SD*)	Ethnicity % Caucasian	Design, comparison group	Video call platform
Choi *et al.* (2014)	USA	Depression; Homebound older adults	**TS** 158 (22%) **VC** 56 (–) **IP** 63 (–) **TC** 39 (–)	**TS** 64.80 (9.2) **VC** Not recorded **IP** Not recorded **TC** Not recorded	**TS** Non-Hispanic White 42%, African American/Black 33%, Hispanic 25% **VC** Not recorded **IP** Not recorded **TC** Not recorded	RCT, IP	Skype
Fletcher *et al.* (2022)	USA	OCD; Veterans	12 (78%)	47.2 (15.2)	White 55% African American 44%	Pre–post, none	HIPAA-secure platform
Franklin *et al.* (2017)	USA	PTSD; Veterans	**TS** 27 (93%) **VC** 7 (92%) **iPhone** 10 (–) **TAU** 8 (–)	**TS** 46.1 (15.5)	**TS** Euro-American 69%, African American 23%, other 8% **VC** Euro-American 75%, African American 8%, other 17%	RCT, TAU+ iPhone	iPhone - Tango; VC - not recorded
Goetter *et al.* (2014)	USA	OCD; community	15 (13%)	32.2 (11.4)	Non-Hispanic white 53.3%	Pre–post, none	Skype
Griffiths *et al.* (2006)	Australia (rural)	Depression, anxiety; community	15 (20%)	Not recorded	Not recorded	Pre–post, none	Not recorded
Gros *et al.* (2011)	USA	PTSD; USA Veterans	**TS** 89 (–) **VC** 62 (94%) **IP** 27 (89%)	**VC** 45.1 (15.0) **IP** 45.2 (16.0)	**VC** Caucasian 50%, African American 45% **IP** Caucasian 52%, African American 48%	Pre–post, IP	Tangberg 1000 MXP VC system
Knowlton and Nelson (2021)	USA	PTSD; USA Veterans	**TS** 583 (79%) **PE-VC-H** 38 (84%) **PE-VC-C** 76 (87%) **PE-IP 119** (80%) **CPT-VCH** 54 (74%) **CPT-VC-C** 95 (82%) **CPT-IP** 201 (75%)	**TS** 47.14 (13.8), **PE-VC-H** 47.8 (13.6), **PE-VC-C** 46.7 (14.9) **PE-IP** 48.6 (15.5) **CPT-VC-H** 44.8 (12.1) **CPT-VC-C** 49.2 (13.8) **CPT-IP** 45.9 (12.6)	European Americans 84%, American Indian/Alaskan Native 5%, Black/ African American 4%, Hispanic/ Latino/a 1%, Pacific Islander 1%, Asian American 0%, unknown 6%	Pre–post, IP	Not reported
Liu *et al.* (2020)	USA	PTSD; Veterans	**TS** 207 (77%) **VC** 103 (80%) **IP** 104 (75%)	**TS** 48.4 (14.1) **VC** 51.4 (14.1) **IP** 45.6 (13.5)	**TS** Hispanic 21%, Caucasian 55%, Black 16%, other 9% **VC** Hispanic 17%, Caucasian 60%, Black 16%, other 7% **IP** Hispanic 24%, Caucasian 51%, Black 15%, other 10%	RCT, IP	Not recorded

(*Continued*)

Table 3. (*Continued*)

Study	Country	Sample	*n** (% male)	Mean age (*SD*)	Ethnicity % Caucasian	Design, comparison group	Video call platform
Luxton *et al.* (2016)	USA	Depression; Veterans	**TS** 121 (82%) **VC** 52 (84%) **IP** 47 (80%)	Not recorded	**VC** White, non-Hispanic 71%, Black, non-Hispanic 13%, Asian, non-Hispanic 5%, Native American, non-Hispanic 2%, Hispanic, any race 5%, Other/unknown 5% **IP** White, non-Hispanic 69%, Black, non-Hispanic 17%, Asian, non-Hispanic 2%, Native American, non-Hispanic 0%, Hispanic, any race 12%, Other/unknown 0%	RCT, IP	Cisco Jabber
Luxton *et al.* (2015)	USA	PTSD; Active duty USA Military and Veterans	10 (100%)	31.8 (7.4)	Not recorded	Pre–post, none	Cisco Jabber
Maieritsch *et al.* (2016)	USA	PTSD; Veterans	**TS** 90 (93%) **VC** 45 (–) **IP** 45 (–)	30.93 (6.1)	Not recorded	RCT, IP	Not recorded
Marchand *et al.* (2011)	Canada (rural)	PTSD; Community	**TS** 68 (36%) **VC** 24 (–) **IP** 44 (–)	**TS** 42.1 (12.1) **VC** Not recorded **IP** Not recorded	Not recorded	Pre-Post, IP	Tandberg 2500 VC system
Matsumoto *et al.* (2018)	Japan	OCD, SAD, PD; community	30 (20%)	35.4 (9.2)	Not recorded	Pre–post, none	Cisco, WebEx, Milpitas
Morland *et al.* (2019)	USA	PTSD; Veterans	**TS** 175 (75%) **VC-H** 58 (76%) **VC-C** 59 (78%) **IP** 58 (72%)	**TS** 46.5 (14.1) **VC-H** 47.3 (14.9) **VC-C** 46.5 (14.1) **IP** 46.5 (12.8)	**TS** American Indian/American Native 3%, Black 29%, White 41%, Asian American 8%, Native Hawaiians/other Pacific Islander 2%, other 10% **VC-H** American Indian/American Native 4%, Black 27%, White 56%, Asian American 4%, Native Hawaiians/other Pacific Islander 0%, other 10%	RCT, IP	Not recorded

(*Continued*)

Table 3. (*Continued*)

Study	Country	Sample	*n** (% male)	Mean age (*SD*)	Ethnicity % Caucasian	Design, comparison group	Video call platform
					VC-C American Indian/American Native 4%, Black 29%, White 49%, Asian American 7%, Native Hawaiians/other Pacific Islander 4%, other 7% **IP** American Indian/American Native 2%, Black 37%, White 28%, Asian American 15%, Native Hawaiians/ other Pacific Islander 4%, other 15%		
Morland *et al.* (2015)	USA	PTSD; Civilians and USA Veterans	**TS** 126 (0%) **VC** 63 (0%) **IP** 63 (0%)	**TS** 46.4 (11.9) **VC** 46.9 (11.8) **IP** 46.0 (12.1)	**TS** Asian 14%, Caucasian 48%, Pacific Islander 12%, other 26% **VC** Asian 11%, Caucasian 43%, Pacific Islander 16%, other 30% **IP** Asian 18%, Caucasian 52%, Pacific Islander 7%, other 22%	RCT, IP	Not recorded
Ong *et al.* (2020)	USA	Narcolepsy, idiopathic hypersomnia; community	**TS** 35 (9%) **VC** 19 (11%) **GR** 16 (6%)	**TS** 32.0 (12.9) **VC** 32.9 (14.4) **GR** 30.9 (11.3)	**TS** Hispanic 9%, non-Hispanic 91.4%, **VC** Hispanic 16%, non-Hispanic (84% **GR** Hispanic 0%, non-Hispanic 100%	CCT, GR	Not recorded
Peterson *et al.* (2022)	USA	PTSD; Active duty USA Military and Veterans	**TS** 120 (88%) **VC** 44 (82%) **IP-C** 44 (95%) **IP-H** 32 (88%)	**TS** 40.5 (10.5) **VC** 41.4 (8.6) **IP-C** 38.5 (11.8) **IP-H** 41.9 (10.9)	**TS** Black 17%, Hispanic 42%, White 37%, other 5% **VC** Black 16%, Hispanic 41%, White 43%, other 0% **IP-Clinic** Black 11%, Hispanic 45%, White 32%, other 11% **IP-Home** Black 25%, Hispanic 38%, White 34%, other 3%	RCT, IP Clinic + IP Home	Not recorded
Pinciotti *et al.* (2022)	USA	OCD; Out-patients, PH	**TS** 468 (49%) **VC** 234 (–) **IP** 234 (–)	TS 29.9 (11.7)	**TS** White 74%, Asian 3%, Hispanic or Latin/x 5%, other 1%, did not provide/know their race 23%	Pre–post, IP	MS Teams
Stubbings *et al.* (2013)	Australia	Depression, anxiety; Community	**TS** 26 (42%) **VC** 14 (43%) **IP** 12 (42%)	**TS** 30.8 (11) **VC** 31.9 (–) **IP** 29.7 (–)	Not recorded	RCT, IP	iChat

