

Virtual Trauma-Focused Therapy for Military Members, Veterans, and Public Safety Personnel with Post-Traumatic Stress Injury: A Systematic Scoping Review

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Submitted to: JMIR mHealth and uHealth
on: July 07, 2020

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Abstract

Background: A necessary shift from in-person to remote delivery of psychotherapy (e.g., teletherapy, eHealth, videoconferencing) has occurred due to the COVID-19 pandemic. A corollary benefit is potential fit in terms of the need for equitable and timely access to mental health (MH) services in remote and rural locations. COVID-19 may increase the need of Trauma-affected populations (TAPs), including public safety personnel (PSP; e.g., paramedics, police, fire, correctional officers), military members (MMs), and Veterans, for timely virtual-delivery services. There is a lack of evidence on the question of whether digital delivery of trauma-therapies for MMs, Veterans, and PSP leads to similar outcomes to in-person delivery. There is also a paucity of information on barriers and facilitators, and a lack of recommendations regarding virtual-delivery.

Objective: To 1) evaluate the scope and quality of peer-reviewed literature on psychotherapeutic digital health interventions delivered remotely to MMs, Veterans, and PSP, and; 2) synthesize knowledge of needs, gaps, barriers to, and facilitators for virtual-assessment of and virtual-interventions for PTSD.

Methods: Identification of relevant studies comprising searching Medline, Embase, APA Psycinfo, CINAHL Plus with Full Text, and Military & Government Collection. Collation, analysis, summarizing, and reporting of results used the Critical Skills Appraisal Program (CASP) Qualitative Checklist, PEDro Scale, Level of Evidence Hierarchy, PRISMA-ScR, and narrative synthesis.

Results: This review process yielded 38 studies for inclusion. Evidence for effectiveness of digital delivery of prolonged exposure therapy, cognitive processing therapy, Behavioural Activation Treatment with Therapeutic Exposure to MMs, Veterans, and PSP was rated Level 1a, while evidence for cognitive behavioral therapy was conflicting. The narrative synthesis indicated virtual delivery of these therapies can be as effective as in-person, but may reduce stigma and cost while increasing access to therapy. Issues of risk, safety, potential harms (suicidality, enabling avoidance), privacy, security, and the match between therapist, modality and patient warrant further consideration. There is a paucity of studies on influences of gender, racial and cultural factors that may result in differential outcomes, preferences, and/or needs. Investigation into additional therapies that may be suitable for digital delivery are needed.

Conclusions: Digital delivery of trauma therapies for MMs, Veterans, and PSP is a critical area for further research. Although promising evidence exists regarding the effectiveness of digital health within these populations, many questions remain and a cautious approach to more widespread implementation is warranted. Additional work is needed to address “the digital divide”.

(JMIR Preprints 07/07/2020:22079)

DOI: <https://doi.org/10.2196/preprints.22079>

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Virtual Trauma-Focused Therapy for Military Members, Veterans, and Public Safety Personnel with Post-Traumatic Stress Injury: A Systematic Scoping Review

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Abstract

Background: A necessary shift from in-person to remote delivery of psychotherapy (e.g., teletherapy, eHealth, videoconferencing) has occurred due to the COVID-19 pandemic. A corollary benefit is potential fit in terms of the need for equitable and timely access to mental health (MH) services in remote and rural locations. COVID-19 may increase the need of trauma-affected populations (TAPs), including public safety personnel (PSP; e.g., paramedics, police, fire, correctional officers), military members (MMs), and Veterans, for timely virtual-delivery services. There is a lack of evidence on the question of whether digital delivery of trauma-therapies for MMs, Veterans, and PSP leads to similar outcomes to in-person delivery. There is also a paucity of information on barriers and facilitators, and a lack of recommendations regarding virtual-delivery. **Objectives:** To 1) evaluate the scope and quality of peer-reviewed literature on psychotherapeutic digital health interventions delivered remotely to MMs, Veterans, and PSP, and; 2) synthesize knowledge of needs, gaps, barriers to, and facilitators for virtual-assessment of and virtual-interventions for PTSD. **Methods:** Identification of relevant studies comprising searching Medline, Embase, APA PsycINFO, CINAHL Plus with Full Text, and Military & Government Collection. Collation, analysis, summarizing, and reporting of results used the Critical Skills Appraisal Program (CASP) Qualitative Checklist, PEDro Scale, Level of Evidence Hierarchy, PRISMA-ScR, and narrative synthesis. **Results:** This review process yielded 38 studies for inclusion. Evidence for effectiveness of digital delivery of prolonged exposure therapy, cognitive processing therapy, Behavioural Activation Treatment with Therapeutic Exposure to MMs, Veterans, and PSP was rated Level 1a, while evidence for cognitive behavioral therapy was conflicting. The narrative synthesis indicated virtual delivery of these therapies can be as effective as in-person, but may reduce stigma and cost while increasing access to therapy. Issues of risk, safety, potential harms (suicidality, enabling avoidance), privacy, security, and the match between therapist, modality and patient warrant further consideration. There is a paucity of studies on influences of gender, racial and cultural factors that may result in differential outcomes, preferences, and/or needs. Investigation into additional therapies that may be suitable for digital delivery is needed. **Conclusion:** Digital delivery of trauma-therapies for MMs, Veterans, and PSP is a critical area for further research. Although promising evidence exists regarding the effectiveness of digital health within these populations, many questions remain and a cautious approach to more widespread implementation is warranted. Additional work is needed to address “the digital divide.”

Keywords:

trauma; mental health; telemedicine; therapy; rehabilitation; digital health; psychotherapy; military; veteran; first responder; public safety personnel; teletherapy; psychotherapy; telepsychiatry

Introduction

Physical distancing required by the COVID-19 pandemic led to a rapid paradigm shift towards remote mental health (MH) service delivery and a surge in the use of digital health (DH) delivery (e.g., teletherapy, telemedicine, eHealth, and mobile health) [1,2]. In early 2020, gradual development, trial, and adoption of DH were common. With the onset of COVID-19 and physical distancing rules for containment of infection spread, supporting people at a physical

distance with DH methods became necessary for accessing services, screening, assessment, and treatment [2,3]. Many aspects of legal, clinical, cultural, practical, and privacy/security issues remain to be addressed for delivering MH services to trauma-affected populations, including public safety personnel (PSP; e.g., border services, communications officials, correctional workers, firefighters, paramedics, police, etc.), military members (MMs), and Veterans [4]. MH concerns and Post-Traumatic Stress Injuries (PTSI) in these groups may be associated with professional service during, or exacerbated by, the COVID-19 pandemic. This review aims to systematically identify the scope of what is known in this context and to summarize current evidence supporting the use of DH with MMs, Veterans and PSP, together with a discussion of barriers and facilitators.

Background

MMs and PSP are frequently exposed to potentially high-stress and traumatic experiences in the course of service [5]. Such exposures can impact their mental and psychosocial health and result in Post-Traumatic Stress Injuries (PTSI) - a range of challenges from Posttraumatic Stress Disorder (PTSD) to symptom clusters that may not meet diagnostic criteria but interfere with daily functioning in social, work or family activities [4]. PTSD is the most common of PTSIs experienced by MMs and Veterans [6-8] and remains the predominant focus of most military and Veteran health research and care [9-11]. Characterized by intrusion symptoms, avoidance, changes in cognition and mood, as well as changes in arousal and reactivity [12], PTSD has historically been difficult to treat because of the variety of associated symptoms. Isolated or cumulative traumatic experiences can also cause long-term psychological and spiritual struggles including depression, anxiety, and moral injury [9,11,13,14]. Moral injury, a separate trauma syndrome that results from exposure to morally injurious experiences such as witnessing or participating in acts that transgress personal morals and values [14], is potentially a key PTSD comorbidity [15].

Incidence of PTSIs among MMs, Veterans and PSP varies: within military and Veteran populations globally, PTSD prevalence is persistent, complex, and may increase over time [16, 17]. Among United States (US) MMs deployed during the War on Terror, PTSD prevalence estimates reached 19% [17] compared to 5.3% for Canadians [18], 2.7% to 4% in United Kingdom (UK) MMs [19], and 3% for MMs from the Netherlands [20]; 2010 rates of PTSD in the Australian Defence Force were 8.3% [21]. A recent meta-analysis reported that overall rates remained high (approximately 23%) for post-9-11 US Veterans [22] and PTSD increased to 16% for Canadian Veterans [23]. Global PTSI studies among PSPs also demonstrate elevated prevalence, severity, and complexity. Prevalence of PTSIs among PSPs in a recent Canadian study were reported as follows: municipal police (36.7%), firefighters (34.1%), Royal Canadian Mounted Police (50.2%), and paramedical staff (49.1%) [24].

Multiple gold-standard frontline psychotherapeutic interventions have been used to treat PTSIs in these populations, including Prolonged Exposure Therapy (PE), Cognitive Processing Therapy (CPT), Cognitive Behavioral Therapy (CBT), and Eye Movement Desensitization Reprocessing (EMDR). PE and CPT have been the main research focus over the last 25 years and appear to have the greatest efficacy for PTSD [25-27]. While MH interventions have been predominantly delivered in-person, pandemic and geographic barriers impede in-person access to assessment and interventions. Based on recent evidence-based publications, some of the main barriers to Veterans and MMs seeking treatment include: concerns about the specific treatment itself (i.e. CBT, PE, CPT), mental health stigma from self and from others, and the technological logistics including internet quality, familiarity with software, and competence

with technology [28]. As well, reduced access to MH clinicians who are adequately trained in remote delivery and individual factors, such as unfavorable attitudes toward interventions, may also be significant barriers to receiving and benefiting from digital health treatments [29]. In active theatres of military operations, remote locations; and for those living in rural communities, there is very limited access to specialized MH services [30]. The new reality of COVID-19 physical-distancing requirements adds to existing barriers for those who may require medical treatment and services for mental and physical health. Increasing access to and understanding the effectiveness and limitations of virtual care is now essential.

Digital Health (e.g., teletherapy, telemedicine, eHealth, and mobile health) may offer MMs, Veterans and PSP alternative access to MH services and therapies in a timely manner. Current literature identifies accepted conventional benefits associated with in-person delivery of gold-standard frontline psychotherapies, including flexible delivery times, physical privacy that enables avoidance of stigma, enhanced self-efficacy, and minimized negative attitudes toward MH interventions [29, 31]. In contrast, potential concerns about the provision of therapy via DH include: potential practical issues with technology interactions, client willingness to engage in telehealth, privacy and safety concerns (e.g. how adverse events will be handled remotely), and MH clinician attitudes.

