Invited Article

Review of the current empirical literature on using videoconferencing to deliver individual psychotherapies to adults with mental health problems

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Abstract. Purpose. The COVID-19 pandemic has resulted in a widespread adoption of videoconferencing as a communication medium in mental health service delivery. This review considers the empirical literature to date on using videoconferencing to deliver psychological therapy to adults presenting with mental health problems.

Method. Papers were identified via search of relevant databases. Quantitative and qualitative data were extracted and synthesized on uptake, feasibility, outcomes, and participant and therapist experiences.

Results. Videoconferencing has an established evidence base in the delivery of cognitive behavioural therapies for post-traumatic stress disorder and depression, with prolonged exposure, cognitive processing therapy, and behavioural activation non-inferior to in-person delivery. There are large trials reporting efficacy for health anxiety and bulimia nervosa compared with treatment-as-usual. Initial studies show applicability of cognitive behavioural therapies for other anxiety and eating disorders and obsessive–compulsive spectrum disorders, but there has yet to be study of use in severe and complex mental health problems. Therapists may find it more difficult to judge non-verbal behaviour, and there may be initial discomfort while adapting to videoconferencing, but client ratings of the therapeutic alliance are similar to in-person therapy, and videoconferencing may have...
advantages such as being less confronting. There may be useful opportunities for videoconferencing in embedding therapy delivery within the client’s own environment.

**Conclusions.** Videoconferencing is an accessible and effective modality for therapy delivery. Future research needs to extend beyond testing whether videoconferencing can replicate in-person therapy delivery to consider unique therapeutic affordances of the videoconferencing modality.

**Practitioner points**

- Videoconferencing is an efficacious means of delivering behavioural and cognitive therapies to adults with mental health problems.
- Trial evidence has established it is no less efficacious than in-person therapy for prolonged exposure, cognitive processing therapy, and behavioural activation.
- While therapists report nonverbal feedback being harder to judge, and clients can take time to adapt to videoconferencing, clients rate the therapeutic alliance and satisfaction similarly to therapy in-person.
- Videoconferencing provides opportunities to integrate therapeutic exercises within the person’s day-to-day environment.

One of the notable impacts of the COVID-19 pandemic on psychological therapy delivery has been the use of videoconferencing becoming widespread. Telehealth—the use of telecommunication technology to deliver services—includes a range of networked communication modalities, also including telephone, email, and text chat messaging. With improvements in online videoconferencing software and internet speeds, products such as Skype, FaceTime, and Zoom had already entered mainstream personal and business communication usage prior to the pandemic, and by incorporating video offer a close approximation to being in-person. While in-person services had been slow to adopt digital technologies prior to the pandemic, substantial potential was already seen in making services more accessible, and the necessity to minimize in-person interaction has catalysed the adoption of this technology in psychotherapy delivery (Chen et al., 2020; Shore, Schneck, & Mishkind, 2020; Torous, Myrick, Rauseo-Ricupero, & Firth, 2020; Wind, Rijkeboer, Andersson, & Riper, 2020).

Videoconferencing has been researched as a medium for therapy delivery over the past three decades, adopting contemporaneous communication technologies such as television-based telemedicine equipment, videophones, and Internet-based webcam systems (Simpson, 2009). While therapists report concerns about technical difficulties and the potential impact of videoconferencing on the therapeutic alliance (Connoly, Miller, Lindsay, & Bauer, 2020; Simpson & Reid, 2014), they make adaptations such as emphasizing their own non-verbal behaviour and clarifying the client’s own responses, and overall are positive about the technology (Connoly et al., 2020). Backhaus et al. (2012) conducted a systematic review of 65 papers across a range of populations, concluding that videoconferencing was feasible, associated with good user satisfaction and similar clinical outcomes to in-person therapy delivery. Recent systematic reviews by Berryhill, Culmer, et al. (2019), and Berryhill, Halli-Tiemey, et al. (2019) have confirmed that there are significant post-therapy effects on the most commonly used outcome measures of anxiety and depressive symptoms aggregated across different clinical groups.

Findings of overall acceptability and efficacy of videoconferencing have informed the implementation of videoconferencing within services, particularly for programmes delivered to geographically isolated or dispersed individuals (Morriss et al., 2019; Muir et al., 2020; Varker, Brand, Ward, Terhaad, & Phelps, 2018). Now adoption is more
widespread, practitioners and clients may need to choose between video and in-person as more equally available options. To inform clinical decision-making, it is now important to consider when, and for whom, this mode of therapy delivery may be applicable. This is particularly important when weighing up choices against pandemic-related health risks associated with transit and in-person contact, which can be avoided by remote therapy delivery.

This review considers the literature to date on how videoconferencing can be utilized for the delivery of psychological therapy to adults presenting with mental health problems. Extending upon previous reviews, which have considered outcomes and satisfaction with videoconferencing across studies as a whole, we consider the following questions:

- For which mental health populations and psychological interventions is there current evidence for psychological therapy being acceptable and efficacious when delivered via videoconferencing?
- What are client and therapist experiences of psychological therapy delivered by videoconferencing, including perceived benefits, challenges and opportunities?

**Methodology**

Primary research studies were identified via the databases PubMed, Medline, PsycINFO, and EMBASE in July 2020. Search terms included combinations of the search terms videoconferencing, telehealth telemedicine, telemental health, telepsychiatry, telepsychotherapy, or telecounselling; psychological therapy, psychotherapy, counselling, psychological intervention, or cognitive behaviour; and mental disorder, mental health, mental illness, anorexia, anxiety, bipolar, bulimia, depression, eating disorder, mood disorder, obsessive–compulsive, personality disorder, post-traumatic stress, psychosis, and schizophrenia. Database searches were supplemented by review of reference lists of included papers and previous review papers.

Studies were included which focused on adult populations experiencing adult mental disorders or clinically significant symptoms of mental disorder. Studies were excluded that focused on children and/or adolescents; people with mental health problems secondary due to physical illness, substance abuse and/or addictions, neurocognitive disorders, learning difficulties, or intellectual disabilities; healthy populations at risk of developing mental health difficulties; and families of people with mental health difficulties. Studies were included that used one-to-one psychological interventions delivered via videoconferencing. This excluded group-based, couple or family interventions; simulated therapy sessions; self-help; general psychiatric care; asynchronous psychological therapy delivered via recorded video. Studies were included that reported quantitative or qualitative data relevant to understanding outcomes or experiences of therapy. Case studies were excluded, as were studies that did not disaggregate psychological therapy results from broader findings, but multiple baseline case series were included.

Abstracts were screened by CM, and full papers were independently reviewed against the inclusion criteria by CM and NT. Each author led extraction of data for a component of the review, with all data extraction checked and verified by NT. Data on outcomes and acceptability were extracted and considered within diagnostic groupings, with a main focus on randomized controlled trial findings, and pre-to-post studies and case series findings considered when they added to the trial literature. Client and practitioner experiences of
videoconferencing were considered across the literature, prioritizing systematically collected data reported by papers, but also including anecdotal participant comments. A thematic synthesis (Lucas, Baird, Arai, Law, & Roberts, 2007) was conducted with a lens of identifying the prominent benefits, challenges, and considerations in delivery.

Results

The literature search identified 1637 papers once duplicates were removed, with a total of 69 papers reporting on 54 discrete studies meeting inclusion criteria (see Table 1). These included 21 randomized controlled trials (RCTs), 20 pre-to-post and non-randomized comparison trials, 6 case series, 4 stand-alone qualitative studies, and 3 studies examining rates of uptake. Of the RCTs, 7 examined efficacy compared with a non-therapy control, and 15 included a head-to-head comparison with in-person therapy, of which 9 conducted formal non-inferiority or equivalence analyses (detailed in Table 2). No studies contrasted videoconferencing with other remote communication modalities (e.g., telephone).

The most frequently studied diagnostic groups were post-traumatic stress disorder (PTSD; 14 studies), and depression (10), for which there were a number of well-powered RCTs, followed by anxiety disorders (6), obsessive–compulsive spectrum disorders (6) and eating disorders (6). Twelve additional studies examined mixed diagnosis populations including a large RCT. Across these studies, a number examined implementations to specific populations, with a large number, particularly PTSD studies, conducted with veterans or military personnel, and others focusing on populations with difficulties attending clinic settings in person, including people with difficulties leaving the home, people living in rural or remote areas, prison inmates, and geographically dispersed members of migrant populations. Less than half of studies were conducted within the person’s home/residence, with many especially older studies, involving visiting a local clinic using telehealth equipment to connect with a therapist in a different location. The types of technology used for videoconferencing included dedicated telemedicine hardware, analogue videophones, and, increasingly, using Internet-based videoconferencing software on computers or smartphones. Many studies provided participants with equipment such as laptop or tablet computers, but more recent studies have used participants’ own devices.

