Virtual Trauma Therapy for Individuals with Suicidal Ideation

by

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Abstract

Suicide is a serious public health issue resulting in high mortality rates around the world. Trauma and adversity are strongly correlated with suicidal thoughts and behaviours. Memories associated with past trauma can contribute to significant distress in the present, creating a desire to escape through suicide. Trauma therapies may be used to reduce suicidality by helping individuals to process past trauma. However, many clinicians are hesitant to deliver trauma therapy for individuals with suicidal ideation (SI) due to a fear of worsening suicidality. Furthermore, social distancing restrictions during the COVID-19 pandemic have led many clinicians to deliver therapy remotely, although concerns exist regarding the safety and efficacy of virtual psychotherapy. The overall objective of this research was to investigate the effect of trauma therapy for individuals with SI in a virtual care context.

Chapter 1 provides a general introduction to suicide, trauma, and psychotherapy. Chapter 2 consists of a scoping review which explores gaps in the literature on trauma focused psychotherapy for individuals with SI. Chapter 3 consists of a literature review on the strengths and weaknesses of virtual psychotherapy. Chapter 4 presents the protocol for a randomized controlled trial (RCT) investigating the safety and efficacy of a trauma therapy for adults with SI, delivered virtually due to the COVID-19 pandemic. Chapter 5 discusses preliminary findings associated with this RCT. Chapter 6 presents a discussion of the current problems associated with suicide prediction and prevention, as well as potential solutions. Chapter 7 summarizes key research findings and discusses potential future research directions

The major findings of this research are that despite concerns among clinicians about worsening suicidality associated with trauma focused psychotherapy, the literature indicates that trauma focused psychotherapy does not appear to increase suicide risk, although some caveats apply due to the heterogeneity of the study populations, study conditions, TFT interventions, and outcomes. Furthermore, while effectiveness and acceptability of virtual psychotherapy are the main aspects of healthcare quality studied in the literature, significant gaps remain with regard to accessibility, appropriateness, efficiency, and safety. In the current RCT investigating the safety and efficacy of a virtually delivered trauma therapy for adults with SI, the sample size enrolled precludes quantitative analysis. A larger sample size may help to generate results that support the use of this virtual trauma therapy as a safe and effective treatment for adults with SI. While virtual trauma therapy may be a crucial part of the solution to suicide prevention, this research also highlights the importance of a public health approach to suicide prevention, involving a focus on social determinants of health and early life trauma.

Preface

This thesis is an original work by Raman Kaur Dhaliwal. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board: “RCT investigating EMDR for suicidal ideation” (ID: Pro00090989).

Chapter 2 of this thesis involves collaboration with Dr. Olga Winkler, Dr. Lisa Burback, Dr. Andrew Greenshaw, Dr. Lorraine Smith-MacDonald, Matthew Reeson, Taylor Erick, Kelly Hartle, Ethan Chow, George Vouronikos, Nicole Antunes, Tyler Marshall, Megan Kennedy, and Liz Dennett. I was responsible for data curation and review and revision of the manuscript.

Chapter 3 of this thesis involves collaboration with Dr. Olga Winkler, Dr. Lisa Burback, Dr. Andrew Greenshaw, Sidney Yap, Fernanda Talarico, Huda F Al-Shamali, Robert Mcweeny, Matthew Reeson, Reham Shalaby, Teresa Chen, Elena Spronk, Rayven Snodgrass, Eileen Ty, Taylor Erick, Tyler Marshall, and Megan Kennedy. I was responsible for conceptualization and methodology, data curation, drafting of the original manuscript, and review and revision of the manuscript.

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Chapter 1 Introduction

1.1 Epidemiology of Suicide

Every year, over 700,000 people die due to suicide, resulting in a global suicide rate of 9.0 per 100,000, exceeding global deaths attributed to breast cancer, malaria, or HIV/AIDS (World Health Organization [WHO], 2021b). Among individuals aged 10-29 years, suicide is second leading cause of death (Public Health Agency of Canada, 2018). The World Health Organization (WHO) has identified a previous suicide attempt to be the strongest predictor of suicide in the general population (WHO, 2021a). The SAD PERSONS Scale (SPS), a suicide risk assessment tool developed for medical professionals, identifies a variety of suicide risk factors, including male sex, age (<19 or >45 years), depression, previous attempt, excess alcohol or substance use, rational thinking loss, lack of social supports, organized plan, no spouse, and sickness (Patterson et al.,1983). Additional suicide risk factors include trauma and adverse childhood experiences (ACEs), as discussed below (Dube et al., 2001). Certain vulnerable groups experience disproportionately high rates of suicide deaths compared to the general population, including Indigenous peoples, military members and veterans, LGBTQ+ populations, elderly individuals, and men (Conwell & Thompson, 2008; Hoge & Castro, 2012; Struszczyk & Galdas, 2019; WHO, 2021a).