While there is evidence regarding the general use of DH, significant knowledge gaps exist regarding its use in this context, including understandings of needs, barriers and facilitators to the use, uptake and sustainability of DH; technological issues that may impede the use of DH solutions (e.g., feasibility, logistics, security, firewalls, compatibility and policies in military and PSP organizations); technology acceptance by PSP, military members, and Veterans, and MH clinicians; and evidence of clinical effectiveness of remote digital assessment and treatment of PTSIs. There is also, as yet, a general lack of published work focusing on knowledge dissemination and implementation plans that will ensure that timely, accessible, and relevant evidence is available to decision-makers who may consider adoption of virtual delivery of assessment and interventions. This review explores knowledge regarding digitally-delivered psychotherapeutic interventions to MMs, Veterans and PSP, along with barriers, facilitators and recommendations for its use. This study contributes uniquely to the MH response to COVID-19 by summarizing evidence for realistic DH solutions for delivery of MH services for MMs, Veterans and PSP with PTSIs for whom MH challenges may be associated with or exacerbated by the COVID-19 pandemic.

The research questions guiding this systematic scoping review are as follows:

1. What is the quality of the existing literature addressing DH delivery of gold-standard, psychotherapeutic trauma interventions for MMs, Veterans, and PSP with trauma-related mental illness?
2. What evidence exists on the efficacy of DH delivery of gold-standard, psychotherapeutic trauma interventions for MMs, Veterans, and PSP with trauma-related mental illness compared to regular in-person intervention delivery?
3. What are the facilitators, barriers, themes, clinical recommendations, considerations and knowledge gaps in the current peer-reviewed, evidence-based literature regarding DH delivery of PTISI-trauma interventions for MMs, Veterans, and PSP with trauma-related mental illness?

Objectives

This scoping review aims to, 1) Systematically evaluate the quality of the existing quantitative,

qualitative and mixed methods peer-reviewed literature on DH interventions for MH with MMs, Veterans, and PSP populations, and; 2) synthesize knowledge of needs, gaps, barriers, and facilitators for DH delivery of PTSI assessment and interventions based on the existing literature.

Methodology

This scoping review employed the following overarching steps: (1) formulation of the research questions based on PICO guidelines (Population, Intervention, Comparison, Outcome); (2) identification of relevant studies; (3) selection of studies; (4) charting of the data; and (5) collation, analysis, summarization, and reporting of results [32]. This scoping review follows PRISMA-ScR reporting guidelines [33].

Identification of Relevant Studies

Information Sources and Search Strategy

A search strategy based on specific inclusion and exclusion criteria was developed by the research team and included the following databases: Medline (Ovid MEDLINE(R) ALL), Embase (Ovid interface), APA PsycINFO (Ovid Interface), CINAHL Plus with Full Text (EBSCOhost interface) and Military & Government Collection (EBSCOhost interface). The search consisted of an extensive list of keywords and subject headings covering four concepts: 1) traumatized individuals 2) military or rescue personnel 3) to person therapy conducted remotely through technology (telephone, video conferencing or online) 4) specific trauma informed therapies (Appendix A). The four concepts were then combined with Boolean AND. The search was limited to articles published from 2010 onwards to include only current technology and therapeutic techniques. Studies were also limited to English-language peer-reviewed articles. Editorials and other non-research articles were removed where possible. The full search strategy is available in the supplementary materials (Appendix A).

Inclusion/Exclusion Criteria

Articles selected for inclusion in this scoping review addressed MM, Veterans, and/or PSP who had a primary diagnosis of PTSD and/or a trauma-related mental health disorder. The intervention modality in outcome studies, or being targeted for validity or reliability studies or reviews, was limited to psychotherapeutic treatments administered via a remote platform. Psychotherapeutic interventions most strongly recommended with MMs, Veterans and PSP include, Cognitive Processing Therapy (CPT), Cognitive Behavioral Therapy (CBT), Prolonged Exposure (PE), and Eye-Movement Desensitization Therapy (EMDR) [34-38]. Other trauma-informed therapies were also included in the search including motivational interviewing, Adaptive Disclosure Therapy (ADT) and Accelerated Resolution Therapy (ART), though the search terms would include results containing other trauma-therapies [39, 40]. Remote psychotherapeutic interventions were limited to those delivered via a remote person-to-person interaction (i.e. the participant and clinician were in separate physical locations during intervention delivery). The delivery platforms included video conferencing, text, app-based, virtual reality, or telephone communication, provided interaction between the participant and clinician was performed in real-time and not pre-recorded or automated. Both individual or group interventions were included.

If the published work included participants with comorbid conditions, such as other MH disorders, disrupted sleep, chronic pain, substance use disorder, or traumatic brain injury, it was included if the additional conditions were secondary to the trauma-induced diagnosis and

not the primary focus of the specific research study.

All articles included in the data set were peer-reviewed and included quantitative, qualitative, mixed-methods, and meta-analyses regardless of positive, negative, or neutral findings. Articles were excluded from the review if they did not meet the inclusion criteria, were not peer-reviewed, or were commentaries, editorials, or grey literature such as non-published graduate student theses. Studies which addressed civilians exclusively, such as those that focused on family members of military, Veteran, and PSP populations only, were also excluded. Studies of interventions that were not specific to trauma, such as dialectical behavioral therapy (DBT), were excluded in the final selection of articles.

Selection of Studies

The study selection phase followed a variation of the procedures used by Neubauer et al. (2018) and Miguel-Cruz et al. (2017) [41,42]. First, a member of the research team exported all of the identified studies to the reference manager software EndNote X9.3.2, © (2006-2013 Thomson Reuters) [43]. After deduplication, the references were imported to Covidence © (2020 Covidence) [44]. Second, prior to the title and abstract evaluation phase, members of the research team were trained in how to apply the inclusion and exclusion criteria (calibration phase). Then, two pairs of independent researchers evaluated the titles and abstracts of the remaining studies and compared them with the inclusion and exclusion criteria. Differences between the two pairs of independent researchers regarding the decision of whether or not to include a study in the next phase were addressed at subsequent meetings. During the full paper reading phase, two researchers reviewed the full texts of the selected studies. Each researcher independently assessed the studies to determine their suitability for inclusion in the data extraction phase. Inclusion or exclusion into the dataset for analysis required consensus.

Charting of the Data

Data extraction process

During this phase, the researchers completed the data extraction of the final selected papers and met regularly to reconcile differences that arose through discussion. In case of any disagreement, one of the researchers acted as a third rater. In addition, the co-principal investigators validated the data extracted from the studies. In each selected study, the research team extracted data according to the following domains: population (medical condition, age, branch of the military, race/ethnicity, sample size (N), Mean age + SD,), study features (design, outcome variables, assessment tools), intervention (whether the intervention was provided via remote access, mode of delivery, therapy/care delivered, Group or 1-1), Clinical Assessment, Clinical Outcome Measures, Clinical Outcomes, Assessment of Technology Usability, Technology Outcome Measures, Technology, Use Outcomes, Duration, and Data Analysis Strategies (Appendix B).

Analysis, Summarization, and Reporting

Data analysis

All data were analyzed and validated by at least two team members involved in the analysis. The research team met regularly to discuss data extraction, analysis and synthesis which were iterative and, in some cases, concurrent. Any discrepancies in the analysis of quantitative or qualitative data were resolved through discussion. This nonlinear process guaranteed rigor and internal validity.

Thematic analysis and narrative synthesis were used to qualitatively analyze the studies, and compile the results (Table 1). Data immersion occurred prior to the commencement of the analysis and coding process. Thematic analysis involved examining text in detail to identify recurring patterns (“themes”) through both inductive and deductive reasoning [45]. Braun and Clarke’s (2006) framework for qualitative thematic analysis guided the inductive analysis such that no pre-existing coding frame was imposed on the studies. Deductive analysis was guided by the research questions, particularly barriers, facilitators and recommendations associated with the use of DH [45]. Once the coding structure was developed, the first round of coding was completed by two team members. Open codes were later combined into preliminary patterns focusing on similarities and differences within and between studies. More abstract concepts were assigned to broader categories of themes and verified through key quotes. The data was then reviewed and twice re-coded. Team members continually compared themes and resolved differences through discussion. Following thematic analysis, a narrative synthesis was conducted to organize, describe, explore, interpret and fundamentally tell the story of the analysis [46, 47].

Quality of the Evidence

The 38 selected studies were further analyzed for the quality of evidence. The three tools utilized for this step were the PEDro Scale [48], Critical Appraisal Skills Program (CASP) Qualitative Scale [49], and the Levels of Evidence Hierarchy. The levels of evidence used to summarize the findings are based on the levels of evidence developed by Straus et al. (2005) [50, 51]. The CASP can be utilized as a tool to evaluate if qualitative literature is valuable to the research topic of interest. The PEDro scale can assist researchers with rapidly identifying which RCTs are likely to be internally valid and could have sufficient statistical information to make their results interpretable [48]. For RCTs, studies scoring 9-10 on the PEDro scale are considered to be of “excellent” methodological quality. Studies with PEDro scores ranging from 6-8 are considered to be of “good” quality, while studies scoring 4 or 5 were of “fair” quality. Studies that scored below 4 were felt to be of “poor” quality [50].

At least two researchers evaluated each of the included studies with the appropriate tool, with the PEDro scale being applied to RCTs (26) and the CASP Qualitative Checklist to studies with a qualitative component (4). Each study with a quantitative component with outcome variables was then categorized based on the trauma-therapy intervention used in the study and assigned a grade based on the Levels of Evidence [50,51].

Results

Search Results

The search strategy yielded 629 articles (see Figure1: PRISMA diagram). After deduplication, 286 titles and abstracts were screened. A total of 131 full text documents were reviewed, with 93 being excluded (Figure 1) for reasons of including a therapeutic intervention not specific to traumatic stress-related disorders, not involving MMs, Veterans, or PSP, not being peer-

reviewed, the diagnosis not being related to trauma, or the administration of the therapeutic intervention not being via DH. The remaining 38 studies were included in the review. Descriptive analysis results are displayed in Table 1 and further details in Appendix B, including a list of all outcome measures reported in the included studies.

Figure 1: PRISMA Chart of Scoping Review Study Identification, Selection, Exclusion, and Inclusion [32].