Across the full range of studies, therapy was found feasible to deliver via videoconferencing, clients were satisfied with therapy, and expected improvements in targeted symptoms occurred. We consider the findings for specific populations in detail (summarized in Table 3), followed by broader findings about use of videoconferencing across all studies.

Application of videoconferencing with different populations

Post-traumatic stress disorder

PTSD was the most researched mental health diagnosis. In addition to small pre–post studies and pilot RCTs, the search identified 7 well-powered RCTs of videoconferencing therapy for PTSD, covering a range of treatment protocols, including cognitive processing therapy (CPT), prolonged exposure (PE), and behavioural activation.

Two trials examined the use of the eight-to-twelve session PE protocol to treat PTSD in veterans (Acierno et al., 2017, also reported on in Gros, Allan, Lancaster, Szafranski, & Acierno, 2018; Gros, Lancaster, López, & Acierno, 2018; and Yuen et al., 2015), and one
| Study | Population | Country | Design | Comparison | N  | Therapy | Location | System | Primary outcomes | Acceptability and alliance measures |
|-------|------------|---------|--------|------------|----|---------|----------|--------|-----------------|----------------------------------|
| PTSD  | Veterans with PTSD | USA | RCT  | IP (NI) | 232 | BA-TE | Home | Own device + provided software, or videophone (Viterion 500) | PCL-M, BDI | CPOSS, SDPQ |
|       | Veterans with comorbid PTSD and depression | USA | RCT  | IP (NI) | 150 | PE | Home | Own device + AK Summit software or provided tablet or videophone | CAPS, PCL-M, BDI | CPOSS, SDPQ |
| Franklin et al. (2017) | Veterans with PTSD | USA | RCT  | TAU | 27 | PE | Home or clinic | Computer + provided software, or iPhone + Tango | CAPS, PDS | Preferred therapy modality, attrition |
| Germain et al. (2009), Germain et al. (2010), Marchand et al. (2011) | PTSD | Canada (rural) | NRCT | IP | 68 | CBT | Clinic | Tandberg 2500 VC units | MPSS | WAI, SEQ, DCCS, VT-Q, VTS |
| Gros et al. (2011) | Veterans with PTSD | USA | NRCT | IP | 89 | PE | Clinic | Tandberg 1000 MXP VC units | PCL-M | IIRS |
| Hassija and Gray (2011) | Women with PTSD from domestic violence | USA (rural) | pre-post | - | 15 | PE or CPT | Clinic | Polycom VSX3000 VC units | PCL, CES-D | Satisfaction Questionnaire |
| Liu et al. (2019) | Veterans with PTSD, male and female | USA | RCT | IP (NI) | 207 | CPT | Clinic | Not stated | CAPS, PCL, PHQ-9 | - |
| Luxton et al. (2015) | Active military and veterans with PTSD | USA | pre-post | - | 10 | BA | Home | Laptop + Cisco Jabber | CAPS, PCL-M, BDI | TSC, CSQ |
| Maienschein et al. (2016) | Veterans with PTSD | USA | RCT | IP (E) | 90 | CPT | Clinic | Not stated | CAPS, PCL | WAI |

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| Study                          | Population                              | Country | Design | Comparison | N  | Therapy | Location  | System                          | Primary outcomes                      | Acceptability and alliance measures              |
|-------------------------------|-----------------------------------------|---------|--------|------------|----|---------|-----------|---------------------------------|------------------------------------------|-----------------------------------------------|
| Morland et al. (2015)         | Women with PTSD, civilians and veterans | USA     | RCT    | IP (NI)    | 149| CPT     | Clinic    | Not stated                      | CAPS, WAI, OPOSS-VA, TSAS, TEQ            |                                               |
| Olden et al. (2017)           | PTSD in high-risk occupations           | USA     | pre-post| -          | 11 | PE      | Home or clinic | Polycom VC units (clinic) or own device (home) | CAPS, PCL, WAI, CSQ, TSAS, ETO |                                               |
| Tuerk et al. (2010)           | Veterans with PTSD (rural)              | USA     | NRCT   | IP         | 47 | PE      | Clinic    | Tandberg 1000 MXP VC units | PCL-M, BDI, WAI, CSQ, TSAS, ETO |                                               |
| Yuen et al. (2015)            | PTSD, combat related                    | USA     | RCT    | IP (NI)    | 52 | PE      | Home      | Own device/tablet + VC software or videophone | CAPS, PCL-M, WAI, CSQ, TSAS, ETO |                                               |
| Ziemba et al. (2014)          | PTSD                                    | USA     | RCT    | IP         | 18 | CT      | Clinic    | Polycom VC units                | CAPS, WAI, CSQ, TSAS, ETO | Satisfaction survey |
| Arnaert et al. (2007)         | Depression: Older adults with depression | USA     | qualitative | -      | 4  | PST     | Home      | Videophone                     | WAI, CSQ, TSAS, ETO | Satisfaction survey |
| Jang et al. (2014)            | Depression: Korean migrants with depression | USA     | pre-post| -          | 12 | CBT     | ‘Place convenient to client’ | Laptop + Videyo | PHQ-9, CSQ |                        |
| Lazzari, Egan, and Rees (2011) | Depression                              | Australia| pre-post| -          | 3  | BA     | Clinic    | Not stated                      | GDS, Satisfaction questionnaire | TEL interviews                     |
| Choi, Hegel, et al. (2014), Choi, Marti, et al. (2014), Choi et al. (2013) | Depression: Housebound adults over 50 with depression | USA     | RCT    | IP, TAU   | 158| PST     | Home      | Laptop + Skype                  | HRSD, WHODAS, GDS, Satisfaction questionnaire | TEL interviews                     |
| Deen et al. (2013)            | Depression: Primary care attendees with positive | USA     | uptake study | -    | 179| CBT     | Home      | Not stated                      | Uptake of therapy | -                              |

Continued
| Study | Population | Country | Design | Comparison | N | Therapy | Location | System | Primary outcomes | Acceptability and alliance measures |
|-------|-------------|---------|--------|------------|---|---------|----------|--------|-----------------|-------------------------------------|
| Egede et al. (2015) | Veterans with depression screen | USA | RCT | IP (NI) | 241 | BA | Home | Videophone | BDI, GDS, SCID | - |
| Luxton et al. (2016), Smolenski et al. (2017), Pruitt et al. (2019) | Military personnel with depression | USA | RCT | IP (NI) | 121 | BA | Home | Laptop + Cisco Jabber | BDI, BHS | IASMHS |
| Sayal et al. (2019) | Young adults presenting with self-harm and depression | UK | RCT | TAU | 22 | PST | Not stated | Mobile phone or video calling (Webex) | BDI | Interviews |
| Lichstein et al. (2013) | Comorbid depression and insomnia | USA | pre-post | - | 5 | CBT | Clinic | Laptop + Skype | HRSD, CSD, ISI | WAI, session ratings, feedback survey |
| Scogin et al. (2018) | Comorbid depression and insomnia | USA (rural) | RCT | TAU | 40 | CBT | Clinic | Computer + Skype | HRSD, CSD, ISI, SCID | WAI |
| Anxiety disorders | GAD | Canada | MBCS | - | 5 | CBT | Clinic | Tandberg 2500 VC system | PSWQ | - |
| Theberge-Lapointe et al. (2015) | GAD | Canada | RCT | IP (S) | 115 | CBT | Clinic | Computer + Tandberg MXP software | Not yet reported | WAI |
| Watts et al. (2020) | Panic disorder/ agoraphobia | Canada | pre-post | - | 8 | CBT | Clinic | Tandberg 2000 VC system | P&A | WAI, session ratings |
| Bouchard et al. (2000) | Panic disorder/ agoraphobia | Canada (remote) | NRCT | IP | 21 | CBT | Clinic | Tandberg 2500 VC system | - | - |