(*Continued*)

Table 3. (*Continued*)

Study	Country	Sample	*n** (% male)	Mean age (*SD*)	Ethnicity % Caucasian	Design, comparison group	Video call platform
Trombello *et al.* (2017)	USA	Depression, anxiety; low Income	74 (20%)	40.0 (–)	Latino/Latina 69%, White 18%, African American 11%, unknown 1%	Pre–post, none	Integrated system (accessed via a secure system)
Tuerk *et al.* (2010)	USA (rural)	PTSD; Veterans	**TS** 47 (94%) **VC** 12 (100%) **IP** 35 (91%)	**TS** 39.0 (15.7) **VC** 39.3 (15.6) **IP** 38.0 (15.9)	**TS** Black 34%, Hispanic 2%, White 64% **VC** Black 17%, Hispanic 0%, White 83% **IP** Black 40%, Hispanic 3%, White 57%	Pre–post, IP	Tanburg 1000 MXP VC system
Yuen *et al.* (2015)	USA	PTSD; Veterans	**TS** 52 (98%) **VC** 23 (100%) **IP** 29 (97%)	**TS** 43.98 (15.2) **VC** 41.2 (15.4) **IP** 46.3 (14.9)	**TS** White 54%, Black African/ American 37%, Hispanic 10% **VC** White 48%, Black African/ American 39%, Hispanic 13% **IP** White 57%, Black African/ American 35%, Hispanic 7%	RCT, IP	Various VC options
Yuen *et al.* (2013)	USA	SAD; community	24 (75%)	35.0 (10.8)	Caucasian 75%, Asian 8%, African American 4%, Hispanic 4%	Pre–post, none	Skype

Study	Participant location	Therapeutic model (language delivered)	No. of sessions (facilitators)	Primary outcome measure(s)	Attrition rate	Findings
Acierno *et al.* (2016)	Home	BA-TE (English)	8 weekly sessions of 90 min 3 and 12 months follow-up (Masters level counsellors)	PCL-M	**VC** 18% **IP** 23%	VC is as effective as IP therapy. VC reduces barriers in accessing psychological interventions
Acierno *et al.* (2017)	Home	PE (English)	10–12 sessions of 90 min 3 and 6 months follow-up (Masters level counsellors)	PCL-M	**VC** 33% **IP** 19%	VC is non-inferior to IP in reducing PTSD scores at post-treatment, 3- and 6-month follow-up, and depression at 6month follow-up. VC reduces barriers in accessing psychological interventions
Al-Alawi *et al.* (2021)	Home	CBT, ACT (English, Arabic)	6 weekly sessions (psychologist)	PHQ-9, GAD-7	**VC** 26% **SH** 20%	Greater reductions found in anxiety and depression scores following VC compared with SH

(*Continued*)

Table 3. (*Continued*)

Study	Participant location	Therapeutic model (language delivered)	No. of sessions (facilitators)	Primary outcome measure(s)	Attrition rate	Findings
Arnedt *et al.* (2021)	Home	CBT (English)	6 weekly session of 30–60 min 12 month follow-up (therapist)	ISI	**VC** 6% **IP** 3%	VC is non-inferior to IP at post-treatment and follow-up; VC sessions were, on average 10 min shorter compared with IP; ratings of therapeutic alliance were comparable
Bouchard *et al.* (2000)	Clinic	CBT (English)	12 weekly sessions (therapists)	P&A, SE-CPAQ	–	Significant statistical and clinical improvements on measures of symptoms and global functioning; good therapeutic alliance established after the first session. VC reduces barriers in accessing psychological interventions
Bouchard *et al.* (2004)	Clinic	CBT (English)	12 weekly sessions 6 months follow-up (therapists)	ACQ, BSQ, MI, SE-SCAQ	–	VC is as effective as IP therapy with statistically significant reductions found on all measures at posttreatment and follow-up; excellent therapeutic alliance was established within the first session. VC reduces barriers in accessing psychological interventions
Bouchard *et al.* (2022)	Clinic	CBT (English)	15 weekly sessions of 60 min 6,12 months follow-up	PSWQ, WAQ, IUS	**VC 23**% **IP** 14%	VC therapy was effective and statistically non-inferior to IP therapy on all measures at all time points. VC reduces barriers in accessing psychological interventions
Choi *et al.* (2014)	Home	PST (English)	6 weekly sessions of 60 min 12, 24 and 36 month follow-up (Masters level social workers)	HAMD	12 week **VC** 13% **IP** 14% **TC** 8% 24 week **VC** 27% **IP** 17% **TC** 18% 36 week **VC** 29% **IP** 29% **TC** 21%	VC and IP were efficacious; effects on depression and disability outcomes following VC were sustained significantly longer compared to IP therapy at 36-week follow up. VC reduces barriers in accessing psychological interventions

(*Continued*)

Table 3. (*Continued*)

Study	Participant location	Therapeutic model (language delivered)	No. of sessions (facilitators)	Primary outcome measure(s)	Attrition rate	Findings
Fletcher *et al.* (2022)	Home	ERP (English)	8–16 weekly session of 90 min (Psychologists)	Y-BOCS	25%	Significant reductions in OCD and PTSD symptoms post-treatment; PPs expressed greater comfort in engaging in VC compared to IP; seeing PPs' environments helped understand symptoms and identify appropriate exposures
Franklin *et al.* (2017)	Home or clinic	PE (English)	10 weekly sessions 1-month follow-up (not recorded)	CAPS, PDS	**VC** 43% **iPhone** 70% **TAU** 0%	Some technical and contextual factors affected ability to engage; PPs preferred therapy via iPhone but this was not associated with higher attendance
Goetter *et al.* (2014)	Home	ERP (English)	16–18 weekly sessions of 90 min 3-month follow-up (clinical psychology doctoral students)	Y-BOCS, CGI	27%	Significant improvements in OCD symptoms. At 3-month follow-up 30% of PPs no longer met DSM-IVTR criteria and 80% of PPs were rated as very much or much improved
Griffiths *et al.* (2006)	Clinic	CBT (English)	6–8 weekly sessions (psychologists)	MHI, HONOS	0%	Some significant and clinical outcome measures post-treatment; unable to conclude if CBT had a specific effect anxiety and depression; PPs found VC acceptable
Gros *et al.* (2011)	Clinic	PE (English)	12 weekly sessions of 60–90 min (therapists)	PCL-M	0%	VC was associated with reduced PTSD, depression, and anxiety symptoms, but IP therapy had better clinical outcomes; older PPs were more likely to complete VC
Knowlton and Nelson (2021)	Home or clinic	PE and CPT (English)	Not reported (not reported)	PCL-5, BDI-II	53%	Significant reductions in PTSD and depression symptoms regardless of treatment delivery modality

(*Continued*)

Table 3. (*Continued*)