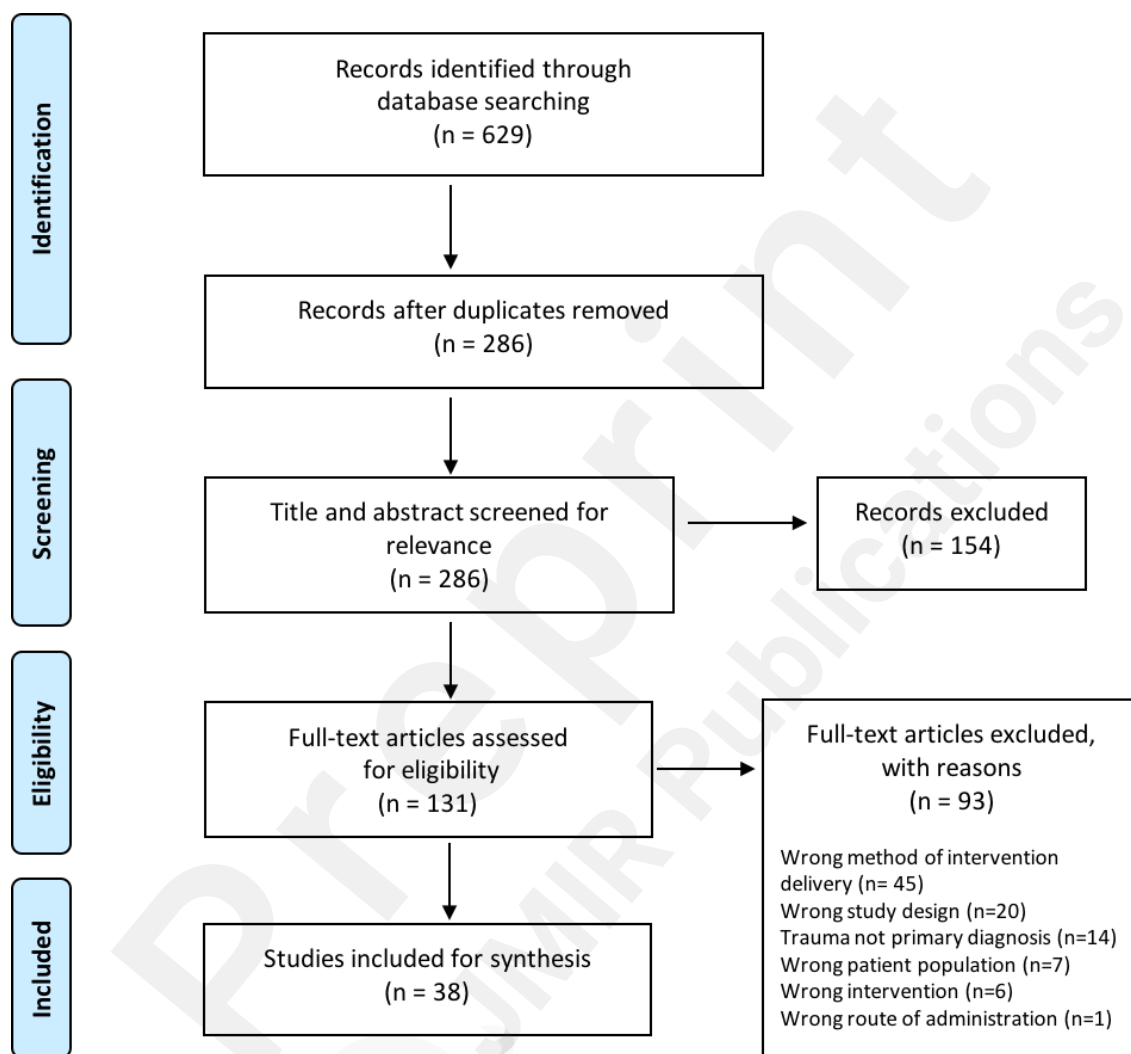


Table 1: Descriptive Analysis, PEDro [47], and Outcomes of all studies included in the Scoping Review.

Study	Study Design	Country	Population	Sex (%)	Race (%)	Therapy Delivered	Mode of Delivery	Pedro Score	Outcome of interest (scales) and effectiveness
Siemba, Bradley, Landry, Roth, Porter, Tyler, 2014.	Quantitative: RCT	United States	Active Duty Military, Veteran	Male (90%) Female (10%)	Black (79%) Other (21%)	Cognitive Behavioral Therapy	Telehealth (Unspecified)	6	Significant PTSD symptom decrease pre/post DH CBT (CAPS5, HAM-A, MADRS; $p = NR$); non-significant difference in effectiveness between CBT delivered in-person and via telehealth ($p = NR$). Both in-

uen, Gros, rice, Zeigler, uerk, Foa, cierno, 2015.	Quantitative: RCT	United States	Veteran	Male (98.1%) Female (1.9%)	White (53.8%) Black (36.5%) Hispanic (9.6%)	Prolonged Exposure Therapy	Videoconference	9	person and DH CBT modes of delivery are effective. Significant PTSD, depression, and anxiety symptom decrease pre/post DH PE (CAPS5, PCL-M, BDI-II, BAI; $p < .001$). DH PE appeared to be effective for MH symptom reduction.
Vierwille, ukay-Martin, hard, Klump, 016.	Quantitative: Secondary Data Analysis	United States	Veteran	Male (87.8%) Female (12.2%)	Minority Status (14.4%) Other (85.6%)	Prolonged Exposure Therapy, Cognitive Processing Therapy	Videoconference	N/A	Clinically significant PTSD and depressive symptom decreased pre/post DH CPT/PE (PCL-5; $p < .001$; BDI-II; $p = .007$); non-significant difference between CBT delivered in-person and via telehealth ($p = 0.319$)
Whealin, oneda, Nelson, ilmes, awasaki, Yan, 017.	Quantitative: Survey Based Pretest- Posttest	United States	Veteran, Civilians (family members)	Veteran: Male (96%), Female (4%); Civilians: Female (96%), Male (4%)	Veterans: NH/PI (60.7%), Asian American (10.7%), White (21.4%), Black (3.6%), NR (3.6%) Civilians: NH/PI (53.6%), Asian American (21.4%), White (17.9%), Black/African American (3.57%), NR (3.57%)	Cognitive Behavioral Therapy, Psychoedu- cation	Videoconference	N/A	Overall relationship quality scores for Veterans were significantly higher pre/post DH CBT/psyched (RDAS; $p = .008$). Relationship satisfaction not significantly changed pre/post (BRSS; $p = .063$). Intervention effective at improving scores on measures of relationship quality, satisfaction, and cohesion pre/post for Veterans and their family members.
Whealin, King, hore, Spira, 017.	Quantitative: Survey Based	United States	Veteran	Male (83%) Female (17%)	NH/PI (27.6%) White (25.6%) Asian American (21.3%) Mixed (19.1%) Black (6.4%)	Cognitive Processing Therapy	Videoconference	N/A	Intervention was well received by rural, largely minority group of Veterans as a means of obtaining mental health care in a timely fashion (VHA mTH, VHA Perceptions of HTHM Intervention Questionnaire; VHA mTH PSQ; $p = NR$).
Vells, lassman, alkovsky, hatfield, Sohn, Morland, Mackintosh, 019.	Quantitative: Secondary Data Analysis	United States	Civilian, Veteran	Female	NR	Cognitive Processing Therapy	Videoconference	N/A	Statistically significant increases in arousal, satisfaction, and desire pre/post DH CPT. The larger the reduction in post-PTSD symptoms, the larger the improvement in sexual function (CAPS5, SFQ; $p > .05$). DH CPT is as effective as in-person delivery.
Valentine, onofry, roman, Smith, auch, Sexton, 019.	Quantitative: Secondary Data Analysis	United States	Veteran	Female (73.5%) Male (26.5%)	Caucasian (68.5%) African American (22.8%) Latinx (3.5%)	Cognitive Processing Therapy, Prolonged Exposure Therapy	Videoconference	N/A	Survivors of military sexual trauma (MST) were significantly more likely to leave DH intervention earlier and not complete treatment than in-person therapy group (MINI, CAPS; $p = 0.043$ and $p = 0.039$). Survivors of MST were less likely to receive a minimum adequate dose of trauma-focused treatment and that early attrition was particularly salient when care was delivered remotely via DH.
uerk, Yoder, uggiero, Gros, cierno, 2010.	Quantitative: Case Control	United States	Combat Veterans	Male (97%) Female (3%)	Black (34%) White (64%) Hispanic (2%)	Prolonged Exposure Therapy	Videoconference	N/A	Significant PTSD and depression symptoms decreased pre/post DH PE (PCL-M, BDI-II; $p > .001$); non-significant difference in effectiveness between PE delivered in-person and via telehealth ($p > .001$). Both in-person and DH PE modes of delivery are effective.

Orphan, Carges, Stanley, Evans-Studnall, 2016.	Quantitative: Quasi-experimental Single Subject Design	United States	Veteran	Female	African American	Cognitive Behavioral Therapy	Telephone	N/A	The participant's PTSD, anxiety, and depression symptoms were reduced post-intervention and quality of life scores increased (PHQ-9, PCL-5, GAD-7, PCS).
Orphan, Gros, Ruggiero, Lejuez, Acierno, 2012.	Quantitative: RCT	United States	Veteran	Male (92.5%) Female (7.5%)	Caucasian (45%) Other (55%)	Behavioral Activation and Therapeutic Exposure	Videoconference	7	Reductions in PTSD symptoms were significant for both DH and in-person therapy while changes in depressive symptoms were not (CAPS, PCL-M, SCID-IV, BDI-II, BAI, AUDIT; $p = .009$). Home-based DH application of behavioral health treatments is a feasible treatment delivery method.
Orphan, Shiner, Watts, Jones, Conner, 2013.	Qualitative: Exploratory	United States	Active Duty, National Guard and Reservists, and separated	Male (84%) Female (16%)	Caucasian (67%) African American (13%) Latino (9%)	Cognitive Behavioral Therapy	Telephone	N/A	Four categories of beliefs were associated with the decision to seek treatment, including concerns about treatment, emotional readiness for treatment, stigma, and logistical issues and suggests areas for intervention efforts to minimize barriers to treatment.
Orphan, McHugo, Xie, Whyman, Jones, 2014.	Quantitative: RCT	United States	Service Members	Male (87%) Female (13%)	Caucasian (69%) African American (14%) Other (14%)	Cognitive Behavioral Therapy	Telephone	5	Those who received the CBT telephone intervention attending a significantly greater number of treatment sessions in the following 6 months than the control group participants (PCL-M, PHQ-9, PASS; $p = .043$). A one-time brief telephone intervention can engage service members in PTSD treatment earlier than conventional methods and can lead to immediate symptom reduction.
Orphan, Adams, Carpenter, Long, Nicholson, Greltsov, Xie, 2016.	Mixed Method: RCT, General Qualitative Exploratory	United States	Service Members	Male (87%) Female (13%)	White (83.4%) Black (16.6%)	Cognitive Behavioral Therapy	Telephone	4	Black participants were significantly more likely to initiate DH CBT treatment ($p = .04$) compared to the White participants although they attended less overall sessions (MINI, PCL-M, PASS). All participants had a significant decrease in PTSD ($p = .0001$) and depression ($p = .001$) symptoms. Three themes of PTSD, treatment-seeking behavior, and efforts toward symptom reduction emerged: (a) social connectedness, (b) attitudes and expectations towards treatment, and; (c) the desire to appear "ok."
Orphan, Morland, Mackintosh, Rosen, Willis, Resick, Chard, Gruenewald, 2015.	Quantitative: RCT	United States	Civilian, Veteran	Female	White (47.6%) Asian (14.3%) Pacific Islander (11.9%) Other (26.2%)	Cognitive Processing Therapy	Videoconference	5	DH CBT outcomes were comparable to in-person treatment reducing PTSD symptoms when compared to the civilian population (CAPS, TEQ, WAI, CPOSS-VA; $p = .001$). Results indicate acceptability and safety of telemedicine for women with PTSD.
Orphan, Morland, Mackintosh, Greene, Rosen, Chard, Resick, Gruenewald, 2014.	Quantitative: RCT	United States	Combat Veteran	Male	Asian (15.2%) Caucasian (46.4%) Pacific Islander (13.6%) Other (Hispanic, Black, and Native	Cognitive Processing Therapy - Cognitive Only	Videoconference	8	Non significant difference in effectiveness of CPT-C delivered in-person and via DH (CAPS, CPOSS-VA; TSAS TEQ 4-Item, GTAS; $p = .24$). Videoconferencing was found to be comparable to in-person