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| Study | Population | Country | Design | Comparison | N | Therapy | Location | System | Primary outcomes | Acceptability and alliance measures |
|-------|------------|---------|--------|------------|---|---------|----------|--------|-----------------|-------------------------------------|
| Morris et al. (2019) | Health anxiety | UK | RCT | TAU | 156 | CBT | Clinic | WebeX or telephone | SHAI - WAI, treatment credibility measure |
| Yuen et al. (2013) | Social anxiety | USA | pre-post | - | 24 | ABBT | Home | Own device + Skype | |
| Fitt and Rees (2012) | OCD | Australia | MBCS | - | 4 | MCT | Clinic | Computer + Polycom PVX v 8.02 | Y-BOCS - WAI, VTS, therapist survey |
| Himle et al. (2006) | OCD | USA | MBCS | - | 3 | CBT | Not stated | Polycom Viewstation VC units | Y-BOCS - WAI, VTS, therapist survey |
| Goetter et al. (2014) | OCD | USA | pre-post | - | 15 | ERP | Home | Not stated | Y-BOCS - WAI, VTS, therapist survey |
| Vogel et al. (2014) | OCD | Norway | RCT | SH, TAU | 30 | ERP | Clinic | Computer/tablet + FaceTime | ADIS-IV, Y-BOCS, VOCI |
| Muroff and Steketee (2018) | Hoarding | USA | case series | - | 7 | CBT | Home | Own device + VC software | HRS-I, SI-R - WAI |
| Lee et al. (2018) | TAU | 22 | ACT + HRT | Home | YSee software (device not stated) | MGH-HPS | WAI, CSQ | Trichotillomania | USA - RCT |
| Abrahamsson et al. (2018) | Binge eating disorder and obesity (rural) | Sweden | case series | - | 5 | CBT | Not stated | Mobile device + VC software | WAI, CSQ, SUS - Meal frequency (EDE) |
| Giel et al. (2015) | Anorexia nervosa | Germany | pre-post | - | 16 | MM | Not stated | Laptop + Cisco VC software | BMI, SCID diagnosis, EDE - Satisfaction ratings |
| Hama et al. (2019) | Japan | pre-post | - | 7 | CBT | Home | Cisco WebEx (device not stated) | EDE - WAI |

Continued
| Study | Population | Country | Design | Comparison | N  | Therapy | Location | System | Primary outcomes | Acceptability and alliance measures |
|-------|-------------|---------|--------|------------|----|---------|----------|--------|-----------------|-------------------------------------|
|       | Bulimia nervosa or binge eating disorder | USA | RCT | IP | 128 | CBT | Clinic | Telemedicine equipment (model not specified) | EDE | WAL, HPRS |
| Mitchell et al. (2008); Ertelt et al. (2011); Marrone et al. (2009) | Bulimia nervosa or EDNOS | UK (remote) | case series | - | 6 | CBT | Clinic | Sony I 600 VC units + VC software | SEDS, BEI-II, BITE | ARM, satisfaction survey, interview |
| Simpson et al. (2005, 2006) | Bulimia nervosa or EDNOS | USA | RCT | IP | 18 | CBT | Not stated | Own device + Fruit Street | EQE, EAT, TFEQ, YFAS | Satisfaction ratings |
| Yu et al. (2020) | Binge eating disorder | USA | RCT | IP | 20 | Individualized | Not stated | Not stated | CORE-10, DASS | - |
| Mixed diagnoses | Psychology clinic referrals, mixed diagnoses | Australia | pre–post | - | 8 | Individualized | Clinic | Video monitor + VC software | SUDS, DASS, OQ45 | Interviews |
| Brunnbauer et al. (2016) | Mood or anxiety disorder | Australia | pre–post | - | 15 | CBT | Clinic | Computer + VC software | MHI, HoNOS | Satisfaction rating |
| Dunstan and Tooth (2012) | Mood or anxiety disorder | Australia (rural) | pre–post | - | 52 | Individualized | Clinic | Not stated | CORE, PHQ-9, SF-12 | - |
| Griffiths et al. (2006) | Mood or anxiety disorder | Rural residents, mixed diagnoses | USA (rural) | pre–post | - | 93 | Individualized | Home | Not stated | - |
| Gonzalez and Brossart (2015) | Rual residents, mixed diagnoses | USA (rural) | qualitative | - | 18 | CBT | Clinic | Computer + VC software | MHI, HoNOS | Satisfaction rating |
| Lindsay et al. (2015) | | | | | | | | | | |

Continued
| Study                        | Population                        | Country | Design | Comparison | N  | Therapy | Location | System                          | Primary outcomes                                      | Acceptability and alliance measures                  |
|------------------------------|-----------------------------------|---------|--------|------------|----|---------|----------|---------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| Matsumoto et al. (2018, 2020)| Veterans, mixed diagnoses         | Japan   | pre-post | -          | 30 | CBT     | Home     | iPad Mini + Cisco WebEx         | Practitioner and client interviews                     | WAI                                                   |
| Morgan et al. (2008)         | People in prison or secure psychiatric hospital, mixed diagnoses | USA     | RCT     | IP         | 186| Individualized | Prison' Hospital | Not stated                     | WAI, SEQ, CSQ                                        |                                                       |
| Simpson et al. (2001),       | People living in a remote area, mixed diagnoses | UK (remote) | qualitative | -          | 10 | Individualized | Clinic | Computer + VC software          | Interview                                             | PHAS                                                  |
| Simpson (2001)               |                                    |         |         |            |    |         |          |                                |                                                       |                                                       |
| Simpson et al. (2015)        | Psychology clinic referrals, mixed diagnoses | Australia | qualitative | -          | 6  | CBT     | Clinic | Computer + Cisco C20 endpoint   | Interview, CORE                                      | ARM                                                   |
| Stubbings et al. (2013)      | Australia                          | Australia | RCT     | IP         | 26 | CBT     | Clinic | Computer + iChat                | DASS, QLESQ                                          | WAI, CSQ, TSQ                                        |
Table 1. (Continued)

| Study                        | Population                  | Country | Design       | Comparison | N     | Therapy | Location | System        | Primary outcomes          | Acceptability measures     |
|------------------------------|-----------------------------|---------|--------------|------------|-------|---------|----------|---------------|---------------------------|----------------------------|
| Valentine, Donofry, and Sexton (2020) | Mood or anxiety disorders Veterans, mixed diagnoses Psychotherapy referrals with postpartum mood or anxiety disorder | USA     | uptake/retention | -          | 250   | CBT     | Clinic/home| Not stated       | Uptake of VC               | -                          |
| Yang et al. (2019)           | Psychotherapy referrals with postpartum mood or anxiety disorder | Canada  | uptake (RCT design) | IP         | 38    | CBT     | Home     | Own device + VC software | Uptake of VC, EPDS         | TSQ, patient reported costs |