Study	Participant location	Therapeutic model (language delivered)	No. of sessions (facilitators)	Primary outcome measure(s)	Attrition rate	Findings
Liu *et al.* (2020)	Clinic	CPT (English)	12 weekly sessions of 60 min 6-month follow-up (therapists)	CAPS	**VC** 23% **IP** 28%	VC was non-inferior to IP condition at 6-month follow-up, but VC was inferior to IP at post-treatment on the CAPS. No significant group differences in attrition rates
Luxton *et al.* (2016)	Home	BA-TE (English)	8 weekly sessions of 50'-60'min 12month follow up (Doctoral level mental health providers)	BDI-II	**VC** 35% **IP** 29%	Strong and similar reductions in hopelessness and depressive symptoms; No differences in treatment satisfaction between groups; slight benefit of IP over VC care on some clinical outcomes. No significant group differences in attrition rates.
Luxton *et al.* (2015)	Home	BA (English)	8 sessions (clinicians)	CAPS, BDI-II	20%	Clinically significant reductions in PTSD symptom severity and depression symptoms; PPs reported high levels of satisfaction; Technical problems were observed but successfully mitigated
Maieritsch *et al.* (2016)	Clinic	CPT (English)	10 weekly/bi-weekly sessions of 50 min 12-month follow-up (Doctoral-level psychologists and masters-level social workers)	CAPS	43%	VC may be equivalent to IP therapy. Significant decreases on post-treatment measures observed in both conditions. No significant group differences in attrition rates
Marchand *et al.* (2011)	Clinic	CBT (English)	16-25 weekly sessions of 60' 6month follow up (Psychologists)	MPSS	VC 27% IP 33%	Equivalent levels of symptom reduction and clinically significant change in both conditions. No significant group differences in attrition rates.
Matsumoto *et al.* (2018)	Home	CBT (English, Japanese)	16 weekly sessions of 50 min (CBT therapists)	Y-BOCS LSAS PDSS	3%	Significant reduction in symptom of obsession-compulsion, panic, social anxiety, depression and general anxiety

(*Continued*)

Table 3. (*Continued*)

Study	Participant location	Therapeutic model (language delivered)	No. of sessions (facilitators)	Primary outcome measure(s)	Attrition rate	Findings
Morland *et al.* (2019)	Home or clinic	PE (English)	6–15 weekly sessions of 90 min 6-month follow-up (therapists)	CAPS	**TS** 38% **VC-H** 38% **VC-C** 54% **IP** 21%	Clinical effectiveness did not differ by treatment modality across; PPs in the VC conditions were significantly more likely to drop out of treatment compared with IP
Morland *et al.* (2015)	Home	CPT (English)	12 weekly/bi-weekly sessions of 90 min 3- and 6-month follow-up (therapists)	CAPS	**TS** 77% **VC** 24% **IP** 21%	VC was non-inferior to IP in the reduction of PTSD symptoms and treatment gains were maintained at 3- and 6-month follow-up; no significant group differences in attrition rates
Ong *et al.* (2020)	Home	CBT-H (English)	6 weekly sessions of 60 min (therapists)	PHQ-9	9%	40% of PPs achieved a clinically significant baseline to post-treatment; PPs reported enthusiasm for the accessibility of VC
Peterson *et al.* (2022)	Home	CPT (English)	12 bi-weekly sessions of 60 min 3- and 6-month follow-up (therapists)	PCL-5	**TS** 35% **VC** 34% **IP-C** 43% **IP-H** 25%	VC was the most acceptable and least often refused delivery format; significant reductions in PTSD symptoms observed in all conditions
Pinciotti *et al.* (2022)	Unclear	CBT + ERP (English)	Unclear (unclear)	Y-BOCS	Not reported	VC CBT and ERP are effective at treating OCD and depressive symptoms and as effective as IP treatment. VC reduces barriers in accessing psychological interventions
Stubbings *et al.* (2013)	Clinic	CBT (English)	12 sessions weekly of 60 min, plus one follow-up session 6-month follow-up (trainee clinical psychology doctoral students)	DASS	19% 6-week 35%	Similar retention rates across conditions; symptom reduction in anxiety, depression, stress and QoL – favouring VC; no significant differences working alliance and satisfaction

(*Continued*)

Table 3. (*Continued*)

Study	Participant location	Therapeutic model (language delivered)	No. of sessions (facilitators)	Primary outcome measure(s)	Attrition rate	Findings
Trombello *et al.* (2017)	Home or clinic	BA (English, Spanish)	8 sessions weekly of 45 min (clinical psychologist and licensed masters social worker)	PHQ-9, GAD-7	Unclear	PPs who received ≥1 session achieved and sustained depression remission; PPs who completed ≥4 sessions achieved lower depression and anxiety scores post treatment compared with those completing <4 sessions
Tuerk *et al.* (2010)	Clinic	PE (English)	8–15 weekly sessions of 90 min	PCL-M, BDI-II	VC 25% IP 17%	Statistically significant reduction in self-reported symptomology via VC
Yuen *et al.* (2015)	Home	PE (English)	8–12 sessions of 90 min (Masters-level therapists)	CAPS	30%	Significant symptom reduction of PTSD, depression, and anxiety post-treatment in both conditions; non-significant differences in clinician-reported PTSD and self-reported anxiety; inconclusive findings for self-reported PTSD and depression symptoms; no difference in PPs satisfaction between conditions. VC reduces barriers in accessing psychological interventions
Yuen *et al.* (2013)	Home	ABBT (English)	12 weekly sessions of 60 min 3-month follow-up (therapists)	SPAI LSAS, Brief FNE	17%[d]	VC rated as acceptable and feasible; significant improvements in social anxiety, depression, disability, QoL, and experiential avoidance. VC reduces barriers in accessing psychological interventions

Mental health condition: OCD, obsessive compulsive disorder; PD, panic disorder; PTSD, post-traumatic stress disorder; SAD, social anxiety disorder.
Design and comparisons: GR, group-based condition; IP, in-person CBT condition; IP-C, in-person clinic; IP-H, in-person home; iPhone, iPhone condition; RCT, randomised controlled trial; SH, sel-help condition; TAU, treatment as usual; TC, telephone-based condition; TS, total sample; VC, video call-based CBT condition; VC-C, video call-based CBT-clinic; VC-H, video call-based CBT-home
Therapies: ABBT, acceptance-based behaviour therapy; ACT, acceptance and commitment therapy; BA, behavioural activation; BA-TE, behavioural activation and therapeutic exposure; CBT, cognitive behavioural therapy; CBT-H, cognitive behavioural therapy for hypersomnia; CPT, cognitive processing therapy; EPR, exposure and response prevention; PE, prolonged exposure; PST, problem-solving therapy.
Measures: ACQ, Agoraphobic Cognition Questionnaire; BDI-II, Beck Depression Inventory, second edition; BFNE, Brief Version of the Fear of Negative Evaluation Scale; BSQ, Body Sensation Questionnaire; CAPS, Clinician-Administered PTSD Scale for DSM-5; CGI, Clinical Global Impressions Scale; DASS, Depression Anxiety and Stress Scale; GAD-7, General Anxiety Disorder Assessment; HAMD, Hamilton Rating Scale for Depression; ISI, Insomnia Severity Index; IUS, Intolerance of Uncertainty Scale; LSAS, Liebowitz Social Anxiety Scale; MI, Mobility Inventory; MHI, Mental Health Inventory; HoNOS, Health of the Nation Outcome Scales; MPSS, Modified PTSD Symptom Scale; P&A, Panic and Agoraphobia Scale; PCL-5, PTSD Checklist for DSM-5; PDS, Post-traumatic Diagnostic Scale; PDSS, Panic Disorder Severity Scale; PHQ-9, Patient Health Questionnaire-9; PSWQ, Penn-State Worry Questionnaire; SE-CAP, Self-Efficacy to Control a Panic Attack Questionnaire; SPAI, Social Phobia and Anxiety Inventory; WAQ, Worry and Anxiety Questionnaire; Y-BOCS, Yale-Brown Obsessive-Compulsive Scale.

(or insomnia-related conditions, $n = 2/30$, 7%). Four studies (13%) included participants with depression and anxiety. One study tested participants with OCD, SAD and PD. Total sample sizes varied from 8 to 583 participants. Mean ages varied from 28.51 to 64.80 years. Two studies (7%) included only one gender, 21 studies (72%) reported ethnicity data and most participants were Caucasian. Research groups were from the USA ($n = 22/30$, 73%), Canada ($n = 4/30$, 13%), Australia ($n = 2/30$, 7%), Oman ($n = 1/30$, 3%) and Japan ($n = 1/30$, 3%). Six studies (20%) included participants from rural, geographically remote areas and isolated groups.