					American) (16%)					treatment. All participants saw a reduction in PTSD symptoms post-treatment and at follow-up.
Morland, Mackintosh, Glassman, Wells, Thorp, Rauch, Cunningham, et al., 2019.	Quantitative: RCT	United States	Veteran, Air Force, Army, Navy, Coast Guard, National Guard	Male	American Indian/ American Native (2.9%) Black (28.6%) White (40.6%) Asian American (8.0%) Native Hawaiians or Other Pacific Islander (2.3%) Other (9.7%)	Prolonged Exposure Therapy	Telehealth (Unspecified)	7	No significant difference in effectiveness between in-person or DH delivery of PE (CAPS5, BDI-II, B-IPF, AUDIT; $p > .385$) Clinical effectiveness of prolonged exposure did not differ between home-based telehealth, office-based telehealth, or in-home-in-person treatment; however, completion of treatment was higher in in-home-in-person treatment in comparison to home ($p=.031$) or office based ($p<.001$) telehealth.	
Morland, Lyles, Mackintosh, Kesick, Chard, 2011.	Quantitative: RCT	United States	Active duty Reserves, Guard, and Veterans; Army, Marines	Male	Caucasian (31%) NH/PI (46.1%) African American (15.4%) Asian (7.7%)	Cognitive Processing Therapy - Cognitive Only	Videoconference	6	No significant differences between in-person versus DH CPT-C on treatment dropout ($p = .26$), between conditions in the number of sessions attended, medians of total number of completed homework assignments, scores between treatment conditions on treatment expectancy measure, or treatment conditions at posttreatment and at 6 month follow-up (CAPS, GTAS, TSAS; $p > .05$).	
Maijeritsch, Smith, Messinger, Lhearn, Wickhoff, Zhao, 2016.	Quantitative: RCT	United States	Veteran	Male (93%) Female (7%)	NR	Cognitive Processing Therapy	Videoconference	5	All participants receiving in-person and DH CPT experienced reduction of PTSD (CAPS; $p = 0.094$ and PCL-5; $p = .079$.) at post-treatment assessment. No significant differences were observed between in-person and DH CPT interventions (CAPS, SCID-I, PCL-5, BDI-II, WAI).	
Duxton, Pruitt, O'Brien, Kramer, 2015.	Quantitative: Pretest-Posttest	United States	Active Duty Military	Male	NR	Behavioral Activation Treatment	Videoconference	N/A	Statistically significant reduction in PTSD symptoms and severity (CAPS, PCL-M, BDI-II, BAI, PSQI, SOP, CSQ, TSC). Feasibility of home based therapy for active military personnel was found.	
Franklin, Walton, Raines, Hambliss, Corrigan, Accurullo, Peterson, et al., 2018.	Quantitative: RCT	United States	Veteran	Male	African American (66%) European American (28%) Other (6%)	Cognitive Behavioral Therapy for Insomnia	Telephone	7	No difference in mode of delivery (in-person or DH; $p=.280$), PSQI scores immediately post-treatment, ($p=.328$), at one month ($p=.205$), or three months post-treatment. Large effects for in-person CBT-I at all three time points and medium to large effects for telephone delivered CBT-I (CAPS, SCID-IV, PSQI). In-person worked faster; however there was no difference between groups at the three month post-treatment mark.	
Macanis, Santa Ana, Killeen, Fadour, Back, 2016.	Quantitative: Quasi Experimental Single Subject Design	United States	Veteran	Female	Black	Prolonged Exposure Therapy	Videoconference	N/A	Participants were able to complete 12 sessions of therapy, and experienced clinically significant reductions in PTSD, depression symptoms, as well as a reduction in alcohol use all of which was maintained at three and six month follow up	

Fernandez- Lejada, Zoller, Luggiero, Cazley, Acierno, 2014.	Quantitative: RCT	United States	Military Personnel	Male	White (57.8%) Other (42.2%)	Prolonged Exposure Therapy	Telehealth (Unspecified)	4	(BDI-II, CAPS, PCL-M, TLFB). DH participants and in-person participant drop out rates were comparable. DH did not predict lower dropout rates (BETPS, TAQ, PCL-M, BDI-II)
Fernandez- Lejada, Hamski, González, Garracedo, 2017.	Quantitative: Pretest- Posttest	United States	Veteran	Male (69%) Female (31%)	Black (69%) White (31%)	Prolonged Exposure Therapy	Telephone	N/A	(PHQ-9, PCL-M). Peer support is a promising tool that can be used to combat dropout rates in PE for PTSD in military personnel and Veterans regardless if delivered in-person or via DH ($p = .031$).
Grubbs KM, Portney JC, Pyne JM, et al., 2015.	Quantitative: Secondary Data Analysis	United States	Veteran	Male (88.7%) Female (11.2%)	White (57.9%) African American (23.3%) Hispanic (9%) Other (9.8%)	Cognitive Processing Therapy	Videoconference	N/A	Higher CAPS scores and the opt- out recruitment method predicted lower likelihood of initiating DH CPT. Diagnosis of major depressive disorder lowered likelihood of engaging in CPT. A pending Veterans Affairs (VA) disability claim was a positive predictor for engagement in DH CPT (MINI, AUDIT, CAPS, SFV-12).
Gros, Yoder, Buerk, Lozano, Acierno, 2011.	Quantitative: Pretest- Posttest	United States	Veteran	Male (93.5%) Female (6.5%)	Caucasian (50%) African American (45.2%) NR (4.8%)	Prolonged Exposure Therapy, Psychoedu- cation	Videoconference	N/A	DH condition produced significant reduction in PTSD symptoms and depression, but was not as effective as the in- person condition. (PCL-5, BDI-II, DASS, IIRSp; $p < 0.01$). DH and in- person treatment was effective in treating PTSD and depression in military Veterans.
Gros, Lancaster, González, Acierno, 2018.	Quantitative: RCT	United States	Veterans and Military Personnel	Male (94%) Female (6%)	White (55.2%) Black (38.8%) Other (6%)	Prolonged Exposure Therapy	Videoconference	6	PTSD symptoms were significantly decreased in both the DH and in-person conditions (CAPS, CPOSS, SDPQ; $p < 0.001$). There were no significant effects of modality on any of the measures of the perception of the quality of service delivery and satisfaction with services provided ($p < 0.16$).
Gallegos, Greltsov, Stecker, 2016.	Mixed Method: RCT, Thematic Analysis	United States	Veteran	Male (87.2%) Female (12.8%)	White (70.6%) Black (14.5%) Hispanic (7.8%) Asian American (1.9%) American Indian or Alaskan Native (2.2%) Other (3.0%)	Cognitive Behavioral Therapy	Telephone	6	Significant reduction in PTSD and depression symptoms post intervention ($p < 0.01$). No significant treatment seeking (DH CBT) difference between suicide and nonsuicidal groups (PCL-M, PASS; $p < .05$).
Franklin, Accurullo, Walton, Arseneau, Peterson, 2017.	Quantitative: RCT	United States	Veteran	Male (92.3%) Female (7.7%)	Euro-American (75%) African American (8.3%) Other (16.7%)	Prolonged Exposure Therapy	Videoconference	5	Those who had some form of PE had a statistically significant PTSD symptom reduction (CAPS; $p = .02$; PDS; $p = .01$) compared to the treatment as usual (TAU) group (CAPS, PDS, BDI-II, BAI). There was no significant difference in symptom reduction among those who attended PE via DH or in-person.
Portney, Pyne, Cimbrell, Ludson, Robinson, Schneider, Moore, et al., 2015.	Quantitative: RCT	United States	Veteran	Male (89.8%) Female (10.2%)	White (63.8%) African American (9.6%) Hispanic (7.6%) Other (9%)	Cognitive Processing Therapy	Telephone	7	Telemedicine outreach for PTSD (TOP) increased DH CPT initiation and engagement in therapy compared to the control group ($p < .001$), which contributed to statistically significant PTSD symptom reductions at 6 ($p < .001$) and