1.2 Failure to Bend the Curve

Although focus on suicide prevention has increased over the years, very little progress has been made in terms of decreasing suicide rates. From 1999 to 2017, the suicide mortality rate in the United States increased by 33% from 10.5 to 14.0 per 100,000 (Hedegaard et al., 2018).

While many attempts have been made to improve care for those within the mental health care system, it is important to note that over half of individuals with mental illnesses remain untreated and those who die from suicide rarely receive specialty mental health care (Hogan & Grumet, 2016; Wang et al., 2005). Currently, suicide is solely addressed through a medical model, but it is becoming clear that the scope of mental health care must be expanded to involve a public health approach.

Digital or remote access to therapy may be an important aspect of this public health approach. Although several concerns exist about the safety and efficacy of online therapy, many have found it to be more convenient and acceptable than in person therapy (Jones et al., 2020). Online psychotherapy has the potential to significantly improve accessibility for individuals who usually have difficulties getting in contact with the mental health care system, such as those who are experiencing mobility issues or living in remote regions. Furthermore, technology can be used to yield data on social determinants of mental health, monitor mental health, and coordinate timely care when mental health crises arise. In this way, a public health approach to suicide combined with technology can help to connect individuals with meaningful supports and potentially bend the suicide curve downwards (Gordon et al., 2020).

1.3 Suicide and Mental Illness

A large majority of suicides around the world are strongly associated with mental illness, such as mood disorders, substance use disorders, psychotic disorders, personality disorders, and posttraumatic stress disorder (PTSD), accounting for rates at least 10 times as high as in the general population (Bachmann, 2018). Suicide risk estimates are 6% for affective disorder, 7% for alcohol dependence, and 4% for schizophrenia (Inskip et al., 1998). Mental disorders that

most strongly predict a subsequent suicide attempt include bipolar disorder, posttraumatic stress disorder (PTSD), and major depressive disorder (MDD) (Nock et al., 2009). Individuals with PTSD are twice as likely to die by suicide compared to individuals without PTSD (Fox et al., 2021). Personality disorders have been found to increase lifetime risk of a suicide attempt by three times (Bolton & Robinson, 2010). For example, suicide deaths occur in up to 10% of individuals with borderline personality disorder (BPD) (Paris & Zweig-Frank, 2001). Research indicates a powerful relationship between dissociation and suicidal behaviour, as the risk of multiple attempted suicides is significantly increased with dissociative disorder diagnoses (Foote et al., 2008).

1.4 Trauma, Mental Illness and Suicide

Evidence indicates that adversity and trauma are strongly associated with suicidal thoughts and behaviours (Dube et al., 2001). Trauma can be defined as "experiences that overwhelm an individual's capacity to cope" (BC Provincial Mental Health and Substance Use Planning Council, 2013). Adverse childhood experiences (ACEs), including emotional, physical, and sexual abuse; household substance abuse, mental illness, and incarceration; and parental domestic violence, separation, or divorce, have been found to increase the risk of attempted suicide by two to five times (Dube et al., 2001). Trauma in childhood is connected to the development of various mental disorders, including posttraumatic stress disorder (PTSD), major depressive disorder (MDD), generalized anxiety disorder (GAD), bipolar disorder, panic disorder, substance use disorder (SUD), borderline personality disorder (BPD), dissociative disorders, and psychosis (Afifi et al., 2008, Schalinski et al., 2016; Varese et al., 2012; Wisdom

et al., 2009). As mentioned above, suicide risk is elevated with many of these mental disorders (Baldessarini & Tondo, 2020).

Early exposure to adversity and trauma is thought to have adverse effects on brain development, which increases risk of psychopathology (Herzog & Schmahl, 2018). ACEs are associated with structural and functional changes in certain brain regions, including the hippocampus and amygdala, and can lead to alterations in stress sensitivity and emotion regulation (Herzog & Schmahl, 2018). Individuals who are exposed to trauma in early life are more likely to exhibit poor impulse control, attention difficulties, self-harm, risky sexual behaviour, and substance use (Ford, 2005). These neurobiological and psychological changes play a role in the development of mental disorders and suicidality later in life (Dvir et al., 2014). The link between trauma exposure and development of mental disorders also exists for trauma experienced in adulthood, although to a lesser extent because children are more vulnerable to adverse brain development than adults (Bremner & Vermetten, 2001; Zlotnick et al., 2008).