Eighteen studies (60%) specified the video calling platform used. Where home-based video call-based CBT was delivered, Skype was the most common platform ($n = 3/30$, 10%). Where clinic-based video call-based CBT was delivered, the Tandberg videoconferencing system (online platform hosted by Cisco) was the most common ($n = 6/30$, 20%). Three studies (10%) reported using various platforms. Laptops, tablets and desktop computers were used across studies, and studies loaned laptops to all participants or those who could not use personal devices. These laptops had pre-loaded software, security measures (i.e. password encryption) and were often configured to limit their functionality (Acierno *et al.*, 2016; Acierno *et al.*, 2017; Choi *et al.*, 2014; Luxton *et al.*, 2015; Luxton *et al.*, 2016; Peterson *et al.*, 2022). Lastly, home-based video call-based CBT was associated with environmental distractions and required further boundary setting to maintain focus. Specifically, Franklin *et al.* (2017) described participants treating sessions less formally, observing them smoking, wearing pyjamas, having the television on in the background and joining from a public place or car.

Quality assessment

Table 4 outlines the Effective Public Health Practice Project (EPHPP) Quality Assessment ratings of studies of using video call-based CBT interventions for adults with mild to moderate common mental health conditions. Study designs included 14 uncontrolled studies ($n = 1464$), 15 RCTs ($n = 1776$), and one controlled clinical trial (CCT; $n = 35$). Eight RCTs were designed as non-inferiority evaluations. Twelve studies (40%, 10 RCTs) received a 'strong' EPHPP global rating, 12 studies (41%, 4 RCTs) were rated as 'moderate', and six (21%, 1 RCT) were 'weak'. Analysis of methodological dimensions indicated strong data collection methods where all studies used valid and reliable data collection tools. All studies received strong or moderate ratings on their study design. Six RCTs received strong a rating on withdrawal and drop-outs; nine received a moderate rating. Two RCTs received a strong rating on blinding to assigned conditions or tasks; 13 received a moderate rating. Eight studies could not be assessed on the EPHPP domain of 'blinding' ratings because their design was described as cohort studies. These studies did not include a control group, and as such blinding was not relevant to these studies. Two RCTs received weak ratings for the control of confounding variables.

Interventions

One thousand six hundred and sixty-nine participants received video call-based CBT, and 22 studies included a comparison group ($n = 19$ in-person; $n = 1$ self-help; $n = 1$ group-based; $n = 1$ treatment as per usual [TAU]). Three studies employed three-arm randomisation, including home-based, clinic-based and in-person conditions (Morland *et al.*, 2020; Peterson *et al.*, 2022) and video call-based, iPhone and TAU groups (Franklin *et al.*, 2017). Where described, no study reported significant differences between demographic or background variables between groups.

Ten studies delivered a course of CBT that included standard CBT techniques, such as psychoeducation, symptom monitoring, cognitive restructuring, exposure exercises, and relapse prevention. Seventeen studies delivered targeted CBT techniques, including prolonged exposure ($n = 6$), cognitive processing therapy ($n = 4$), behavioural activation ($n = 2$), exposure and response prevention ($n = 2$), behavioural activation and therapeutic exposure ($n = 2$), and

Table 4. Effective Public Health Practice Project (EPHPP) quality assessment ratings of studies using video call-based CBT interventions for adults with mild to moderate common mental health conditions

Study	Selection bias	Study design	Confounders	Blinding	Data collection	Withdrawal and drop-outs	Global rating
Acierno *et al.* (2016)	Moderate	Strong	Strong	Moderate	Strong	Strong	Strong
Acierno *et al.* (2017)	Moderate	Strong	Strong	Moderate	Strong	Strong	Strong
Al-Alawi *et al.* (2021)	Weak	Strong	Strong	Moderate	Strong	Moderate	Moderate
Arnedt *et al.* (2021)	Weak	Strong	Strong	Moderate	Strong	Strong	Moderate
Bouchard *et al.* (2000)	Weak	Moderate	Weak	N/A	Strong	Weak	Weak
Bouchard *et al.* (2004)	Weak	Moderate	Weak	N/A	Strong	Weak	Weak
Bouchard et al, 2022)	Moderate	Strong	Strong	Strong	Strong	Moderate	Strong
Choi *et al.* (2014)	Moderate	Strong	Strong	Moderate	Strong	Strong	Strong
Fletcher *et al.* (2022)	Moderate	Moderate	Weak	N/A	Strong	Strong	Moderate
Franklin *et al.* (2017)	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Goetter *et al.* (2014)	Moderate	Moderate	Weak	N/A	Strong	Moderate	Moderate
Griffiths *et al.* (2006)	Moderate	Moderate	Weak	N/A	Strong	Strong	Moderate
Gros *et al.* (2011)	Moderate	Moderate	Strong	Moderate	Strong	Moderate	Strong
Knowlton and Nelson (2021)	Moderate	Moderate	Strong	Moderate	Strong	Weak	Moderate
Liu *et al.* (2020)	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong
Luxton *et al.* (2016)	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong
Luxton *et al.* (2015)	Moderate	Moderate	Weak	N/A	Strong	Strong	Moderate
Maieritsch *et al.* (2016)	Weak	Strong	Strong	Moderate	Strong	Moderate	Moderate
Marchand *et al.* (2011)	Moderate	Moderate	Strong	Moderate	Strong	Moderate	Strong
Matsumoto *et al.* (2018)	Weak	Moderate	Weak	N/A	Strong	Strong	Weak
Morland *et al.* (2019)	Moderate	Strong	Strong	Moderate	Strong	Strong	Strong
Morland *et al.* (2015)	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong
Ong *et al.* (2020)	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Peterson *et al.* (2022)	Moderate	Strong	Weak	Moderate	Strong	Moderate	Moderate
Pinciotti *et al.* (2022)	Moderate	Moderate	Strong	Moderate	Strong	Weak	Moderate
Stubbings *et al.* (2013)	Moderate	Strong	Strong	Moderate	Strong	Strong	Strong
Trombello *et al.* (2017)	Weak	Moderate	Weak	N/A	Strong	Weak	Weak
Tuerk *et al.* (2010)	Moderate	Moderate	Weak	Moderate	Strong	Moderate	Moderate
Yuen *et al.* (2015)	Moderate	Strong	Strong	Strong	Strong	Moderate	Strong
Yuen *et al.* (2013)	Moderate	Moderate	Weak	N/A	Strong	Moderate	Moderate
Total							
Strong	0	16	17	2	30	11	12
Moderate	21	14	0	19	0	14	12
Weak	9	0	13	0	0	5	6
N/A	0	0	0	9	0	0	0

N/A, not applicable.

problem-solving therapy ($n = 1$). One study delivered a combination of prolonged exposure and cognitive processing therapy, and two included a third-wave CBT approach (acceptance and commitment therapy).

Sessions ranged from six to 25 sessions, were between 30 and 90 minutes long, and were mostly scheduled on a weekly basis. No differences in the number of sessions or session length were found between controlled and uncontrolled studies or the CBT technique used. Facilitators ranged from qualified therapists and psychologists to masters or doctoral students of psychology, mental health studies, and social work. All therapists were provided with ongoing supervision, and most had previous experience with the treatment protocols. For those without, extensive training was provided (Acierno *et al.*, 2016; Choi *et al.*, 2014; Gros et al., 2011; Luxton *et al.*, 2015; Luxton *et al.*, 2016; Ong *et al.*, 2020). Most sessions were conducted in English. Three studies also offered the choice to have sessions in Arabic, Japanese or Spanish.

Eighteen studies included follow-up sessions, varying from 3 to 36 months. Attrition rates fluctuated from 0 to 77% in RCTs and from 0 to 53% in uncontrolled studies. Where comparisons between video call-based and in-person conditions were possible, most studies revealed no significant group differences in attrition rates. Analysis of variables predicting uptake,

engagement, satisfaction and completion rates identified limited predictors. Across studies, baseline demographics (i.e. age, gender, race, ethnicity, disability status, education, marital status, socioeconomic status) and clinical variables (i.e. symptom severity, time, financial barriers, perceived stigma, and beliefs surrounding mental health) were unrelated to uptake and completion.

Feasibility and acceptability

Most studies reported that video call-based CBT was more convenient (i.e. participants were able to attend more frequently and fit therapy into caring and work schedules) and was an opportunity to overcome barriers in accessing psychological interventions to populations that would otherwise have been unable to access therapy due to geographical distance, financial difficulties, concerns regarding stigma, work commitments, time constraints, disability, and mental health. For example, Yuen *et al.* (2013) reported that 71% of participants previously experienced barriers in accessing treatment. Trombello *et al.* (2017) also found that when delivered in more than one language, video called-based CBT increased access to those experiencing significant cultural and linguistic barriers, noting that monolingual Spanish speakers were more likely to discontinue treatment earlier than their English-speaking counterparts.