Note. VC videoconferencing. Populations: EDNOS = eating disorder not otherwise specified; GAD = generalized anxiety disorder; OCD = obsessive-compulsive disorder; PTSD = post-traumatic stress disorder. Design: MBCS = multiple baseline case series; NRCT = non-randomized controlled trial; RCT = randomized controlled trial. Comparison: IP = in-person; IP (E) = in-person, including an equivalence analysis; IP (NI) = in-person, including a non-inferiority analysis. TAU = treatment-as-usual or enhanced treatment-as-usual condition; SH = self-help. Therapies: ABBT = acceptance-based behaviour therapy; BA = behavioural activation; BA-TE = behavioural activation and therapeutic exposure; CPT = cognitive processing therapy; CT = cognitive therapy; HRT = habit reversal therapy; MM = Maudsley model; PE = prolonged exposure; ERP = exposure and response prevention; MCT = metacognitive therapy; PST = problem-solving therapy. Measures: ACQ = Agoraphobic Cognitions Questionnaire; ADIS-IV = Anxiety Disorders Interview for DSM-IV; BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale; BITE = Bulimic Investigatory Test; BMI = body mass index; BSQ = Body Sensation Questionnaire; CAPS = Clinical Administered PTSD Scale; CES-D = Centre for Epidemiology Scale for Depression; CORE = Clinical Outcomes Routine Evaluation; CPOSS = Charleston Psychiatric Outpatient Satisfaction Scale; CSDD = Connavus Sleep Diary; CSQ = Client Satisfaction Questionnaire; CSS = Client Satisfaction Survey; DASS = Depression Anxiety Stress Scale; DCCS = Distance Communication Comfort Scale; EAT = Eating Attitude Test; EDE = Eating Disorder Examination; EPDS = Edinburgh Postnatal Depression Scale; ETO = Expectancy of Therapeutic Outcome; GDS = Geriatric Depression Scale; HPRS = Hill Process Rating System; HRSD = Hamilton Rating Scale for Depression; HRS-I = Hoarding Rating Scale-Interview; IASMHS = Inventory of Attitudes Toward Seeking Mental Health Service; ISI = Insomnia Severity Index; LSAS = Liebowitz Social Anxiety Scale; MHH-HPS = Massachusetts General Hospital Hair Pulling Scale; MHI = Mental Health Inventory; MI = Mobility Inventory for Agoraphobia; MPSS = Modified PTSD Symptom Scale; OQ45 = Outcome Questionnaire 45; P&A = Panic and Agoraphobia Scale; PCL PTSD Checklist (M military version); PDS = Prolactin Disorder Scale; PDSS = Panic Disorder Severity Scale; PEAS = Patient EX/RP Adherence Scale; PHAS = Penn Helping Alliance Scale; PHQ-9 = Patient Health Questionnaire for Depression; PSFQ = Penn State Fatigue Questionnaire; QLEQ = Quality of Life Enjoyment and Satisfaction Questionnaire-18 item; RTQ = Reaction to Treatment Questionnaire; SCID = Structured Clinical Interview for DSM; SDPQ = Service Delivery Perception Questionnaire; SEDS = Survey for Eating Disorders; SEQ = Session Evaluation Questionnaire; SHAI = Short Health Anxiety Inventory; SI-R = Saving Inventory Revised; SPAI = Social Phobia and Anxiety Inventory; SUDS = Subjective Units of Distress Scale; TBI = Treatment Evaluation Inventory; TEFQ = Treatment Expeclancy Questionnaire; TFEQ = Three-Factor Eating Questionnaire; TSAS = Treatment Session Checklist; TSQ = Teledhealth Satisfaction Questionnaire; VOCI = Vancouver Obsessive Compulsive Inventory; VTF = Videoconference Therapy Questionnaire; VTS = Videoconferencing Telepresence Scale; WAI = Working Alliance Inventory; WHODAS = World Health Organization Disability Scale; YAFS = Yale Food Addiction Scale; Y-BOCS = Yale-Brown Obsessive-Compulsive Scale.
Table 2. Between group differences in working alliance, primary outcomes, dropout, and satisfaction in large randomized controlled trials involving direct comparisons with in-person therapy

| Study                      | Population                        | N   | Therapy | Therapeutic alliance | Primary outcome                                                                                                                                                                                                 | Dropout/satisfaction                                                                                                                                                                                                 |
|----------------------------|-----------------------------------|-----|---------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acierno et al. (2016)      | PTSD and depression, veterans     | 232 | BA-TE   | -                    | PCL-M, BDI: VC non-inferior to IP at post-therapy, and 3 and 12 months                                                                                                                                          | Rate of completion of both therapy and post-treatment assessment: no difference (VC 82%, IP 77%)                                                                                                                                 |
| Acierno et al. (2017),     | PTSD and depression, veterans     | 150 | PE      | -                    | PCL-M: VC non-inferior to IP at post-therapy, 3 months and 6 months; BDI: VC non-inferior to IP at 6 months, inconclusive at post and 3 months                                                                         | No difference in number of sessions attended (VC 7.6, IP 8.6) or completion of a minimum dose of 6 sessions, but discontinuation occurred earlier in VC over sessions 1-8                                                                 |
| Gros, Allan, et al. (2018) |                                   |     |         |                      |                                                                                                                                                                                                                |                                                                                                                                                                                                                 |
| Liu et al. (2019)          | PTSD, veterans                     | 207 | CPT     | -                    | CAPS: VC non-inferior to IP at 6 months, but not at post-therapy; PCL: VC non-inferior to IP at post and 6 months; PHQ-9: VC non-inferior to IP at post and 6 months                                                                 | No difference in study dropout (VC 23%, IP 28%)                                                                                                                                                                                                                 |
| Maieritsch et al. (2016)   | PTSD, veterans                     | 90  | CPT     | WAI client ratings show equivalence | CAPS, PCL: inconclusive but trend for equivalence between groups ($p < .10$)                                                                                                                                 | High rates of treatment dropout (43% overall) but no difference by group                                                                                                                                               |
| Morland et al. (2015)      | PTSD, female, civilians and veterans | 149 | CPT     | WAI client ratings: VC inferior to IP at session 2, but difference small ($d = -0.07$), and no difference at session 6 or 12; therapist ratings: no difference at any time point. Homework completion: no difference (VC 77%, IP 80%) | CPS: VC non-inferior to IP at post-treatment, 3 and 6 months.                                                                                                                                                     | Therapy completion rate: no difference ($\leq 10$ sessions: VC 76%, IP 79%). Treatment expectations: no difference. Satisfaction ratings: both groups rated service highly on global ratings, with no difference, but VC inferior to IP on CPQOS ratings of broader service delivery ($d = -0.24$) |
| Yuen et al. (2015)         | PTSD, combat related               | 52  | PE      | No difference on ratings of how comfortable feel talking with therapist or quality of communication                                                                                                           | CAPS: VC non-inferior to IP; PCL: neither group superior but non-inferiority analysis inconclusive                                                                                                            | SDPQ: 100% satisfied with treatment in both VC and IP                                                                                                                                                                |
| Choi, Hegel, et al. (2014),| Depression, housebound adults over 50 | 158 | PST     | -                    | HAMD: neither group superior at 12 or 24 weeks; VC superior to IP at 36 weeks; WHO-DAS: neither superior at any time point                                                                                                                                               | Treatment Evaluation Inventory: VC superior to IP                                                                                                                                                                  |
| Choi, Marti, et al. (2014) |                                   |     |         |                      |                                                                                                                                                                                                                |                                                                                                                                                                                                                 |
| Egede et al. (2015)        | Depression, veterans               | 241 | BA      | -                    | BDI, GDS, SCID: VC non-inferior at 4 weeks (mid), 8 weeks (post) and 3 months.                                                                                                                                 | No difference in full therapy completion rate (VC 81%, IP 79%)                                                                                                                                                   |
| Luxton et al. (2016)       | Depression, military personnel     | 121 | BA      | -                    | BDI: VC non-inferior to IP at mid-therapy and 12 weeks, but not at post-therapy; BHS: VC non-inferiority not                                                                                                                                                           | CSQ: high satisfaction, no difference between groups.                                                                                                                                                              |

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Table 2. (Continued)

| Study                        | Population                        | N  | Therapy | Therapeutic alliance | Primary outcome                                                                 | Dropout/satisfaction |
|------------------------------|-----------------------------------|----|---------|----------------------|---------------------------------------------------------------------------------|----------------------|
| Watts et al. (2020)          | Generalized anxiety disorder      | 115| CBT     | WAI: across 8 time points, VC superior to IP in client ratings; neither group superior on therapists' ratings. | Established at any time point, and found to be inferior to IP at post-therapy. |                      |
| Mitchell et al. (2008),      | Bulimia nervosa or EDNOS          | 128| CBT     | WAI: no difference in client ratings, VC inferior to IP in therapist ratings. | EDE neither group superior for abstinence from bingeing and/or purging, VC inferior to IP for reduction in binge eating frequency across time points. |                      |
| Ertelt et al. (2011),        |                                   |    |         |                      |                                                                                 |                      |
| Marrone et al. (2009)        |                                   |    |         |                      |                                                                                 |                      |
| Morgan et al. (2008)         | People in prison or secure forensic psychiatric hospital | 186| Individualized therapy | WAI: no difference in client ratings. |                                                                                 |                      |