									12 months (p = .02) follow up for patients (PDS; MINI, AUDIT, SFV-12).
Deal, Abadijan, McCamish, Shi, Parasovsky, Weighngard, 2012.	Quantitative: RCT	United States	Veteran	Male (64%) Female (36%)	Caucasian/White (45.2%) Black/African American (8.2%) Asian (19.2%) Hispanic/Latino (19.2%) Multiracial/other (8.2%)	Motivational Interviewing	Telephone	7	A greater proportion of those randomized to the DH MI vs. control group engaged in mental health treatment (p =0.004). (PCL M, PHQ-9, PRIME MD, AUDIT, ASI-lite). Those engaged in MI significantly decreased marijuana use (p < 0.05) and mental health treatment related stigma (p = 0.03) and increased self reported intention to engage in mental health treatment (8 weeks; p =0.02; 16 weeks; p =0.005).
Delton, Vangelin, Gurek, 2015.	Quantitative: Single Case Design	United States	Military	Male	NR	Prolonged Exposure Therapy	Videoconference	N/A	Continued decline in symptoms after switching from in-person to DH PE sessions during the second half of the treatment. (PCL-M). Study supports the delivery of PE therapy via DH without a discernible negative impact or compromise to the therapeutic alliance.
Olden, Wyka, Lukor, Peskin, Altemus, Lee, Linkelstein-Fox, et al., 2017.	Quantitative: RCT	United States	Military, Public Safety Personnel (Navy, Army Reserves, Coast Guard, Army, Firefighter, National Guard, Law Enforcement, Salvation Army Workers)	Male (81.8%) Female (18.2%)	White (63.7%) Black (9.1%) Hispanic (18.2%) Other (9.1%)	Prolonged Exposure Therapy	Videoconference	4	Improvement in PTSD and depressive symptoms (CAPS: p<0.001 and BDI-II; p=0.004). Half of study completers no longer met criteria for PTSD and none met criteria for major depression at post treatment assessment. Significant improvement in anger expression (STAXI-2; p=0.048, d=0.71). (CAPS, BDI-II, PCL, STAXI-2, WAI-SF, CSQ). Individuals in occupations at risk with PTSD endorsed high levels of therapeutic alliance, treatment satisfaction, satisfaction with use of videoconferencing, and satisfaction with clinical interaction
Murphy, Burgoose, 2019.	Quantitative: Pretest-Posttest	United Kingdom	Veteran	Male (88.9%) Female (11.1%)	NR	Cognitive Processing Therapy	Videoconference	N/A	Age, education, employment, and relationship status were related to therapy completion. (PCL-5, PHQ-9, GAD-7, DAR5, AUDIT). Improvements in mental health scores following DH CPT were observed with a large effect size and maintained at three months.
Morland, Wells, Glassman, Grubbs, Mackintosh, Golshan, Sohn, et al., 2019.	Quantitative: Cross Sectional Design	United States	Veteran (Army, Marines, Navy, Airforce, Coast Guard)	Male (75%) Female (25%)	Caucasian (46%) African American (28%) Asian American (9%) American Indian or Alaskan Native (3%) NH/PI (3%) Other (11%)	Prolonged Exposure Therapy	Videoconference	N/A	No specific therapeutic treatment was preferred over others. Differences between preference for DH versus in-person not statistically significant (p>0.199). Veterans seeking care for PTSD could benefit from having DH and in-person options.
Boykin, Keegan, Thompson, Koelkel, Lindsay, Fletcher, 2019.	Quantitative: Secondary Data Analysis	United States	Veteran	Male (66.1%) Female (33.8%)	Caucasian (51.4%) African American (45.9%) Other/Multiracial (1.4%)	Cognitive Processing Therapy, Prolonged Exposure Therapy	Videoconference	N/A	No demographic characteristics significantly predicted completion of therapy when using DH. Therapy type was a significant predictor of completion. Findings support greater emphasis on clinical

									expertise and competence in delivering therapies via DH rather than emphasizing predetermined patient criteria to identify which patients might benefit from DH.
Shawick, Turgoose, Murphy, 2019.	Qualitative: General Qualitative	United Kingdom	Veteran (Army, Navy, Royal Air Force, Marines)	Male (94%) Female (6%)	White (94%) Black (6%)	Cognitive Processing Therapy	Videoconference	N/A	5 key themes: 1. Effect of your own environment 2. Importance of good therapeutic alliance 3. Technicalities and practicalities 4. Personal accountability 5. Measuring change. Overall, the Veterans appeared to support use of DH. Veterans felt comfortable in their own homes, were able to establish good rapport with therapists and reported symptom improvements.
Scierno, Knapp, Guerk, Gilmore, Tejuez, Ruggiero, Muzzy, Egede, Hernandez-Tejada, Foa, 2017.	Quantitative: RCT	United States	Veteran	Male (96.2%) Female (3.8%)	White (60.6%) Black (33.3%) Hispanic (5.3%) Other (0.8%)	Prolonged Exposure Therapy	Videoconference	8	PE delivered via DH or in-person were effective at reducing PTSD (PCL-M; $p < 0.0001$) and depression symptoms (BDI-II in-person; $p < 0.0001$ v.s. BDI-II DH; $p < 0.004$). Treatment gains following DH PE were largely maintained in this study (CAPS, BDI-II, PCL-M).
Scierno, Gros, Ruggiero, Hernandez-Tejada, Knapp, Tejuez, et al., 2016.	Quantitative: RCT	United States	Veteran	Male (94.4%) Female (5.6%)	White (50.4%) Black (47.4%) Hispanic (0.9%) Other (1.3%)	Behavioral Activation and Therapeutic Exposure	Videoconference	6	Behavioural Activation and Therapeutic Exposure (BA-TE) delivered via DH was as effective as BA-TE delivered in-person in terms of its impact on reducing PTSD and MD symptoms. (CAPS, PCL-M, BDI-II)

Refer to Appendix A for a full list of outcome measures. NH/PI - Native Hawaiian/Pacific Islander.

Evidence Appraisal Results

The RCTs (29) varied in quality, with PEDro scores ranging from 4 to 9 (Table 1). The CASP Qualitative Scale found all studies with a qualitative component (4) to be valuable and to have contributed to the overall evidence on the topic. Levels of Evidence (Table 2) ranged from 1a (PE, CPT, and Behavioral Activation and Therapeutic Exposure (BA-TE)) to 4 (Behavioral Activation (BA)). A Level 1a rating indicates strong evidence and is achieved when two or more RCTs of high quality (PEDro ≥ 6) demonstrate similar findings and a Level 4 rating indicates that findings are supported by at least one study of pre-post-test, post-test, case series or single subject intervention design [50].

The results for CBT were conflicting (Table 2).

Table 2: Level of Evidence Hierarchy [50] for Digital Health Delivery of Trauma Therapy Interventions utilized with MMs, Veterans, and PSP.

Treatment	Conclusion of Level of Evidence	Study
Prolonged Exposure Therapy (PE)	There is Level 1a evidence that PE delivered via videoconferencing significantly reduces PTSD	Yuen et al., 2015; Wierwille et al., 2016;

	symptoms in Veterans and MM with PTSD	Tuerk et al., 2010; Morland et al., 2019; Jaconis et al., 2016; Hernandez-Tejada et al., 2017; Gros et al., 2011; Gros et al., 2018; Franklin et al., 2017; Pelton et al., 2015; Olden et al., 2017; Acierno et al., 2017
Cognitive Processing Therapy (CPT)	There is Level 1a evidence that CPT delivered via videoconferencing significantly reduces PTSD symptoms in Veterans with PTSD.	Wierwille et al., 2016; Wells et al., 2019; Morland et al., 2015; Morland et al., 2014; Morland et al., 2011; Maieritsch et al., 2016; Fortney et al., 2015; Murphy & Turgoose, 2019
Cognitive Behavioural Therapy (CBT)	There is conflicting evidence that CBT delivered via videoconferencing or telephone significantly reduces PTSD symptoms in Veterans and MM with PTSD	Ziamba et al., 2014; Stecker et al., 2014; Stecker et al., 2016; Gallegos et al., 2016; Trahan et al., 2016
Behavioural Activation and Therapeutic Exposure (BA-TE)	There is Level 1a evidence that BA-TE delivered via home-based videoconferencing significantly reduces PTSD symptoms in Veterans with PTSD	Acierno et al., 2016; Strachan et al., 2012
Behavioural Activation Treatment for posttraumatic stress disorder (BA for PTSD)	There is Level 4 evidence that BA for PTSD delivered via clinic-based videoconferencing significantly reduces PTSD symptoms and depressive symptoms in MM with PTSD	Luxton et al., 2015

Qualitative Analysis Results

The narrative synthesis and qualitative thematic analysis yielded a number of emerging themes related to the efficacy, clinical utility, ethics, accessibility, facilitators (Table 3), and barriers (Table 4) regarding remote delivery of trauma-focused therapies. As well, a number of clinical recommendations emerged that complement the findings of the quantitative analysis and rating of evidence (Table 5).

Facilitators

A number of facilitators were identified regarding virtual delivery of trauma-therapies to MMs, Veterans and PSP. These included: 1) the convenience of accessing teletherapy, particularly for

clients in rural and remote areas [52-54], 2) comfort of participating in therapy from the client's home [53-56] resulting in less stress [57, 58] and stigma, [54, 59], 3) the efficaciousness of several different evidence-based PTSD treatment modalities delivered using DH, including PE, CPT, CBT, and BA-TE [25, 60-62], and 4) the ability to see a therapist from a central health clinic or a location of their choosing reduced travel time, and transportation and missed work costs. [25, 57, 63] Many clients found that participating in teletherapy provided the same opportunities for relationship-building with the therapist as in-person treatment [64, 65]. From the MH clinician perspective, the same clinical skills and safety protocols required for handling increased emotional responses and symptom emergence in-person were noted to be used in a remote delivery context [58].

Table 3: Summary of facilitators from all studies included in review

Themes and Subthemes	Findings
1. Facilitators	
1.1 Participants	
1.1.1 Availability/Accessibility of services	<p>Access. Teletherapy may be beneficial for individuals who live in rural areas, as they are more accessible than in-person services. This benefit may be increased if the internet or electronic devices are provided to the clients.</p> <p><i>"Service members who are living in geographically remote locations or in areas that have a shortage of specialty healthcare professionals may especially benefit from Home-Based Tele Mental Health options"</i> [66, p. 1].</p>
1.1.2 Ethnic Background and Sex	<p>Ethnicity and Sex. Black Veterans seem to be more likely to seek out services, whether through telehealth or in-person. Additionally, female military Veterans may be more open to using teletherapy compared to in-person treatment.</p> <p><i>"Blacks overall were found to be more than 2 times as likely to seek treatment as White participants"</i> [67, p. 5].</p> <p><i>"...telehealth may help to overcome unique barriers experienced by female Veterans seeking care in a traditionally male-dominated health care system. Adoption of telehealth technologies may be particularly useful as the VAMC continues its efforts to expand services sensitive to the experiences of female Veterans including an expanded awareness and focus on providing MST related services"</i> [68, p.114].</p>
1.1.3 Rapport/trust building in Therapy	<p>Rapport. The ability to build rapport and develop a strong therapeutic alliance is possible with Teletherapy and has been demonstrated in a number of studies</p> <p><i>"Participants reported high levels of therapeutic alliance with their therapist throughout the treatment"</i> [65, p. 157].</p>