Seventeen studies (57%) reported data on treatment satisfaction, feasibility and acceptability, of which 64% ($n = 11/17$) indicated high levels of treatment satisfaction. For example, Matsumoto *et al.* (2018) reported that 83% of participants preferred video call-based CBT to in-person CBT and reported extremely high rates of participant satisfaction. Yuen *et al.* (2013) reported that 95% of participants were completely or mostly satisfied with treatment, and 100% of therapists were satisfied with this format. Peterson *et al.* (2022) reported that video calling was the least refused delivery format compared with in-person CBT. Franklin *et al.* (2017) reported that no participant had a problem being offered video call-based CBT.

While participants embraced its novelty, studies highlighted a period of discomfort, apprehension, scepticism, anxiety and unfamiliarity in using video calling during early sessions (Choi *et al.*, 2014; Yuen *et al.*, 2013; Yuen *et al.*, 2015). This reduced over time as participants became more confident and comfortable with the technology (despite minor technical difficulties), feeling proud of their ability to use video calls. Participants felt interactions with their clinician became more 'natural' as sessions progressed. Four studies (13%) specifically stated that video call-based CBT created a less intense environment (greater comfort, less pressure and intimidation, eased communication) and fostered a greater sense of agency, flexibility and control in sessions (Choi *et al.*, 2014; Fletcher *et al.*, 2022; Yuen *et al.*, 2013; Yuen *et al.*, 2015). Participants also reported preferring in-person CBT, describing a reduced sense of therapist presence in sessions and perceiving exposure tasks as less real and engaging (Arnedt *et al.*, 2021; Choi *et al.*, 2014; Fletcher *et al.*, 2022). Facilitators also described difficulties in detecting emotion and interpreting body language, noting the potential to miss relevant safety behaviours typically observed in-person (Yuen *et al.*, 2013).

Most studies ($n = 28/30$, 93%) described intervention protocols and adapted these to deliver video call-based CBT, provide technical support, and include directives for technical disruptions. Nine studies (30%) offered instructions to download and install video calling platforms and provided a brief introductory session or test call prior to treatment to resolve any difficulties (Acierno *et al.*, 2016; Acierno *et al.*, 2017; Choi *et al.*, 2014; Fletcher *et al.*, 2022; Liu *et al.*, 2020; Luxton *et al.*, 2015; Luxton *et al.*, 2016; Yuen *et al.*, 2013; Yuen *et al.*, 2015). For some, this was part of the assessment procedure to ensure participants had the skills and technical resources.

Ten studies (33%) reported technical difficulties. These included difficulties in establishing a connection, connection stability, disconnection, disruptions to audio and visual quality, and a lack of a quiet, confidential space (Franklin *et al.*, 2017; Luxton *et al.*, 2015; Luxton *et al.*, 2016; Marchand *et al.*, 2011; Peterson *et al.*, 2022; Yuen *et al.*, 2013). While distracting and frustrating,

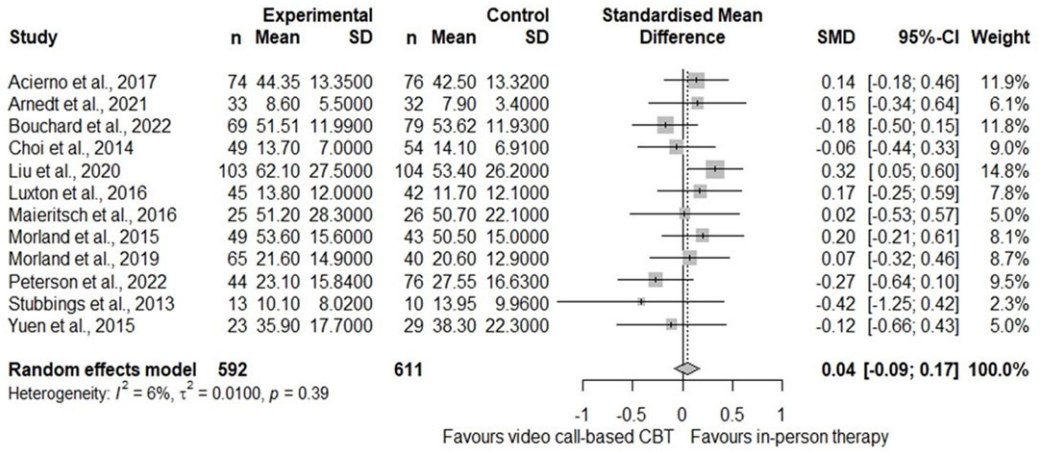

Figure 2. Forrest plot for the meta-analysis examining the effects of individual video call-based CBT and in-person treatments using a random effects model.

minor disruptions were quickly and effectively mitigated (in minutes) through in-session troubleshooting or reconnection and did not negatively impact participant engagement and communication or deter participants from video call-based CBT (Choi *et al.*, 2014; Luxton *et al.*, 2015; Marchand *et al.*, 2011; Tuerk *et al.*, 2010). Minor disruptions also reduced over time as participants became more proficient at troubleshooting (Yuen *et al.*, 2013; Yuen *et al.*, 2015). Severe technical issues (i.e. inability to re-establish connection) were managed by postponing or cancelling sessions, or using the telephone (Griffiths *et al.*, 2006; Luxton *et al.*, 2015).

Other adaptions included incorporating security measures into the protocol ($n = 5/30$, 17%; i.e. access through a secure system, using encrypted functions, enhanced security, and changes to the practical logistics of document sharing ($n = 13/30$, 43%; i.e. using emails, in-built chat features, apps, faxing, screen sharing, digital questionnaires, file sharing; Al-Alawi *et al.*, 2021; Bouchard *et al.*, 2000; Bouchard *et al.*, 2004; Choi *et al.*, 2014; Fletcher *et al.*, 2022; Griffiths *et al.*, 2006; Gros *et al.*, 2011; Luxton *et al.*, 2015; Luxton *et al.*, 2016; Marchand *et al.*, 2011; Matsumoto *et al.*, 2018; Stubbings *et al.*, 2013; Trombello *et al.*, 2017; Tuerk *et al.*, 2010). Clinical exercises were also adapted by restricting, removing or changing exposure exercises to *in vivo* exposure and supporting participants via the telephone for community exposures tasks (Gros *et al.*, 2011; Pinciotti *et al.*, 2022; Stubbings *et al.*, 2013; Tuerk *et al.*, 2010; Yuen *et al.*, 2013).

Most protocols included safety procedures outlining how participants could access in-person support in the event of a clinical emergency or crisis. Procedures included participants completing release of information forms with contact details of nominated persons (Luxton *et al.*, 2015), providing participants with details of on-site support staff or the clinic address (Acierno *et al.*, 2017; Tuerk *et al.*, 2010) and acquiring the direct line for local emergency services' dispatch for each participant (Acierno *et al.*, 2017). Only one study activated emergency safety procedures where the participant expressed suicidal ideation, was assessed by a supervisory psychologist and taken to hospital for further evaluation (Luxton *et al.*, 2016).

Effectiveness

Figure 2 summarises the results comparing the effects of video call-based CBT to in-person therapy based on primary severity outcomes ($k = 12$, $n = 1203$). Seven RCTs were non-inferiority studies. Heterogeneity was low ($I^2 = 5.7\%$; $Q = 11.67$; $p = 0.389$). The pooled estimate was small (SMD = 0.044, 95% CI = −0.086, 0.174; $z = 0.660$) and not statistically significant at 0.05

($p = 0.510$). Assuming this set of studies is representative, the pooled average outcome scores were only 0.07 lower for video call-based CBT, with the upper 95% CI indicating that the inferiority of video calling is likely no more than 0.2. This is typically interpreted as a small effect.