Note: Only includes randomized controlled trials sufficiently powered to detect large between group effects (N ≥ 52 at 80% power). If no primary outcome specified, symptoms of target disorder listed. **Superiority/inferiority** refers to group differences observed versus a null hypothesis of **no difference**; **non-inferiority** (one tailed test) and **equivalence** (two-tailed test) refer to whether or not the confidence interval for the difference includes a null hypothesis of the groups differing by the minimum clinically significant difference. PTSD = post-traumatic stress disorder; EDNOS = Eating disorder not otherwise specified. Therapies: BA = behavioural activation; BA-TE = behavioural activation and therapeutic exposure; CBT = cognitive behavioural therapy; CPT = cognitive processing therapy; PST = problem-solving therapy. Groups: IP = in-person; VC = videoconferencing. Measures: BDI = Beck Depression Inventory; CAPS = Clinician Administered PTSD Scale; CGI = Clinical Global Impression; CPOSS = Charleston Psychiatric Outpatient Satisfaction Scale; CSQ = Client Satisfaction Questionnaire; EDE = Eating Disorders Examination; GDS = Geriatric Depression Scale; HAMD = Hamilton Rating Scale for Depression; SCID = Structured Clinical Interview for DSM diagnosis; SCL-90R = Hopkins Symptom Checklist; SDPQ = Service Delivery Perceptions Questionnaire; SEQ = Session Evaluation Questionnaire; WAI = Working Alliance Inventory.
trial combined behavioural activation with exposure therapy to treat both PTSD and depression (Acierno et al., 2016; Gros et al., 2012; Strachan, Gros, Ruggiero, Lejuez, & Acierno, 2012). All compared videoconferencing to in-person delivery and had samples that were over 90% male. Videoconferencing showed similar rates of therapy completion (Acierno et al., 2016, 2017; Yuen et al., 2015) and satisfaction (Gros, Allan, et al., 2018; Yuen et al., 2015) and was non-inferior to in-person for PTSD, depression, and anxiety (Acierno et al., 2016, 2017; Yuen et al., 2015).

Four trials examined CPT delivered by videoconferencing in comparison with in-person therapy (Glassman et al., 2019; Lui et al., 2019; Maieritsch et al., 2016; Morland et al., 2015). Participants were again predominantly veterans, with one study also including civilians (Morland et al., 2015), but females were better represented in CPT studies (Lui et al., 2019: 45% female, Morland et al., 2015: 100% female). Delivery by videoconferencing was found to be non-inferior to in-person in reducing PTSD symptoms in all studies other than Lui et al. (2019) who found that videoconferencing was inferior at post-treatment, but equivalent at 6-month follow-up. All studies found no significant differences in dropout or satisfaction between videoconferencing and in-person conditions.

Overall, the generally positive findings of acceptability and efficacy of videoconferencing for exposure-based therapies are noteworthy, suggesting this modality is able to support this emotionally challenging, experientially focused, treatment. It has also been observed that videoconferencing clients rate the therapeutic alliance as highly for exposure-based sessions as other CBT-based sessions (Germain, Marchand, Bouchard, Guay, & Drouin, 2010).

**Depression**

We identified 3 well-powered RCTs of videoconferencing therapy for depression, 3 smaller RCTs, and 4 studies using other designs. Two studies, including one of the RCTs (Yang, Vigod, & Hensel, 2019), primarily reported on uptake of videoconferencing. Intervention models included problem-solving therapy, behavioural activation and combined CBT protocols for depression with insomnia, and for depression with self-harm. Overall, results suggested participants were satisfied with therapy, and ratings of acceptability and efficacy appeared similar to in-person delivery.

Problem-solving therapy was examined in a three-arm RCT which compared videoconferencing or in-person delivery with a supportive weekly care-call control condition in 158 housebound adults over the age of 50 with depression (Choi, Hegel, et al., 2014; Choi, Marti, et al., 2014). On the Hamilton Rating Scale for Depression (HRSD), both videoconferencing and in-person problem-solving therapy were superior to the control condition at 12 weeks, 24 weeks, without differing from each other, and videoconferencing was superior to both conditions at 36 weeks (Choi, Marti, et al., 2014).

Videoconferencing-based behavioural activation has been examined in two RCTs, both conducted with veterans. Luxton et al. (2016) conducted an RCT of an 8-session behavioural activation intervention delivered by telehealth or in-person to 121 military personnel and veterans with depression. Both conditions showed significant post-treatment improvements on the Beck Depression Inventory (BDI) as the primary outcome, and non-inferiority analyses showed videoconferencing was non-inferior at mid-treatment and 12-week follow-up, but not immediately post-therapy. Egede et al. (2015) obtained more conclusive results in a larger non-inferiority trial with 241 older veterans with major depression. Comparing videoconferencing delivery using a videophone system with in-person delivery, non-inferiority was established with no significant
Table 3. Summary of evidence for feasibility, acceptability, and efficacy by population

| Therapy models found feasible to deliver using videoconferencing | Outcomes of videoconferencing delivery |
|---------------------------------------------------------------|---------------------------------------|
| PTSD                                                          | BA-based exposure therapy, CPT, prolonged exposure | 6 of 7 RCTs found non-inferior to in-person therapy, with the other finding videoconferencing inferior at post-treatment and non-inferior at follow-up |
| Depression                                                    | BA, CBT, problem-solving therapy       | 1 RCT found superior to routine care. 3 RCTs compared with in-person therapy, finding few differences between modalities, and 1 trial establishing non-inferiority. |
| Anxiety disorders                                             | CBT, including focused therapies for GAD, panic disorder, social anxiety and health anxiety | 1 RCT, with health anxiety, found superior to routine care. Pre–post studies show improvements following therapy for other anxiety disorders. No non-inferiority trials conducted, but 1 small RCT (mixed diagnoses) found similar outcomes to in-person delivery. |
| Obsessive–compulsive disorders                                | CBT, ERP; CBT for hoarding; habit reversal therapy for trichotillomania | No fully powered RCTs. Pre–post studies show improvements following therapy. |
| Eating disorders                                              | CBT; Maudsley Model-based relapse prevention | 1 RCT (bulimia nervosa) comparing to in-person therapy, finding few differences. Pre–post improvements observed for both bulimia nervosa and anorexia nervosa |
| Psychotic disorders                                           | No studies identified                  | -                                    |
| Bipolar disorder                                              | No studies identified                  | -                                    |
| Personality disorders                                         | No studies identified                  | -                                    |

Note: BA = behavioural activation; CBT = cognitive behaviour therapy; CPT = cognitive processing therapy; ERP = exposure and response prevention; RCT = randomized controlled trial.
differences observed in trajectories of improvement on the BDI and Geriatric Depression Scale, with rates of recovery similar between conditions.

Smaller studies have additionally demonstrated feasibility and acceptability of delivering CBT-based therapies via videoconferencing to specific populations such as women with post-partum depression or anxiety (Yang et al., 2019) and Korean migrants with depression (Jang et al., 2014). Among other notable studies, Scogin et al. (2018) conducted a small RCT of a 10-session CBT-based treatment for comorbid depression and insomnia delivered via Skype, which found superiority over usual care on a measure of insomnia, but not the HRSD. Finally, in treating self-harm, Sayal et al. (2019) commenced a small RCT (N = 22) of problem-solving therapy for young adults following presentation for self-harm and mild depression. However, this was discontinued due to recruitment difficulties (an analysis of which did not attribute these to the use of videoconferencing).

Anxiety disorders
Anxiety disorders have been less fully studied than depression. Nonetheless, anxiety disorders feature as a major group in a number of mixed diagnosis studies, which have demonstrated that CBT-based therapies can be satisfactorily delivered (e.g., Brunnbauer et al., 2016; Dunstan & Tooth, 2012; Griffiths, Blignault, & Yellowlees, 2006; Matsumoto et al., 2018, 2020; Stubbings et al., 2013). Among these, an RCT design was used by Stubbings, Rees, Roberts, and Kane (2013) in a study of 26 people with mainly anxiety disorders. Reductions on all subscales of the Depression Anxiety Stress Scale (DASS) were observed following videoconferencing CBT, and, while underpowered, no differences in the magnitude of effect were observed between videoconferencing and an in-person comparison group. The feasibility of applying videoconferencing to deliver therapies to other specific populations is indicated by the following, mainly small, studies.

Generalized anxiety disorder (GAD)
A multiple baseline case series by Théberge-Lapointe, Marchand, Langlois, Gosselin, and Watts (2015) showed evidence for successful cognitive behavioural treatment of GAD, with five participants no longer meeting diagnostic criteria post-therapy and 3 months later, and this outcome persisting to 12 months after treatment in all but one case. At the time of writing, initial results from a large RCT of CBT for GAD (N = 115), focusing on working alliance, have been reported by Watts et al. (2020), with clients rating the working alliance more highly for videoconferencing than in-person therapy across time points, although therapists rated both modes of delivery similarly.