<p>1.1.4 <i>Participant Environment</i></p>	<p>Home Environment. Having the client participate in therapy from their own home allows them to feel comfortable and engage more easily in the therapeutic process. This may be especially helpful for clients who have experienced military sexual trauma <i>"Participants mentioned that being able to do therapy in their own environment helped them to relax and engage better than if they had had to go somewhere unfamiliar"</i> [53, p. 5].</p>
<p>1.1.5 <i>Use/Uptake of the Therapy</i></p>	<p>Uptake. Evidence seems to point to the comfort of clients with the use of teletherapy, belief in its effectiveness, and a willingness to use it again <i>"...throughout the duration of treatment, the majority of participants reported that they would be willing to use telehealth-delivered treatment again"</i> [65, p.158]. <i>"Participants also endorsed high expectations that the intervention would be helpful throughout the course of treatment"</i> [65, p. 157].</p>
<p>1.2 Technology</p>	
<p>1.2.1 <i>Stigma Associated with Therapy</i></p>	<p>Stigma. There seems to be a reduced amount of stigma surrounding teletherapy compared to in-person due to issues of privacy. <i>"The Advantage of Home-Based Teletherapy include reduced stigma (e.g., patients do not need to visit a mental health care facility)..."</i> [54, p. 2].</p>
<p>1.2.2 <i>Availability/Accessibility/Cost-effectiveness of Services</i></p>	<p>Cost. Home Based Teletherapy may be less expensive than classic in-person therapy, thereby making it more accessible to clients and decreasing the cost (transportation costs, travel time, missed work). Clients also seem to appreciate the flexibility of teletherapy in terms of where and when they can access treatment. <i>"It is more convenient and it is not like waiting at the office knowing you just have 1 hour to talk"</i> [56, Table 1, p. 9].</p>
<p>1.3 Ethical</p>	
<p>1.3.1 <i>Privacy</i></p>	<p>Security. Some clients see teletherapy as more private and secure because they can access it in their homes. This is especially apparent in smaller, tight-knit communities <i>"Moreover, some service members may be drawn to HBTMH because of the privacy it offers to those who are concerned about stigma associated with seeking mental health treatment."</i> [66, p. 1].</p>
<p>1.3.2 <i>Safety/Risk</i></p>	<p>Stress. Teletherapy is perceived by some clients as less stressful than in-person therapy. The same clinical skills can be used during remote as in-person delivery for handling heightened emotional responses and symptoms. <i>"Titrating of emotional reactions and patient engagement in traumatic memories, normally including anxiety, increased psychomotor activity, crying, and reexperiencing symptoms, were all</i></p>

	<i>handled adequately with the same protocol and clinical skills employed for in-person PE" [58, p. 119].</i>
1.4 Clinical Utility	
1.4.1 Effectiveness of different types of therapy when delivered via Teletherapy	Modalities. Several different evidence-based therapies that have been shown to be effective for teletherapy including PE, CPT, and CBT <i>"Use of clinical video conferencing services to provide evidence-based treatment to Veterans with posttraumatic stress disorder (PTSD) was found to be as effective as face-to-face treatment provision without negatively impacting therapeutic process measures." [69, p. 2]</i>
1.4.2 Therapy dropout rates in DH	Dropout. Therapy dropout rates, reasons and patterns are similar between therapy delivered in person and remote delivery/ therapy drop out rates are dependent more on comorbidities, client life circumstances, and treatment type than on mode of delivery. It is important to note that most of the therapies delivered were based in Cognitive Behavioural Therapy or Prolonged Exposure. <i>"There were no significant differences in the rates of dropout between the in-person condition and the (home-based) telehealth condition" [25, p. 504]</i>

Barriers

Multiple barriers were also identified (Table 4) including: 1) issues with technology related to connectivity, inconsistent access to secure high-quality internet connection, and hardware that disrupts and limits high quality and secure service delivery [25,52,53, 57-60, 64, 65, 69, 70], 2) client openness to digital health services [56], 3) challenges to client privacy and comfort including lack of a quiet, private space, experiences of isolation or disruption in the home environment, and client discomfort with communication over video conferencing [52, 53, 56, 61,71], 4) limits to the therapeutic alliance and therapist comfort with intervention activities that may impact clinical utility and effectiveness [52, 55, 58, 72, 73], 5) the ease of abrupt disengagement from treatment and engagement in social avoidant behaviours [52,55-57, 61], and 6) safety concerns and risk management [56, 64, 65].

Table 4: Summary of barriers from all studies

Themes and Subthemes	Findings
2. Barriers	
2.1 Technological issues are prevalent, causing	Connectivity challenges due to problematic client/therapist Internet connection, video conferencing hardware and software, or problems with server connection commonly present difficulties establishing and maintaining a clear, audible, and uninterrupted video-feed impacts the quality of service delivery and client satisfaction.

<p>disruption and limits to high quality and secure service delivery</p>	<p><i>"The majority of the technical problems that were reported involved lost wireless signals or video or audio quality issues, such as a delay in picture or sound due to poor Internet connection."</i> [25, p. 509].</p> <p><i>"...technical issues with initiating and maintaining a videoconferencing connection were more frequent than expected..."</i> [66, p. 884].</p> <p>Hardware that is compatible for securely connecting with encrypted video conferencing software is not always available for clients. Additionally, as many participants in the studies were provided hardware, more knowledge regarding the protocols and optimal infrastructure for secure delivery of DH services using personal/private computers or video conferencing compatible devices is needed.</p> <p><i>"An ideal capability would be to use a network infrastructure that meets U.S. Department of Defense network security requirements but that also allows for the use of privately owned end-user equipment (i.e., personal computers, Webcams, mobile devices, etc.)."</i> [66, p. 885].</p>
<p>2.2 Perceptions of digital health services may limit client acceptance and openness</p>	<p>Openness to DH use may depend on previous experiences or recommendations from trusted individuals or sources. Veterans were described as being hesitant to try new technologies due to issues of security or inconsistency with lifestyle (especially in rural populations). As the studies included clients who were seeking services and open to digital health delivery, more knowledge is yet needed of the perceptions and acceptance of digital health services in this population.</p> <p><i>"Clinical experience, however, suggests that many patients are hesitant to try new technologies"</i> [57, p. 16]</p>
<p>2.3 Challenges to client privacy, comfort and safety exist due to client environment and remote nature of service delivery</p>	<p>Lack of a quiet, private space in which clients can engage in therapy without the fear of being overheard by family members or roommates is common.</p> <p><i>"...advantages [of digital health] must be balanced by potential shortfalls, such as lack of privacy from family members when televideo sessions are conducted into homes where soundproofing between rooms may not be in place."</i> [54, p. 416].</p> <p>Session disruptions by doorbells or experiencing an abrupt transition back into everyday life after logging off a session made it difficult to engage from the home environment.</p> <p><i>"That's why it was hard to switch from talking all about it and then sort of, the hour's up and then you've got to try and get on with normal life."</i> [53, p. 5]</p> <p>Discomfort with communication over video was indicated by some clients despite satisfaction with their therapist. Concerns about managing strong emotions evoked in therapy in an isolated home environment lead clients to prefer in-person treatment. Additionally, clients may be less trusting of the privacy and confidentiality of digital health services.</p>

	<p><i>"I do not like not knowing who else is in the room with the therapist."</i> [57, p. 9].</p> <p>Safety is difficult to manage in a clinically unsupervised environment where a client may be at risk of purposefully terminating a teleconference session while being at risk of suicide. Much of the reviewed literature excluded clients who posed a risk for suicide and therefore more examples and knowledge on managing risk and responding to crisis is necessary. Establishing safety protocols involving family members or neighbours and adjusting service delivery schedules to accommodate is a commonly reported measure; feasibility and ethics in doing so must be considered.</p> <p><i>"Potential drawbacks include ... the difficulties of ensuring patient safety in a clinically unsupervised environment."</i> [57, p. 16].</p>
<p>2.4 <i>Limits to the therapeutic alliance and intervention activities may impact clinical utility and effectiveness</i></p>	<p>Establishing and building the therapeutic alliance necessary for effective treatment may be challenged due to the impersonal feeling of videoconferencing which is influenced by an inability to read all the client and therapist non-verbal body cues.</p> <p><i>"Despite being able to see the therapists face, several participants reported that they felt that doing therapy over Skype felt impersonal because they weren't in the same room."</i> [53, p. 5].</p> <p>Therapist comfort with DH may impact the selection of treatment modalities. Further, some clients may benefit from the in-person presence of a clinician to complete exposure activities as per a treatment protocol. Clients with hypervigilance may be unwilling to close eyes during imaginal exposure as they are not reassured that a therapist can watch out for and respond to threats in their environment. Secure exchange of information online related to intake, assessment, and client homework remains an issue.</p> <p><i>"Patients who present with more severe symptoms or extreme hypervigilance may be harder to treat via telehealth."</i> [58, p. 121]</p>
<p>2.5 <i>Ease of disengagement with services and enablement of social avoidant behaviours may be enhanced</i></p>	<p>Clients can disengage quickly and easily if a session becomes too challenging or uncomfortable. They may engage in distractions during the session such as watching television or browsing the internet.</p> <p><i>"if you're having a bad session, you can just switch him off and walk out the room easily."</i> [51, p. 7].</p> <p>Enablement of socially avoidant behaviours may occur when delivering mental health service to a client in their home. Care is required to ensure DH delivery is not discouraging clients from engaging in healthy life events.</p> <p><i>"...Veterans may require leaving their home and attending face-to-face sessions as part of the therapeutic process."</i> [56, p. 291].</p>

Recommendations

A number of recommendations were identified to support the use of DH to deliver evidence-based psychotherapy to this population. Key recommendations included: 1) identify and manage technological issues that may impede the use of digital health [25, 66], 2) supplement

interventions to increase patient comfort [54, 75], 3) consider ways to establish and maintain rapport and trust [62, 70], 4) be flexible and provide additional supports as needed to facilitate progress and commitment to therapy [53,62,76], 5) review previously established standards and practices of delivering certain psychotherapeutic interventions to improve suitability for digital delivery [54, 76], 6) address risk and safety issues [66], 7) understand and accommodate for demographic factors that can influence the client experience of clients using digital health [67, 77], and finally, 8) support therapists through training to promote their effective use and uptake of digital health [71, 78]. Specific findings related to these key themes are presented in Table 5.