Table 5 and Figs 3–5 outline the meta-analysis of results of the leave-one-out sensitivity analysis examining the effects of video call-based CBT and in-person treatments using a random effects model. Leave-one-out sensitivity analysis identified the three most influential studies as Liu *et al.* (2020; 14.8% weight), Acierno *et al.* (2017; 11.9% weight) and Bouchard *et al.* (2022; 11.8% weight). No distinguishing features were observed in these studies. The exclusion of Liu e*t al.* (2020) decreased the SMD score by 0.038, favouring video call-based CBT (SMD = –0.005; 95% CI = –0.131, 0.120). Excluding Acierno *et al.* (2017) decreased increased the SMD by 0.015 (SDM = 0.0289; 95% CI = –0.115; 0.173); favouring in-person CBT. Excluding Bouchard *et al.* (2022) increased the SMD by 0.033 (SMD = 0.077; 95% CI = –0.0556; 0.209). In all, the change in SMD was relatively small, and differences were not statistically significant.

Furthermore, in systematically reviewing the included studies, non-inferiority evaluations found that video call-based CBT was non-inferior to in-person therapy, indicating that video call-based CBT is not unacceptably less efficacious than in-person CBT. Where reported, non-inferiority boundaries ranged from –0.4 to 0.5, or a reduction of 4–10 points from either the upper or lower CI boundary. Other studies reported similar findings suggesting video call-based CBT can be as effective as in-person CBT and is superior to self-help and telephone-support. Over half of the studies reported clinically and/or significant reductions in target symptoms for depression, panic, avoidance, anxiety, OCD, social anxiety, PTSD, and improved quality of life and global functioning with treatment gains maintained at follow-up. All the 14 studies that included PTSD populations ($n = 2009$; 9 RCTs) found that video call-based CBT was as effective, equivalent to, or non-inferior to in-person CBT, describing statistically significant reductions in symptomology with treatment gains maintained at 3- and 6-month follow-up (where measured). They also noted clinical effectiveness did not differ by treatment modality, indicating the specific effectiveness of video call-based CBT in treating PTSD.

Discussion

This systematic review aimed to assess the feasibility, acceptability, and effectiveness of video call-based CBT for mild to moderate common mental health conditions in adults. Findings highlight that video call-based CBT appears to be feasible, acceptable, and effective transdiagnostically, where clinically meaningful results were found in treating PTSD, anxiety, depression, OCD, PD with agoraphobia, SAD, GAD and insomnia populations with only small differences in efficacy (sufficient to be judged non-inferior) to in-person therapy. Regardless of mental health condition, most studies found no significant differences between video call-based CBT and in-person, self-help and group-based interventions in clinical outcomes, client satisfaction and therapeutic relationship. Protocols also included optional models, technical and risk management processes, allowing therapists to focus on specific symptoms, manage clinical risk and prioritise interventions.

Efficacy was further indicated in the meta-analysis, which indicated that there is no evidence to suggest that remote CBT is inferior to in-person CBT in reducing common mental health symptoms, given that there was no significant difference between the two. This finding is comparable to recent meta-analyses by Norwood *et al.* (2018); Batastini *et al.* (2021); Greenwood *et al.* (2022); and Salazar de Pablo *et al.* (2023), that indicate a lack of significant differences between video call and in-person interventions. Whilst a non-inferiority boundary was not explicitly set in this study (due to the authors not being aware of any explicit guidelines on how to combine inferiority boundaries across multiple studies), it is likely that effects are around 0.1.

Table 5. Meta-analysis of results of the leave-one-out sensitivity analysis examining the effects of video call-based CBT and in-person treatments using a random effects model

Study removed	EPHPP rating	Population	Outcome	K	o	SMD	95% CI	*Z*	*p*-value	I^2 (%)	I^2 CI (%)	Q	Heterogeneity *p*-value
n/a (all studies included)	—	—	—	12	1203	0.044	−0.086; 0.174	0.660	0.510	5.7	0.0; 60.7	11.67	0.389
Acierno *et al.* (2017)	Strong	PTSD	PCL	11	1053	0.029	−0.115; 0.173	0.39	0.694	11.9	0.0; 52.2	11.35	0.331
Arnedt *et al.* (2021)	Moderate	Chronic insomnia	ISI	11	1138	0.035	−0.102; 0.173	0.50	0.616	13.1	0.0; 53.6	11.50	0.320
Bouchard *et al.* (2022)	Strong	GAD	PSWQ	11	1055	0.077	−0.056; 0.209	1.14	0.256	0.0	0.0; 60.2	9.51	0.485
Choi *et al.* (2014)	Strong	Depression	HAMD	11	1100	0.052	−0.087; 0.192	0.73	0.463	11.8	0.0; 52.1	11.34	0.332
Liu *et al.* (2020)	Strong	PTSD	CAPS	11	996	−0.005	−0.131; 0.120	−0.08	0.935	0.0	0.0; 60.2	7.13	0.713
Luxton *et al.* (2016)	Strong	Depression	BDI	11	1116	0.031	−0.108; 0.170	0.44	0.661	11.7	0.0; 52.0	11.33	0.333
Maieritsch *et al.* (2016)	Moderate	PTSD	CAPS	11	1152	0.044	−0.092; 0.180	0.63	0.528	14.2	0.0; 54.8	11.66	0.309
Morland *et al.* (2015)	Strong	PTSD	CAPS	11	1111	0.028	−0.111; 0.167	0.40	0.689	10.1	0.0; 49.8	11.12	0.348
Morland *et al.* (2019)	Strong	PTSD	CAPS	11	1098	0.039	−0.102; 0.180	0.54	0.587	14.2	0.0; 54.8	11.66	0.348
Peterson *et al.* (2022)	Moderate	PTSD	PCL	11	1083	0.081	−0.046; 0.208	1.26	0.209	0.0	0.0; 60.2	8.51	0.579
Stubbings *et al.* (2013)	Strong	Depression, anxiety	DASS	11	1180	0.055	−0.076; 0.185	0.82	0.413	4.2	0.0; 61.9	10.44	0.403
Yuen *et al.* (2015)	Strong	PTSD	CAPS	11	1151	0.052	−0.083; 0.186	0.75	0.454	11.5	0.0; 51.7	11.29	0.335

K, number of studies; o, number of observations, SMD, standard mean difference.

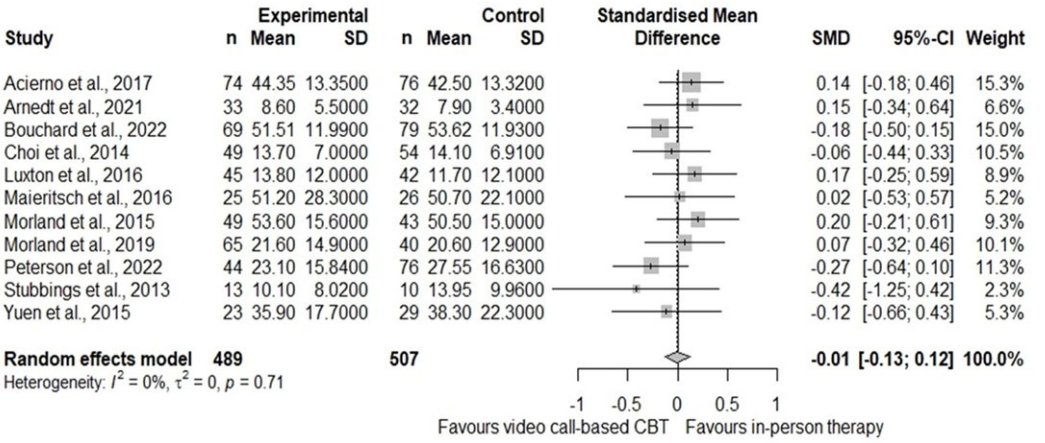

Figure 3. Forrest plot of the leave-one-out sensitivity analysis and exclusion of Liu *et al.* (2020) in the meta-analysis examining the effects of individual video call-based CBT and in-person treatments using a random effects model.