Panic disorder and agoraphobia have only been studied in small pre-to-post studies, all of CBT. Bouchard et al. (2000) found significant improvements across all measures, reporting that five out of the eight participants no longer experienced panic attacks after the 12-week treatment. Bouchard et al. (2004) delivered the same intervention to a further 10 videoconferencing cases, compared with a non-randomized in-person delivery group. Nearly all participants achieved remission at the end of treatment, maintained six months later, a similar to in-person delivery. Matsumoto et al. (2018) also found significant reductions in panic symptoms among 10 participants with panic disorder in their pre-to-post study of CBT.
**Social anxiety.** Modality of delivery is of particular interest for social anxiety, where communication itself is a source of anxiety. Yuen et al. (2013) examined 12 sessions of acceptance-based behaviour therapy for 24 individuals with SAD. Therapists rated the use of videoconferencing as feasible, and there were post-therapy improvements on several questionnaire measures of social anxiety, maintained and at the 3-month follow-up, as well as changes on observer-rated social behaviour; participants indicated that they were satisfied with the treatment. Likewise, Matsumoto et al. (2018) found reductions in social anxiety following videoconferencing-based CBT in their small sample of 10 social anxiety participants.

**Health anxiety.** The largest study for a specific anxiety disorder has been for health anxiety: Morris et al. (2019) conducted an RCT comparing CBT delivered via videoconferencing or telephone with routine care in 156 participants. Supporting the use of videoconferencing, health anxiety was reduced in the therapy group relative to routine care at 6-, 9-, and 12-month time points.

**Obsessive–compulsive and related disorders**
Research into videoconferencing-delivered psychological treatments in obsessive–compulsive and related disorders was limited, with studies limited to case series and small sample single-arm open trials and pilot RCTs. Nevertheless, there is an emerging support for the acceptability and effectiveness of videoconferencing for a range of intervention types across OCD, hoarding and trichotillomania.

Matsumoto et al. (2018) reported on a standard 16-week CBT treatment for their 10 OCD patients. Symptom reduction pre–post treatment, strong therapeutic alliance, high rates of satisfaction with treatment, and 100% retention, supported the effectiveness and feasibility of the intervention. Further, two studies (Goetter, Herbert, Forman, Yuen, & Thomas, 2014; Vogel et al., 2014) successfully used exposure and response prevention (ERP) to treat OCD via videoconferencing, with post-treatment symptom reductions. Vogel et al. (2014) noted high engagement with treatment, an ability to observe exposure exercises as they occur in participants’ natural environments, and an opportunity to involve family members and carers, thus addressing family accommodation to rituals where appropriate.

Emerging investigations in hoarding and trichotillomania provide support for its effectiveness, feasibility, and that it provides additional benefits when compared to existing treatments. Muroff and Steketee (2018) delivered a structured CBT treatment for seven patients with hoarding. Six of the seven patients experienced improvements in symptoms post-treatment, with five maintaining the gains at 3-month follow-up. The ability to use portable devices to move around rooms was noted as an important facilitator in the treatment. In relation to trichotillomania, Lee, Haeger, Levin, Ong, and Twohig (2018) conducted an RCT comparing videoconferencing-based ACT-enhanced Habit Reversal Therapy to waitlist control in 22 trichotillomania patients. The study had high retention rates with only one dropout in each condition, and high levels of participant satisfaction and therapeutic alliance. Statistically and clinically significant improvements in trichotillomania symptoms were noted among the treatment group.
Eating disorders
In the treatment of eating disorders, there has been a single large RCT, which examined CBT for bulimia nervosa and related disorders (Ertelt et al., 2011; Marrone, Mitchell, Crosby, Wonderlich, & Jollie-Trottier, 2009; Mitchell et al., 2008). Although bulimia symptoms reduced for both videoconferencing and in-person delivery, and rates of abstinence from bingeing and/or purging showed were similar, the reduction in binge eating frequency was less for videoconferencing participants across multiple time points (Mitchell et al., 2008). Working alliance was rated similarly by clients for each of the conditions, but therapists rated the alliance less strongly in the videoconferencing condition (Ertelt et al., 2011).

Most other studies identified by the search examined smaller single group samples for bulimia and related disorders, reporting reductions in bulimic symptoms (Abrahamssom, Ahlund, Ahrin, & Alfonsson, 2018; Hamatani et al., 2019; Simpson et al., 2006) and satisfaction with the online modality (Abrahamssom et al., 2018; Simpson et al., 2005).

For anorexia nervosa, Giel et al. (2015) conducted a single group pilot study examining a relapse prevention intervention based on the Maudsley model (Schmidt, Magill, & Renwick, 2015) in 16 individuals. Eight sessions were delivered via videoconferencing, bookended by two in-person sessions. Three-quarters of participants completed therapy, rating high satisfaction, and at post-intervention body mass index had increased by an average of 1.1 points, eating concerns were reduced, and two participants were in complete remission.

Other populations
No studies were identified providing data on videoconferencing therapy delivery to persons with psychotic disorders, bipolar disorder, or personality disorder.

Client and practitioner experience
Overall acceptability
Every RCT comparing at-home videoconferencing with in-person delivery at a clinic reported no group differences on questionnaire measures of satisfaction (see Table 2). Differences in satisfaction or dropout were only seen in two studies overall, both delivering interventions within the same environment: Morland et al. (2015) reported lower satisfaction ratings primarily related to negative experiences of the clinic setting that was attended for videoconferencing (also used in the in-person condition), suggesting specificity to the potentially impersonal experience of attending a clinic for a video-based appointment. Conversely, Choi, Hegel, et al. (2014) found that housebound people with depression receiving in-home therapy via videoconferencing were more satisfied than those being visited by a therapist. Overall, this demonstrates that satisfaction with videoconferencing-based therapy is as high as traditional forms of delivery.

In terms of therapy dropout, nearly all comparisons with in-person therapy revealed no group differences (see Table 2). An exception was a follow-up analysis of discontinuation in the trial by Acierno et al. (2017) reported that early dropout tended to arise more often with videoconferencing (Gros, Allan, et al., 2018), even though overall session attendance rates were similar. While dropout seems to only arise in a small number of people, other studies report discomfort with videoconferencing being cited by participants as a reason for dropout, so this may be an issue with a small number of people, although at this stage
there is a lack of information on what contributes to this (Germain, Marchand, Bouchard, Drouin, & Guay, 2009; Lichstein et al., 2013; Simpson, Bell, Knox, Mitchell, & Eating, 2005).

It should be noted that individual comments expressing a preference for in-person therapy were often noted from videoconferencing participants (Choi, Wilson, Sirrianni, Marinucci, & Hegel, 2013; Lichstein et al., 2013; Simpson et al. 2005, 2006). Among qualitative client reports, a period of early discomfort and adaptation to using videoconferencing technology was also an experience reported by participants across studies (Choi, Hegel, et al., 2014; Dunstan & Tooth, 2012; Fit & Rees, 2012; Germain et al., 2009; Lichstein et al., 2013; Simpson et al., 2005, 2006; Simpson et al., 2015; Yuen et al., 2015). For some participants, attitudes towards videoconferencing (including scepticism, anxiety, unfamiliarity) were linked to the experiences of discomfort in early sessions (Arnaet, Klooster, & Chow, 2007; Choi, Hegel, et al., 2014; Fit & Rees, 2012; Simpson et al., 2005, 2006). For most, this early discomfort was reduced over time, as participants got more comfortable with the technology (Choi, Hegel, et al., 2014; Dunstan & Tooth, 2012; Simpson et al., 2005, 2006; Simpson et al., 2015) or their interactions with their therapist became more ‘natural’ (Yuen et al., 2015), although this did not always occur (Choi, Hegel, et al., 2014; Choi et al., 2013; Lichstein et al., 2013; Simpson et al., 2005). Therapists reported similar experiences of initial apprehension and discomfort, before becoming more confident in using videoconferencing technology and adapting to the modality (Dunstan & Tooth, 2012; Michell et al., 2008). This is balanced by other reports of participants embracing the novelty and use of technology in therapy delivery (e.g., Arnaet et al., 2007; Choi, Hegel, et al., 2014; Choi et al., 2013; Dunstan & Tooth, 2012). It should be noted that many of these studies were conducted before the widespread day-to-day use of videoconferencing platforms, and less adaptation may be required in the 2020s.