Table 5: Recommendations from all studies

Themes and Subthemes	Findings
3. <i>Recommendations</i>	
3.1 <i>Technological issues that may impede use of digital health solutions need to be identified and addressed</i>	<p>Backups for IT disruptions. Service providers need alternatives in place if connectivity issues arise that cannot be resolved through technical assistance from a clinician or technical expert <i>"If the audio quality remained poor, then the therapist and participant muted their webcams and spoke to each other through the telephone while still using the video feature"</i> [25 p. 509].</p> <p>Secure assessments. Secure methods of distributing and collecting assessments and homework assignments need to be considered. <i>"Several modifications were also required for sharing homework and study handouts ...such as use of screenshots of homework and handouts and holding handouts up to the camera."</i> [66, p. 882].</p>
3.2 <i>Providers can supplement interventions with pre-treatment strategies or peer support to increase patients comfort with receiving psychotherapy using digital health platforms</i>	<p>Pre-treatment strategies can help with preparation for therapy and support participants' use of digital health. <i>"...the present study incorporated many of the recommendations from Gros and colleagues' 2013 review, including the preparation session with a walkthrough and testing of the technology, possibly improving the likelihood of acceptance of and satisfaction with telehealth as a result."</i> [75, p. 54].</p> <p>Peer assistance can support Veterans in becoming more open to digital health and play a role in accomplishing the more difficult aspects of treatment. <i>"...patients who have concerns related to safety or hesitate due to technical concerns may benefit from receiving assistance from a peer before deciding whether or not to try [home telemental health] HTMH"</i> [56, p. 16]. <i>"peer navigators" ...may be useful in helping patients to accomplish difficult aspects of treatment, such as in vivo exposure assignments."</i> [76, p. 51].</p>

<p>3.3 Providers need to consider ways in which rapport and trust can be established and maintained between therapists and clients when using digital health</p>	<p>Initial in-person meetings may help to facilitate rapport building for services delivered by digital health.</p> <p><i>"... simple changes may result in increased adherence to [prolonged exposure therapy] including... meeting the therapist in-person to increase connection and commitment to the treatment provider"</i> [62, p. 128].</p> <p>Rapport building. Providers should continue to be mindful about embedding ongoing opportunities within therapy to promote rapport building</p> <p><i>"...attention to the development and maintenance of mutually trusting relationships and continued assessment for comfort is recommended"</i> [70, p. 303].</p>
<p>3.4 Participants may require additional support and flexibility to support progress and commitment to therapy.</p>	<p>Flexible treatment delivery options and additional information prior to and during therapy, along with practical solutions to support engagement in digital health appointments, can help with progress and commitment to therapy.</p> <p><i>"...offering a hybrid, in-person + telemedicine option may be useful, and would empower patients to match the modality of treatment delivery to the stage of treatment they are completing."</i> [76, p. 50].</p> <p><i>"... participants reporting that they would have liked to have known more before starting the therapy to better prepare....Many participants said the workbooks and additional information given to them between sessions were beneficial."</i> [53, p. 5].</p> <p><i>"...simple changes may result in increased adherence to [prolonged exposure therapy], including using smart-phone calendar reminders; using personal rather than VA-issued smart-phones..."</i> [62, p. 128].</p>
<p>3.5 Previously established standards and practices of delivering certain psychotherapeutic interventions need to be analyzed to improve suitability for digital health</p>	<p>Pace of Treatment. Due to the independent nature of psychotherapeutic interventions delivered via digital health, there may be a need to alter pace of treatment.</p> <p><i>"...increased hyper-vigilance symptoms in telemedicine vs. in-person PTSD treatment groups, may suggest a need for clinical and administrative modifications to the standard exposure therapy protocol when delivered via telemedicine"</i> [76,, p. 50].</p> <p>Variable intervention delivery. To reduce likelihood of dropping out of therapy due to temporary symptom exacerbation from exposure exercises, intervention delivery may need to be adjusted (massing sessions at beginning until benefits are experienced) or adjunct with additional cognitive restructuring exercises or education</p> <p><i>"...treatment-interfering cognitions, such as negative treatment expectancies, may need to be addressed with cognitive restructuring in the early stages of treatment"</i> [55, p. 6].</p> <p>Addressing avoidance. In patients where digital health may be reinforcing avoidance behaviours, additional education and</p>

	<p>discussion to address avoidance behaviours may be warranted. Peer support and encouragement during in-vivo exposure exercises may help to reduce dropout rate</p> <p><i>"Veterans engaged in [Clinical Video Technology] CVT-delivered PE or [Cognitive Processing Therapy] may need additional education about the role of avoidance in symptom maintenance and frank discussion about How the CVT modality may be reinforcing avoidance" [55, p. 6].</i></p>
<p>3.6 Providers need to consider risk and safety of clients due to the remote and independent nature of digital health</p>	<p>Safety planning. Using workable safety standards and planning (including baseline risk assessment, ongoing monitoring of level of risk, obtaining contact information regarding client's choice of emergency contact prior to treatment) can facilitate the safe delivery of mental health care to clients in their homes</p> <p><i>"All participants completed a release of information form so that a contact person, of their choice, could assist in case of clinical emergency. The requirements and processes for engaging with third parties were disclosed and discussed during the informed consent process" [66, p.881].</i></p>
<p>3.7 There is a need to recognize and build an understanding of demographic factors (race, gender, age etc.) that could influence the experience of clients using digital health</p>	<p>Demographic considerations. Recognizing the differences in race and ethnic background for clients should be a priority.</p> <p><i>"Maintaining an understanding of racial obstacles and facilitators in seeking support and continuing follow-up care will be increasingly essential as the military population continues to experience post-traumatic stress related to combat experiences" [67, p.487].</i></p> <p>Gender, age and related roles may impact an individual's preference and capacity to receive interventions via digital health; considerations around this should be discussed and reviewed with clients.</p> <p><i>"...the effects of age on modality preference among women may reflect barriers to in-office care that uniquely affect the middle-aged and older female populations (e.g., responsibility for caring for both older and younger family members, which may make it more difficult to attend office-based appointments)." [77, p.690].</i></p> <p><i>"Younger women may be more likely to have young children in the home, which may require active caregiving during treatment sessions...Therefore, [office based treatment] may offer a neutral setting where younger women can receive more private care with fewer distractions." [77, p.690].</i></p>
<p>3.8 Therapists need to be supported through training to</p>	<p>Train providers. It is important to support the training of more therapists across a variety of different settings to use digital health to meet the diverse needs of this population.</p> <p><i>"Given the high amount of turnover and transition among providers</i></p>

<p><i>promote effective use and uptake of digital health.</i></p>	<p><i>within and between deployments, it is imperative that all providers using [clinical videoconferencing] technology be briefed prior to, or at the beginning of, deployment" [78, p. 386].</i></p> <p><i>"...having multiple providers who can offer [Video To Home] decreases burden of trying to meet diverse needs with only one or two designated providers" [71, p.6].</i></p>
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Discussion

This review sought to explore, synthesize, and evaluate the available peer-reviewed research regarding needs, gaps, barriers, and facilitators for safe DH delivery of trauma-focused psychotherapy for MMs, Veterans, and/or PSP who had a primary diagnosis of PTSD or a stress-related mental health disorder. The review is important and timely given the current COVID-19 pandemic, the concomitant need for physical distancing, as well as the ongoing need to support those in rural and remote locations including in theatres of operations or war. There is an urgent need to ensure that digital MH services are accessible, effective, safe and secure.

Efficacy of DH Delivery of Trauma-Therapies

Overall, there was encouraging support for the use of DH to facilitate the treatment of trauma-related MH problems among MMs and Veterans. The majority of studies included in this review indicated that DH was as effective as in-person delivery of psychotherapeutic interventions (CPT, PE, and BA-TE) at clinically and statistically significantly reducing PTSD and depressive symptomatology among MMs and Veterans with MH challenges (Table 1). DH engagement was not rated by clients as inferior to in-person therapy when it came to building a relationship with their clinician [65]. Interestingly, within the included studies baseline variables, such as age, gender, education level, employment status, and relationship status, did not appear to correlate with the effectiveness of the psychotherapeutic intervention or the modality of which it was delivered [63, 71, 79]. While results regarding adherence to therapy and dropout varied throughout the studies; the modality of therapy delivery (DH or in-person) did not appear to be a predictor of adherence or dropout.

Importantly, published work confirms that DH can improve access to treatment in this population due to a combination of reasons including convenience, cost savings, reduced stigma and comfort and safety of the home environment. We also note that some studies may have included a selection bias by including participants who were already accepting of the idea of remote delivery of services. In the end, personalization and flexibility of therapy, with attention to multiple overlapping facilitators and barriers, may be required.

Quality of the Evidence

The quality of the evidence of the studies included in this review was variable and required a review of multiple quantitative, qualitative, and mixed-method methodologies which made data comparisons challenging. The quality of the RCTs included in this study had PEDro scores ranging from "fair" to "excellent" with the majority of the studies rated as "good" quality (Table 1). Increased sample sizes within the RCTs would contribute to larger effect sizes and stronger conclusions regarding the efficacy of DH psychotherapeutic interventions for this population. Although CPT, PE, and BA-TE were rated as Level 1a for evidence (Table 2) there was a

multitude of different outcome measures utilized across all studies which would make it challenging to further complete meta-analyses with conclusive comparisons. The Levels of Evidence for utilization of DH CBT scored, “conflicting,” and noted variation in results, and a lack of consensus. This finding is similar to other published evidence-based literature focusing on generalized trauma-affected populations [80]. The CASP qualitative checklist purposefully does not result in a score for those assessed studies; however, this tool demonstrated that the qualitative studies were of sound methodology and added a valuable contribution to the literature. Lastly, the literature-base is relatively new and as such, it is still fundamentally limited with studies predominantly focussing on 3 therapeutic modalities: PE, CPT, and CBT interventions. Other efficacious psychotherapeutic interventions would benefit from study with MMs, Veterans, and/or PSP.

Facilitators, Barriers, and Recommendations

Facilitators, barriers and recommendations reported in the literature (Table 3, 4, 5) offer the clinical and research community insights into ways to respond to the urgent need to research and remotely deliver MH services. Particularly, identified facilitators need to be maximized, barriers overcome and recommendations implemented for DH to be best used in practice. Doing so will require policy and practice, as well as system change. As DH delivery can result in more timely help-seeking behaviour by MMs, Veterans and/or PSP, it would be beneficial for more MH clinicians and MH clinics to incorporate DH delivery options as one of several modes of service delivery routinely available to clients [29, 31]. This may involve complimenting in-person with digital service delivery and varying hours of access to services beyond traditional clinical hours of operation. Doing so would necessitate that MH clinicians and clients have appropriate technologies, access to systems and supports, and that strategies and policies be put in place to ensure connectivity, privacy, security and confidentiality [71].

Providing immediate support to MMs, Veterans and PSP through digital means, particularly when they are contending with operational stresses and trauma, may reduce the acute and long-term impacts on MMs, Veterans and PSP themselves, as well as on their teams, organizations and families [65, 70]. Digitally connecting MH clinicians and remotely or rurally-located clients can result in MMs, Veterans and PSP receiving support and services that they might not receive otherwise [57, 29, 31].

The benefits of timely and responsive interventions can reach beyond the individual and into family, organization and community life [70]. This can positively impact wellbeing, operational readiness, and pandemic response. It can also potentially better serve those who might not otherwise seek treatment such as disadvantaged or minority groups, or those for examples who have experienced sexual trauma or operational stress injuries [55-57, 65, 67].