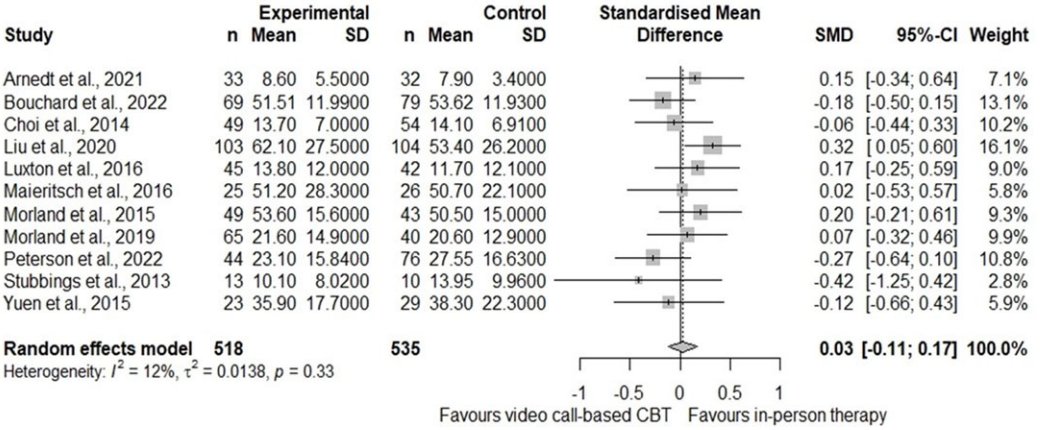

Figure 4. Forrest plot of the leave-one-out sensitivity analysis and exclusion of Acierno *et al.* (2017) in the meta-analysis examining the effects of individual video call-based CBT and in-person treatments using a random effects model.

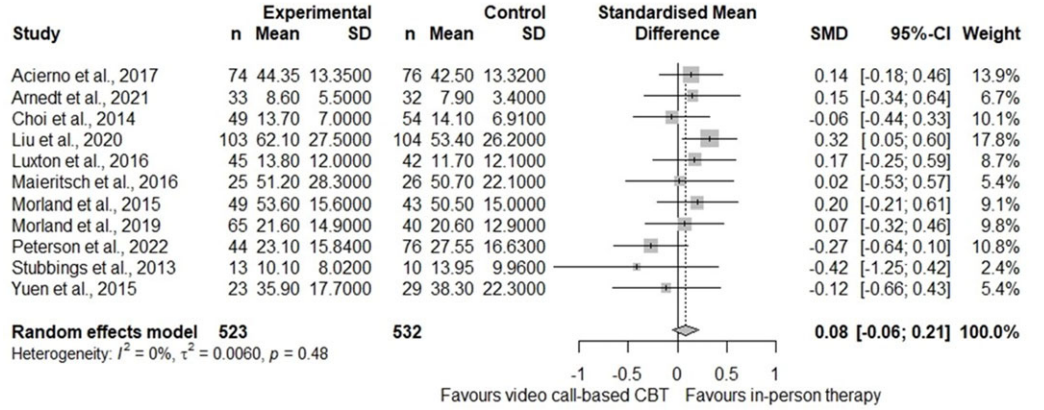

Figure 5. Forrest olot of the leave-one-out sensitivity analysis and exclusion of Bouchard *et al.* (2022) in the meta-analysis examining the effects of individual video call-based CBT and in-person treatments using a random effects model.

Attrition rates for video call-based CBT varied from 3 to 43% and were typically similar than their in-person comparison group where reported. This suggests that treatment modality, initial concerns regarding satisfaction, and therapeutic relationship do not appear to contribute to disengagement. Such rates are comparable to the literature that indicates an approximate 30% attrition rate (Alavi *et al.*, 2023; Song and Foster, 2022; Moller *et al.*, 2019; Varker *et al.*, 2021). Furthermore, the 2018 UK NHS Digital report on the IAPT programme reported a 29% attrition rate (Moller *et al.*, 2019). Varker *et al.* (2021) also noted in their paper that the recommended attrition rate for PSTD treatment is 20.9%, with increased rates for the military and veteran population.

Access and inclusivity

The Global Guidelines for Telepsychiatry (Mucic, 2021) note that video call-based interventions can contribute to reducing the global disparity in access to care by '*allowing service users to access evidence-based interventions and care*'. To date, 80% of individuals in developing countries cannot access traditional treatment for mental health problems (United Nations, 2020), and between 44 and 70% of individuals in developed countries who require mental health care are unable to access evidence-based treatments (World Health Organization, 2019b). This review highlights that video call-based CBT has potential to facilitate access to evidence-based psychological interventions without diminishing effectiveness, enabling services to address many physical, psychological, and financial barriers associated with access to mental healthcare. The findings are consistent with the literature that propose that telemental health can reduce service and client costs and time, increase reach to geographically remote and diverse regions, and offer access to those concerned with stigma and confidentiality (Chiauzzi *et al.*, 2020; Gros *et al.*, 2011; Mazziotti and Rutigliano, 2021; Mitchell *et al.*, 2021; Rains *et al.*, 2022; Richardson *et al.*, 2009; Schlief *et al.*, 2022). Nevertheless, while worldwide internet use is growing significantly (Statista Research Department, 2023), for video call-based CBT to increase access to psychological interventions, it requires an active internet connection, financial resources, and technology. Approximately 63% of the global population uses the internet (Statista Research Department, 2022). Consideration of this fact is critical given its potential to facilitate or hinder access and engagement in mental health services (Baxter *et al.*, 2022; Bignall *et al.*, 2019; Gopalkrishnan, 2018; World Health Organisation and Calouste Gulbenkian Foundation, 2014). Under-served populations, including ethnic minorities and rural and remote populations, are the most likely to face barriers in accessing evidence-based interventions. They are also the most vulnerable to the digital divide (UK Parliament, 2020; UNCTAD, 2021; United Nations, 2020). Thus, it is likely that video call-based CBT remains inaccessible to numerous communities, including those with poor or inadequate infrastructure to provide and maintain reliable internet connectivity and those without the financial feasibility to maintain internet costs and skills, awareness and the availability to access such interventions (Bali *et al.*, 2016; Ong *et al.*, 2020; Rains *et al.*, 2022; Sorwar *et al.*, 2016).

Mental health services may wish to allocate provisions to facilitate access to video call-based CBT so service users can have a choice of intervention (i.e. provide devices and data to service users). This comes with significant costs, raising the question of how these costs will be funded. Services should also invest in training clinicians to ensure they are equipped with the necessary skills and competence to deliver video call-based interventions to maximise its therapeutic impact (Mucic, 2021).

Attitudes and beliefs towards video call-based CBT

Several studies reported on service users' and clinicians' beliefs and attitudes towards video call-based CBT. Concerns about security and confidentiality, the therapeutic relationship and the impersonal nature of a video call, lack of awareness and understanding of how to use video calling

platforms, and feeling deskilled in managing crises (Glueckauf *et al.*, 2018; Rohland *et al.*, 2000; Sampaio *et al.*, 2021) have previously been described as concerns of video call-based interventions. Comparatively, this review highlighted that these concerns subsided, and there was no detrimental impact on the therapeutic relationship. Instead, this review highlights that high levels of satisfaction were reported. Despite clinicians' concerns, the absence of safety events (risk events) suggests that video call-based CBT can be delivered safely when clear safety standards are considered. This variability may suggest that clinicians find the remote therapy process more challenging without this necessarily being reflected in the service user experience. Such beliefs are likely to be routed in training that often emphasises critical factors in therapy outcomes that can only be achieved in in-person interactions.

Strengths and limitations of the included studies

All studies yielded strong quality ratings on measures, although these differed across studies due to differing participant populations. Studies also reported group differences between conditions and controlled for these appropriately in the design or analysis. Borrelli (2011) reported that conclusive statements about treatment effects cannot be made without considering treatment fidelity. Most studies included treatment fidelity checks, enhancing intervention strength, reliability, and validity (Karas and Plankis, 2016).