Facilitating access

One of the presumed benefits of videoconferencing is that it facilitates access. As shown in Table 1, many of the studies reviewed targeted participants in rural or geographically remote areas, and some involved applications to potentially isolated groups (e.g., housebound older adults; victims of domestic violence, migrants). Participant reports indicated that many people receiving videoconferencing therapy would otherwise have been unable to access any therapy (Choi et al., 2013; Hassija & Gray, 2011), while others included references to challenges of travel distance and its associated financial impact (Abrahamsson et al., 2018; Simpson et al., 2005; Simpson et al. 2015). Some studies also referred to the opportunity to provide specialist services for a specific issue to people over a broad area (Hassija & Gray, 2011; Lee et al., 2018).

Even when not an absolute barrier, the increased accessibility appeared valued. The post-partum mental health study by Yang et al. (2019) examined uptake when the option to use videoconferencing in place of in-person psychotherapy sessions was offered: 74% used videoconferencing for at least one therapy session, with 21% doing all therapy via video; Time and cost savings were identified, and participants reported being able to attend more frequently. In other studies, participants spoke of convenience, such as fitting therapy into busy life schedules (Abrahamsson et al., 2018; Choi, Hegel, et al., 2014; Choi et al., 2013; Lee et al., 2018; Yuen et al., 2015), and being able to access therapy from home (Choi, Hegel, et al., 2014). Continuity of care independent of location was also highlighted, both in relation to moving house (Simpson et al., 2005, 2006), and being released from prison (Morgan, Patrick, & Magaletta, 2008).
Symptoms of anxiety, concerns about stigma, and negative thought processes also featured as potential barriers to accessing in-person services that videoconferencing was able to circumvent (Abrahamsson et al., 2018; Bouchard et al., 2000; Simpson, Guerrini, & Rochford, 2015). For example, in the trichotillomania study by Lee et al. (2018), 40% of participants reported that they would not have entered treatment in an in-person setting due to shame. Privacy for persons in small or rural communities was also referred to (Simpson et al., 2005; Simpson et al., 2015). Nonetheless, privacy was not always assured by videoconferencing with concerns about privacy from others within the person’s own home being raised by some participants (Abrahamsson et al., 2018; Choi, Hegel, et al., 2014; Franklin, Cuccurullo, Walton, Arseneau, & Petersen, 2017). Notably, concerns about privacy from use of networked digital technology did not tend to be reported.

Client factors predicting uptake and satisfaction

Studies of client variables predicting uptake, engagement and completion of therapy have identified relatively few predictors. In considering predictors of uptake among American primary care attendees with a positive depression screen, Deen, Fortney, and Schroeder (2013) found that uptake of videoconferencing-based CBT was predicted by perceiving illness to be persisting, believing that treatment would be effective, and reporting geographic barriers to attending; Time barriers, financial barriers, perceived stigma, and other beliefs about depression were unrelated to uptake. In a mixed diagnosis veteran sample offered therapy, Valentine et al. (2020) found that videoconferencing therapy uptake, and sessions completed, were each unrelated to age, race, gender, and marital status.

Several studies have examined predictors of differential satisfaction with, or dropout from, videoconferencing therapy. In most studies, completion of therapy appears unrelated to baseline demographic (age, gender, ethnicity, income) and clinical variables (Choi, Hegel, et al., 2014; Germain et al. 2009; Luxton et al., 2016; Watts et al., 2020), although unreplicated findings reported by single studies include greater completion rates for mood rather than anxiety disorders (Valentine et al., 2018), lower baseline PTSD and absence of disability status (Gros, Allan, et al., 2018), and, among veteran samples, being an older, Vietnam-era veteran (Gros, Yoder, Tuerk, Lozano, & Acierno, 2011). Pruitt et al. (2019) also found that satisfaction with therapy was higher for older military, although, in their sample, this was confounded with serving vs veteran status, with active military needing to travel off base to access videoconferencing facilities. Analyses of predictors of outcome have been limited, but in a military sample, Smolenski, Pruitt, Vuletic, Luxton, and Gahm (2017) found greater baseline anxiety and loneliness predicted participants having a better outcome from in-person than from videoconferencing-based therapy.

Among their participants with depression, Choi, Hegel, et al. (2014) found no relationship between ratings of treatment acceptability and computer/Internet ownership, or network quality. Similarly, in an analysis of PTSD trial data, Price and Gros (2014) observed that outcome of PTSD treatment via telehealth was unrelated to prior experience with, or expressed comfort with, telehealth at the outset of treatment. This suggests that prior experience is not a requirement to benefit. However, prior experience of therapy appears to predict completion. In their study of uptake, Deen et al. (2013) found predictors of treatment completion were different from those for uptake, and completion was most related to engagement with other treatments: receipt of prior
counselling and being prescribed antidepressant medication. Watts et al. (2020) also found prior therapy experience predicted completion.

Technical issues
Most studies referred to technical issues as an experience impacting on the delivery of therapy. These included difficulties establishing connection, disconnection, suboptimal audio and visual quality, and bandwidth and connection stability issues resulting in lag and frozen images. Participants considered minor disruptions such as lag as a frustrating and distracting disadvantage of videoconferencing, but, overall, this did not negatively impact on participant engagement (Abrahamsson et al., 2018; Choi et al., 2013; Dunstan & Tooth, 2012; Lichstein et al., 2013). Studies resolved these issues through in-session troubleshooting or reconnection. Severe technical issues (e.g., disconnection and inability to re-establish connection) were managed by postponing or cancelling scheduled sessions, or by utilizing a back-up communication method (e.g., telephone) (Abrahamsson et al., 2018; Germain et al., 2010; Hassija and Gray, 2011; Lee et al., 2018; Luxton, Pruitt, O’Brien, & Kramer, 2015; Olden et al., 2017; Yu et al., 2020; Vogel et al., 2014; Watts et al., 2020).

To proactively manage technical issues, test calls or in-person training were often provided to therapists to resolve potential technical issues at the outset (Acierno et al., 2016, 2017; Choi, Hegel, et al., 2014; Choi, Marti, et al., 2014; Goetter et al., 2014; Gros, Allan, et al., 2018; Gros, Lancaster, et al., 2018; Luxton et al., 2015, 2016; Yuen et al., 2013, 2015), and many studies arranged for technical support to be available as part of the study design (Acierno et al., 2016, 2017; Germain et al., 2009, 2010; Liu et al., 2019; Olden et al., 2017; Scogin et al., 2018; Watts et al., 2020; Yuen et al., 2013). Yuen et al. (2013, 2015) observed that technical difficulties reduced over the course of the study, in part due to participants becoming proficient at troubleshooting. Overall, while technical issues were encountered in most studies, participant feedback and reports from the study authors indicate that disruptions were not sufficiently impactful to detract from therapy.

Therapy relationship and process
On both formal measures and in qualitative reports, studies consistently reported that the videoconferencing clients were typically able to develop a positive connection with the therapist (Simpson et al., 2005, 2006; Simpson et al., 2015; Choi et al., 2013; Dunstan & Tooth, 2012; Fitt & Rees, 2012; Yuen et al., 2015), although some individual reports found a reduced sense of the therapist’s presence (e.g., Arnaet et al., 2007; Choi, Marti, et al., 2014). Furthermore, nearly all well-powered RCTs that directly compared client ratings of the therapeutic relationship with in-person delivery found no significant differences (Table 2), consistent with observations in smaller studies (e.g., Morgan et al., 2008; Scogin et al., 2018). Additionally, in an analysis of equivalence, Maieritsch et al. (2016) found confidence intervals for the working alliance fell within a priori bounds of equivalence in their trial of CPT. An exception to these findings is the CPT trial by Morland et al., (2015), which found statistically, but marginally, lower ratings for videoconferencing in the second session, with no differences at later time points. It is notable that, mirroring the adaptation to discomfort reported in some studies, some studies have also observed that videoconferencing clients rate a stronger alliance as sessions progress (Ertelt et al., 2011; Germain et al., 2010).
The converse finding of a stronger alliance in the videoconferencing condition by Watts et al. (2020) corresponds to qualitative comments in other studies to there being potential advantages of videoconferencing for the therapeutic relationship. Participants discussed finding therapy easier through having a greater sense of control (i.e., of emotion, of context, of the ability to leave) and the creation of a less intense therapy environment (Dunstan & Tooth, 2012; Fitt & Rees, 2012; Simpson, 2001; Simpson, Deans, & Brebner, 2001, Simpson et al. 2005; Simpson et al. 2006; Simpson et al. 2015). Participants discussed the ability to ‘talk more freely’, being less self-conscious, finding it easier to communicate and feeling less pressured or intimidated in videoconferencing than they might be in-person (Fitt & Rees, 2012; Simpson et al., 2005, 2015; Yuen et al., 2015).