While the literature regarding the use of DH to deliver trauma-therapies is encouraging, some specific concerns regarding remote delivery warrant consideration. Receiving therapy in one's home, for example, may increase the likelihood of MMs, Veterans and PSP avoiding traumatic cues and/or engaging in avoidance behaviors, although this may be more of a dialectic than an actual impediment. That being said, starting with DH may enable those who would otherwise find it difficult to engage and face their anxieties to actually do so. This may be analogous to the difference between flooding and gradual systematic desensitization, where DH may represent a first step for some clients towards challenging more difficult avoidance behaviors outside the home environment. Similar to the risk management strategies required for in-person service delivery with MMs, Veterans and PSP who are at increased risk of self-harm, violence, and

suicidality, safeguards need to be implemented when using DH delivered psychotherapeutic interventions. It is important to note that the reviewed literature does not indicate a heightened risk of suicide per se associated with DH interventions. Consequently, while safety planning is as important for DH as it is for in-person therapy, suicide risk should not automatically preclude digital delivery of MH interventions [81]. Finally, not all patients benefit equally from DH interventions. While engaging in therapy at home can be a facilitator for certain clients, some may experience traumatic cues, interruptions, be concerned about privacy or have discomfort in revealing their home environment to the therapist [62]. This speaks to the importance of determining the right therapy and mode of delivery for the right person at the right time.

Although this scoping review was specific to digital health interventions specific to MM, Veterans, and PSP, it may also assist with informing clinicians and researchers on the use of digital health in the general civilian population. As well, it will add to the growing body of literature exploring digital health utilization for other conditions (i.e. substance use, anxiety, depression, dual-diagnosis, schizophrenia, cancer, chronic pain)

Knowledge Gaps and Future Research

With DH interventions being of relatively recent necessity as a result of the COVID-19 pandemic, this review highlights key gaps in the peer-reviewed literature and areas requiring future research. With regard to user factors, there is a paucity of research (i.e., only 3 identified studies) related specifically to PSP, emphasizing the need for further study of DH use with this population. As well, the majority of studies were conducted in the US, pointing to the need for future studies to be conducted with MMs, Veterans and/or PSP from other international jurisdictions. Further work is also needed not only regarding the impact of demographic and contextual factors but on the client's stage of treatment, level of functioning, illness severity, attachment style and comorbidities. How common comorbidities, such as depression, personality disorders, or dissociation impact engagement or outcomes in DH is also yet unknown. For example, some patients require more co-regulation in session with the therapist, and there is little information about how DH delivery might impact this process.

Factors specific to MH clinicians also warrant further study. This includes consideration of their attitudes, technology acceptance, and usability of DH. As well, little is known about clinicians' concerns about the impact of DH on safety, risk management, and control of the therapeutic situation. It is currently unclear whether or not a clinician's comfort and belief in the efficacy of DH interventions has a similar influence on therapeutic outcome. It is also important to understand the training and support needs of clinicians to adapt previous in-person interventions to DH delivery formats. There are also practical aspects to consider regarding the delivery of therapy via DH. For example, it is currently not well known how the prolonged use of video conferencing technologies impacts a clinician's level of fatigue, attention and level of engagement throughout a session.

Therapeutic factors associated with the use of DH also warrant further investigation. This includes factors associated with establishing and maintaining the therapeutic relationship between the clinician and client, to those around safety and containment. Similarly, types of treatments that lend themselves better to digital delivery need to be determined and studied. Some therapeutic modalities, for example, are more dependent on in-person therapeutic relational factors (e.g., the ability to read body language), and others involve experiential activities that may prove difficult to duplicate in a remote delivery context, particularly in the

absence of secure platforms to facilitate homework and other barriers. CBT and DH delivery for MMs, Veterans, and PSP also subsequently warrants additional high-quality research to address the current conflict in the literature. Further, the use of DH for the delivery of group-based interventions also warrants further study, specifically as it relates to group dynamics, privacy and stigma, and particularly given the benefits and cost-efficacy of group interventions. Future research into individualization of DH therapy, with attention to multiple facilitators and barriers, is required. Finally, on macro-level, further research is needed as to how to best address systemic issues such as health system policies and medicolegal issues that may present as barriers to DH for healthcare organizations, administrators, managers, MH clinicians, and, therefore, the clients they serve.

Strengths and Limitations

Significant efforts were made to ensure the rigour and quality of the review. Notably, it was performed following *a priori* and detailed procedures with increased attention to ensuring quality control and reducing bias [41, 42]. Further, the search strategy was extensive and included 5 databases. Inclusion and exclusion criteria were determined before study onset and adhered to throughout. Appropriate calibration and pilot testing, use of at least two independent reviewers for all stages of the process, additional verification of extracted data, and group discussion of conflicts improved the quality of the review.

The authors also acknowledge several limitations of this review. First, the review specifically selected for articles focusing on MMs, Veterans, and/or PSP who had a primary diagnosis of PTSD or a stress-related mental health disorder. Thus, there may be additional informative literature that focuses on other populations. Third, with an imposed date limit, it is possible that quality studies published before 2010 may have missed; however, with the rapid speed of advancement in DH, technology, access to technology, and quality of it is likely that. Finally, there are limits to aggregate data.

Conclusion

In light of COVID-19, research regarding the remote delivery of trauma-therapies for MMs, Veterans and PSP is no longer simply novel, but a real-world necessity. As well as during times of physical-distancing, DH is a mode of delivering psychotherapeutic interventions for those who are in remote locations including rural areas or during tactical and operational deployment. Despite some promising evidence in currently published literature, healthcare organizations and MH clinicians should continue to proceed cautiously with remote delivery of psychotherapeutic trauma-therapies as much research is still needed to address the “digital divide” for among trauma-affected MMs, Veterans and/or PSP. This systematic scoping review included 38 studies researching factors related to the use of DH to deliver psychotherapeutic interventions for MMs, Veterans, and/or PSP affected by trauma. Evidence for the effectiveness of digital delivery of PE, CPT, and BA-TE to MMs, Veterans and PSP was rated Level 1a, while evidence for CBT was conflicting. The narrative synthesis suggests that DH delivery of these therapies can be as effective as in-person delivery; for some, it may increase access, reduce stigma, and facilitate engagement with MH clinicians. Issues of risk, safety, privacy and security, DH modality, clinician factors, and barriers to DH need to be researched further as does the potential for additional trauma-therapies, including ART, ADT, and EMDR, to be suitable for digital delivery. Further elucidation is also needed for gender, racial and cultural factors that may create differences in client outcomes, preferences, and needs. Professional organizations are likely to need to invest in training for clinicians, guidelines for DH delivery of trauma-

therapies, ethical and medicolegal guidance, and assistance for adapting to the DH environment.

Acknowledgements

The authors wish to thank the Canadian Institute of Health Research (CIHR) for funding support provided through the Knowledge Synthesis: COVID-19 in Mental Health & Substance Use grant competition.

Abbreviations

ART - Accelerated Resolution Therapy
ASI - Addiction Severity Index
AUDIT - Alcohol Use Disorder Identification Test
BA - Behavioral Activation
BA-TE - Behavioral Activation and Therapeutic Exposure
BAI - Beck's Anxiety Inventory
BDI-II Beck's Depression Inventory version 2
BETPS - Barriers to Exposure Therapy Participation Scale
B-IPF - Brief Inventory of Psychosocial Functioning
BRSS - Burns Relationship Satisfaction Scale
CAF - Canadian Armed Forces
CAPS/CAPS5 - Clinically Administered PTSD Scale
CASP - Critical Skills Appraisal Program
CIHR - Canadian Institute for Health Research
CBT - Cognitive Behavioral Therapy
CBT-C - Cognitive Behavioral Therapy - Cognitive only
CPOSS-VA - Charleston Psychiatric Outpatient Satisfaction Scale-VA version
CPT - Cognitive Processing Therapy
CSQ - Client Satisfaction Questionnaire
CVT - Clinical Video Technology
DAR 5 - Dimensions of Anger Reactions
DASS - Depression Anxiety and Stress Scale
DBT - Dialectical Behavioural Therapy
DH - Digital Health
DSM-5 - Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
ECS - Exercise Confidence Survey
EES - Eating Efficiency Scale
ETO - Expectancy of Treatment Outcome
EMDR - Eye Movement Desensitization and Reconsolidation
GAD-7 - Generalized Anxiety Disorder Scale
GTAS - Group Therapy Alliance Scale
HAM-A - Hamilton Anxiety Rating Scale
HBTMH - Home Based Tele-Mental Health
HSC - Hopkins Symptom Checklist
HSEA - HELP Self-Efficacy Assessment
HTMH - Home Tele-Mental Health
IT - Information Technology
IIRS - Illness Intrusiveness Ratings Scale
LEC - Life Events Checklist
MADRS - Montgomery-Asberg Depression Rating Scale

MH - Mental Health
MI - Moral Injury
MINI - Mini-International Neuropsychiatric Interview
MMs - Military Members
MST - Military Sexual Trauma
NATO - North Atlantic Treaty Organization
NH - Native Hawaiian
OIF - Operation Iraqi Freedom
OEF - Operation Enduring Freedom
OQ-45 - Outcome Questionnaire 45
PASS - Perceptions about Services Scale
PCL-5 - PTSD Checklist for DSM-5
PCL-M PTSD Checklist for Military
PDS - Posttraumatic Diagnostic Scale
PE - Prolonged Exposure Therapy
PEDro - Physiotherapy Evidence Database
PHSS - Patient Health Satisfaction Survey
PI - Pacific Islander
PICOS - Population, Intervention, Comparison, Outcome, Study Type
PRIME MD - Primary Care Evaluation of Mental Disorders
PSP - Public Safety Personnel
PSQI - Pittsburgh Sleep Quality Index
PTSD - Post-Traumatic Stress Disorder
PTSI - Post-Traumatic Stress Injury
R-DAS - Revised Dyadic Adjustment Scale
RCT - Randomized Controlled Trial
SCID-IV - Structured Clinical Interview for the DSM-IV
SDPQ - Service Delivery Perceptions Questionnaire
SF-36 - 36 item Short Form Health Survey
SFV-12 - Veterans' SF-12 Health Survey
SFQ - Sexual Functioning Questionnaire
SOP - Suicide Assessment and Risk Management Standard Operation Procedure
STAR - STAR Scale to Access Therapeutic Relationships in Community Mental Health Care
STAXI-2 - State-trait Anger Expression Inventory 2
TAPs Trauma-Affected populations
TAQ - Telehealth Attitudes Questionnaire
TEQ - Treatment Expectancy Questionnaire
TLFB - Timeline Followback
TSAS - Telemedicine Satisfaction and Acceptance Scale
TSC - Treatment Session Checklist
TSF - Treatment Satisfaction Form
UK - United Kingdom
US - United States of America
VAC - Veteran Affairs Canada
VAMC - Veterans Affairs Medical Center
VHA mTH PSQ - VHA mTH Patient Satisfaction Questionnaire
VHA mTH - VHA Mobile Telehealth Questionnaire
VR - Virtual Reality
WAI - Working Alliance Inventory

WAI-SF - Working Alliance Inventory Short Form
ZBI - Zarit Burden Interview-short version

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Supplementary Materials

Appendix A: Detailed Search Strategy

Appendix B: Detailed Descriptive Analysis

Supplementary Files

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