Over half of the studies included were RCTs, and less than a third included a non-inferior analysis. RCTs were well designed, reported group differences between conditions and controlled for these appropriately in the design or analysis. These studies add strength to the evidence base regarding the effectiveness of video call-based CBT and demonstrate good applicability in clinical practice due to their prospective design, concurrent control group, and control of baseline values and confounders (Peinemann *et al.*, 2014). However, only a limited number of studies described using an Intent to Treat (ITT), the inclusion of which provides a more reliable estimate of clinical effectiveness, mirroring clinical practice (i.e. non-compliance, protocol violations, attrition while preserving sample size and minimising Type 1 errors and bias related to incomplete data; Fergusson *et al.*, 2002; Gupta, 2011). Absence of a control condition in the uncontrolled studies meant that it is not possible to infer concrete and meaningful conclusions regarding treatment effects on population and conditions in these studies; and to discriminate treatment outcomes from outcomes related to other factors, such as symptom progression or individual expectations.

Strengths and limitations of this review

This is the first known systematic review and meta-analysis to investigate feasibility, accessibility, and effectiveness of individual video call-based CBT for adults with mild to moderate common mental health conditions. Strengths include the design of the search strategy and the large number of databases accessed, enabling this review to include a comprehensive range of studies that encompass a variety of study designs and comparison groups. Using an independent rater minimised potential bias and error in the screening, data extraction and EPHPP process. However, the potential for error in calculating sample sizes due to unclear reporting on drop-outs and the unknown use of identical participants across studies remains. While discrepancies were discussed under the supervision of a third independent individual, this study did not use a formal measure of inter-reliability to assess the consistency of individual ratings. The exclusion of grey literature was intended to ensure only high-quality peer-reviewed studies were included, but consequently, the findings could be subject to publication bias. This review's generalisability is also limited to its inclusion criteria, excluding studies published in a language other than English. It was unclear how many participants were taking psychiatric medication; therefore, it is difficult to infer if symptom reduction was attributed to psychological intervention or medication. Exclusion

of qualitative studies was due to limitations of the quality tool used that did not allow the comparison of quantitative and qualitative studies. Their inclusion could have provided further rich data on the acceptability of video call-based CBT. Lastly, the meta-analysis was based on 12 studies, which is relatively small, although not an unacceptable sample.

Over two-thirds of samples included a US military and veteran PTSD population (from the Iraq, Gulf, and Vietnam Wars). Whilst this limits the generalisability of this study's findings, it also highlights the dominance of video call-based CBT for PTSD in the research. The US Department of Veteran's Health Affairs (VHA) has been the leader in establishing and using telemental health interventions and has invested significant resources into telemental health and the innovation of alternative service delivery modalities (including video call-based interventions) to ensure convenient and timely access to treatment (Department of Defense, 2010; Knowlton and Nelson, 2021; Strachan *et al*., 2012; US Department of Veteran Affairs, 2020). For example, in 2019, over 490,000 veterans had engaged in video call-based health appointments, and the VHA had provided over 2.6 million telemental health episodes of care – 50% of which supported Veterans in rural communities (Millard, 2020). By contrast, there were relativity few studies on other anxiety disorders, which is especially notable given that CBT is the NICE-recommended psychological treatment for these conditions.

Many included studies were published before the COVID-19 pandemic, where day-to-day use of video calling was less common, and service providers were not incentivised or trained to provide video call-based interventions (Chiauzzi *et al*., 2020; Cowan *et al*., 2019; Glueckauf *et al*., 2018; Mace *et al*., 2018; Sampaio *et al*., 2021). Now, video calling is the norm, and individuals' attitudes and experiences have likely changed, and clinicians are generally more optimistic about video call-based CBT (Rains *et al*., 2022). The COVID-19 pandemic has also led to technological advances, increased awareness, access, and understanding of video calling, as well as changes in leading platform providers (i.e. from Skype to Zoom and MS Teams). These factors will inevitably influence ongoing research in ways that are likely to go beyond the scope of this review.

Several different terminologies were noted to be used across the literature to define psychological therapy delivered by video calling (i.e. telemental-health, e-Mental health, telepsychology, video therapy, telepsychiatry, virtual therapy, telemedicine, teletherapy, eTherapy, online therapy). There does not appear to be a universal definition, and many definitions are defined by context and used interchangeably. For example, Ostrowski and Traci (2016) found 42 different terms were used across USA licensing boards. Lack of standardisation has potential to confuse stakeholders and can lead to difficulties in service provision, training, measurement and practices, ethical guidelines, and evidence-based research. Subsequently, it is crucial that professionals work together to establish a standardised definition in the literature and clinical practice to provide clarity, clear guidance, professional competencies, and training needs.

Clinical applications

Findings of this review indicate that video call-based CBT can be trusted as a helpful and useful treatment modality in the delivery of psychological therapy. It has the potential to increase access and, therefore, the overall provision of psychology. Services should be equipped to provide additional training to their workforce and the required technology and training to clinicians and service users, where needed. Greater steps should also be taken to ensure privacy and confidentiality, ensuring service users are in a private space (Shachar *et al*., 2020). Clinicians should be mindful of when and to which populations video call-based CBT should be offered, offering introductory test calls to assess technological competency. They should also be aware of the differences in the way the therapeutic relationship may present and how to work flexibly, specifically in adapting clinical exercises to accommodate for the distance between service user and clinician, and the impact of working remotely on managing crisis and their clinical and

home–work boundaries (James *et al.*, 2022). Services and clinicians should also be aware of the causes, indicators and signs of 'Zoom fatigue' (defined in Riedl, 2022) and its impact on stress, exhaustion and burnout. Services should embed resources and staff support into their workforce to raise awareness, prevent, and provide support when necessary. As video call-based CBT does not require the service user and clinician to be in the same location or country, clinicians must be aware of the regulatory requirements and licensing that may be limited by geographical requirements (Shachar *et al.*, 2020).

Future research

Future research should continue to investigate and test non-inferiority between video call-based CBT and in-person CBT through large-scale RCTs with ethnically diverse samples that extends beyond US military populations. This will further establish which conditions are more likely to benefit from video call-based CBT compared with in-person therapy, where the need to manage significant risk, mental health symptoms or interpersonal dynamics may be more prevalent. Studies should also consider the impact of medication on symptom reduction and service user engagement, and the cost-effectiveness of implementing video call-based interventions and continue to investigate preferred video calling platforms and clinicians' attitudes and beliefs related to video call-based interventions.

Conclusion

During the COVID-19 pandemic, video call-based CBT became a necessity, and, for many, this is now embedded into clinical practice. This paper identifies promising research in support of feasibility, accessibility, and effectiveness of video call-based CBT in treating common mental health conditions. Video call-based CBT can help overcome many barriers in accessing evidence-based psychological interventions without impacting service user satisfaction and therapeutic alliance. As technology continues to develop in clinical practice, researchers should establish universal definitions and work with stakeholders to reduce the digital divide so that everyone can be provided with the choice to access video call-based treatments.

Key practice points

(1) Video call-based CBT appears to be feasible, acceptable and effective transdiagnostically, and can be trusted as a helpful and useful treatment modality in the delivery of psychological therapy.
(2) Video call-based CBT can help overcome many barriers in accessing evidence-based psychological interventions without diminishing effectiveness or impacting service user satisfaction, therapeutic alliance, and managing risk events.
(3) With the increased need for digital mental healthcare, including video call-based interventions, services should be equipped to provide additional training to their workforce, and the required technology and training to clinicians and service users, while remaining mindful of the digital divide.

Further reading

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Data availability statement. The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Author contributions. **Anisah Ebrahimjee:** Conceptualization (equal), Data curation (lead), Formal analysis (lead), Investigation (lead), Methodology (lead), Project administration (lead), Software (lead), Visualization (lead), Writing – original draft (lead), Writing – review & editing (equal); **John Hodsoll:** Conceptualization (equal), Methodology (supporting), Software (supporting), Supervision (supporting), Writing – review & editing (equal); **Lucia Valmaggia:** Conceptualization (equal), Methodology (supporting), Supervision (supporting), Writing – review & editing (equal); **Lauren Hickling:** Formal analysis (supporting), Methodology (supporting), Validation (supporting), Writing – review & editing (supporting); **Simon Riches:** Conceptualization (equal), Methodology (lead), Supervision (lead), Writing – review & editing (lead).

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Competing interests. The authors declare none.

Ethical standards. This review is registered on PROSPERO (CRD42021291055). The researchers have abided by the Ethical Principles of Psychologists and Code of Conduct as set out by the BABCP and BPS.

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