Two of the three well-powered studies that included both client and therapist ratings (Ertelt et al., 2011; Morland et al., 2015; Watts et al., 2020) identified differences of perspective: videoconferencing clients rated a stronger alliance than in-person clients, while therapists rated the conditions the same (Watts et al., 2020), or clients rated the conditions similarly when therapists rated videoconferencing as inferior (Ertelt et al., 2011). These quantitative findings correspond to therapist reports of some difficulties in detecting emotion and ability to read body language through videoconferencing (Dunstan & Tooth, 2012; Simpson et al., 2005; Yu et al., 2020; Yuen et al., 2013). This highlights that therapists and clients may have discrepant experiences of videoconferencing therapy and that therapists can find the process of therapy more challenging, without that necessarily being reflected in client experience.

Adaptations of therapy

To deliver therapy via videoconferencing, several studies reported adaptations to therapy protocols. Most commonly, the practical logistic changes to how components of therapy were delivered involved using other technologies to share documents (e.g., mailing, faxing, emailing, or screen sharing worksheets and homework) (Gros et al., 2011; Himle et al., 2006; Lindsay et al., 2017; Luxton et al., 2015; Matsumoto et al., 2018; Turek, Yoder, Ruggiero, Gros, & Acierno, 2010). Clinical variations included removing situation-specific in vivo exposure exercises from videoconferencing sessions and asking participants to complete exposure as homework only (Gros et al., 2011; Yuen et al., 2015), or creatively adapting or restricting exposure exercises so that they would be suitable for delivery within the virtual environment (e.g., talking on the phone to someone; Yuen et al., 2013). While feasible, for some clients, exposure tasks via videoconferencing were perceived to be less real and less engaging when compared with in-person (Yuen et al., 2013). Conversely, where videoconferencing was delivered by smartphone, opportunities were identified in using the portability of the device to observe and conduct exposure activities within the person’s environment (Franklin et al., 2017; Turek et al., 2010; Vogel et al., 2012, Vogel et al., 2014).

Clients also reported that some activities translated less well such as meditation (Lindsay et al., 2017) and use of imagery (Simpson et al., 2005) and that sensitive topics may be easier to discuss in person than over videoconferencing (Lindsay et al., 2017). It is notable that the studies surveyed used primarily behavioural models of treatment, so more reflective therapies are relatively less tested.

In addition to facilitating exposure tasks, the opportunity to see the person in their home environment was mentioned by some practitioners as helpful in contextualizing the person’s experiences (Lindsay et al., 2017) and potentially altering the power balance by
seeing the person in their own territory (Simpson et al., 2005). However, environmental
distractions arose more frequently within the home environment were also noted, and
some clients treated the session less formally (e.g., smoking, attending wearing pyjamas),
sometimes requiring boundary setting to maintain focus (Franklin et al., 2016; Lindsay
et al., 2017; Yu et al., 2020). When contrasting with therapy delivered in-person within the
home, even greater distractions were noted when the therapist is in the home
environment, and videoconferencing was noted to help to formalize the interaction
and help clients stay focused (Choi, Hegel, et al., 2014).

Discussion and conclusions

The literature to date shows consistent positive findings about the suitability of the
videoconferencing modality for delivery of psychological therapies, with consistent
findings that videoconferencing does not differ from in-person therapy on outcome,
satisfaction, therapy completion, and client experiences of the therapeutic alliance.
Advantages include accessibility, particularly to persons without local in-person services,
but also in terms of convenience, reducing time and financial costs, and circumventing
stigma, self-consciousness and privacy concerns. Disadvantages include therapists finding
it harder to judge body language, both clients and therapists experiencing initial
discomfort with the modality while adapting to it, and interruptions arising from
inevitable technical issues. However, it appeared that these concerns became less as
clients and therapists adjusted: It may be that these issues become less of a concern as
familiarity with videoconferencing grows across the population.

In considering the clinical populations for whom videoconferencing-based therapy is
most evidenced, conclusions primarily reflect the availability of trial data, rather than
patterns of superior or inferior efficacy being observed. That withstanding, the
videoconferencing modality has its most established evidence base in the delivery of
cognitive behavioural therapies for PTSD and depression, where multiple trials have
determined non-inferiority to in-person therapy. Across anxiety, obsessive–compulsive
spectrum and eating disorders, there is also emergent evidence supporting use. Notably,
there was a lack of study of videoconferencing therapy delivery to people with psychosis
(although see Santestaban-Echarri et al., 2020, for findings of broader service delivery,
such as psychiatry appointments, being acceptable to this population).

Among therapy modalities, CPT, PE, and behavioural activation all have evidence of
non-inferiority, so can be considered the best supported for delivery in this modality. It is
notable that trauma-focused therapies, as some of the most confronting therapeutic
approaches, are the best evidenced, which suggests that an in-room presence is not
required to deliver quite challenging therapies. Nonetheless, studies with available data
have primarily utilized behavioural therapies. This leaves it unknown how therapies that
use greater Socratic dialogue and reflection may operate within a videoconferencing
environment, where some of the technical issues such as lag may prove more interruptive
to the therapy process. Likewise, it is not known whether therapies for complex
presentations, such as personality disorder and psychosis, which require more careful
monitoring of in-session rapport, would be equally successful.

A further caveat is that most large-scale studies have been conducted in American
veteran/military populations, with predominantly male participants, raising questions of
generalizability. Of note, the clearest finding of videoconferencing having slightly poorer
outcomes than in-person therapy was in a trial for bulimia nervosa with a predominantly
female group (although also using older telemedicine technology). On the other hand, the 
female-only study by Morland et al. (2015) also found non-inferiority and broadly similar 
results and observed that outcomes were in fact better among civilians compared with 
veterans. Nonetheless, these limitations in the available data urge some caution in 
assuming that videoconferencing therapies will function as well as in-person therapy with 
all therapies and populations. It should also be noted that we did not aggregate and meta-
analyse mean scores for variables across studies, so there may be small between group 
differences that individual trials were not powered to detect.

In considering areas for further research, it is notable that since the COVID-19 
pandemic, new questions have emerged as in-person therapy has not always been the 
most important reference point. We did not identify any studies that contrasted 
videoconferencing with telephone as the other widely accessible communication 
modality. While, in a non-clinical client group, Day and Schnier (2002) failed to find any 
advantages of video counselling over telephone on process or outcome measures, 
considering the contrasting uses of these two widely accessible platforms, and 
understanding whether visual non-verbal feedback facilitates maintaining rapport, is 
needed in clinical populations. Further study also needs to be directed at examining the 
opportunities that may be presented by using videoconferencing as a therapeutic 
medium. Observations suggest there are particular affordances of video, allowing access 
to the home environment and potentially for portability, which may have advantages in 
better connecting with the person’s daily life, and developing more ecologically valid 
therapeutic exercises. Rather than considering videoconferencing second to a presumed 
gold standard of in-person therapy, attention to these affordances is needed to evolve 
videoconferencing-based therapy practice in its own right.

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Conflict of interest
All authors declare no conflict of interest.

Author contributions
Neil Thomas (Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Supervision; Writing – original draft; Writing – review & editing) Caity McDonald (Conceptualization; Data curation; Formal analysis; Investigation; Writing – review & editing) Kathleen de Boer (Data curation; Formal analysis; Investigation; Writing – original draft; Writing – review & editing) Rachel M. Brand (Investigation; Writing – original draft; Writing – review & editing) Maja Nedeljkovic (Investigation; Writing – original draft; Writing – review & editing) Liz Seabrook (Conceptualization; Data curation; Formal analysis; Investigation; Writing – original draft; Writing – review & editing).
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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