1.5 Impact of Psychotherapy on Suicide

Use of psychotherapy for patients at risk of suicide leads to reductions in suicidal ideation and suicide attempts (Calati & Courtet; 2016; Calati et al., 2018; Méndez-Bustos et al., 2019). A recent meta-analysis found that individuals receiving psychotherapy were less likely to attempt suicide at follow-up compared to individuals receiving usual care such as psychotropic treatment alone (Calati & Courtet, 2016). Common psychotherapies include Dialectical Behaviour Therapy (DBT), Cognitive Behavioural Therapy (CBT), and Interpersonal Therapy (IPT) (Méndez-Bustos et al., 2019), which are often used in patients with diagnoses of BPD and MDD (Méndez-Bustos et al., 2019). These psychotherapy modalities may decrease suicidality by modifying

maladaptive cognitions that contribute to suicidal thoughts and behaviours, such as hopelessness and entrapment, or teaching coping strategies and problem-solving techniques (Bryan, 2019; Schneider, 2012).

Some conceptualize suicide as an avoidance-based strategy to escape from painful psychological states (Joiner, 2005; Shneidman, 1993). Memories associated with past trauma can contribute to the generation of strong emotional and behavioral reactions in the present (Center for Substance Abuse Treatment, 2014). Trauma therapies, such as Prolonged Exposure (PE), Cognitive Processing Therapy (CPT), Trauma-Focused Cognitive Behavioral Therapy (TF-CBT), and Eye Movement Desensitization and Reprocessing (EMDR), may help to reduce suicidality by using different cognitive, emotional, behavioral, or sensory techniques to help individuals process symptoms of past trauma (Bryan, 2016a; Watkins et al., 2018). These therapies work by modifying beliefs, emotions, sensations, or behavioral urges that are associated with memories of past trauma, so that these memories are no longer distressing and do not cause disturbances in an individual's daily functioning (American Psychological Association, 2020; Watkins et al., 2018).

Practice guidelines based on expert opinion recommend caution with the use of trauma therapies for patients with acutely elevated suicide risk, defined as "suicidal ideation with moderate or higher intent to die, the presence of a suicide plan, and/or the incidence of a suicide attempt in the past 3 months" (Bryan, 2016a; Courtois & Ford, 2009; Department of Veterans Affairs and Department of Defense, 2010; Herman, 1992; Linehan, 1993). Experts advise a phased approach involving stabilization before attempting trauma-focused psychotherapy, which involves processing of traumatic memories (Cloitre et al., 2012a). This causes hesitation among clinicians to provide trauma therapy for patients with suicidal ideation (SI), even when there is

no suicidal intent or plan, due to the belief that it would lead to problems such as destabilization and worsening suicidality.

However, recent evidence shows that delivering trauma therapy to patients with suicidal ideation can be effective, leading to improvements in suicidality among high suicidal risk populations with PTSD, BPD, and MDD, and even among those experiencing acute mental health crises (Cox et al., 2016; Fereidouni et al., 2019; Gradus et al., 2013; Harned et al., 2012; Proudlock & Peris, 2020). Although there is sometimes an exacerbation of trauma symptoms and suicidal ideation during the initial stages of trauma therapy, this is often transient and has not been found to impact the overall improvement of symptoms during the course of trauma therapy (Larsen et al., 2020, Tripp et al., 2021). While it may be safe to deliver trauma therapy to patients with SI, the literature suggests that more complex suicidal populations, such as those with severe dissociative symptoms, repeated or early childhood trauma, complex PTSD, or severe emotion dysregulation, may require extensive stabilization and improvement of emotion regulation skills prior to processing of trauma (Cloitre et al., 2012b).

1.6 Virtual Psychotherapy

The need to improve psychotherapy options for suicidality and access to mental health services generally has become more urgent because of the potential mental health consequences of the current COVID-19 pandemic. Efforts to control the spread of infection, including physical distancing guidelines, stay-at-home orders, travel restrictions, and closures of schools, restaurants, and public recreation facilities, have been met with concern regarding the exacerbation of suicide risk factors, such as depression, PTSD, substance abuse, domestic violence, and unemployment (Government of Alberta, 2021; John et al, 2020). Although the

literature indicates that suicide death rates have not yet increased, rates of suicidal ideation during the pandemic are found to be higher than rates prior to the pandemic (Farooq et al., 2021; Pirkis et al., 2021). It has been suggested that impact of the COVID-19 pandemic on suicide risk factors and suicidal ideation may lead to a delayed increase in suicide rates, necessitating a need for improvement in mental health services (Botchway & Fazel., 2021).

The need to comply with physical distancing restrictions during the COVID-19 pandemic, along with the increased demand for mental health services, has forced a shift from in-person psychotherapy to remotely-delivered psychotherapy (Liu et al., 2020b). With this abrupt shift, concerns have been voiced regarding the safety and effectiveness of remotely-delivered psychotherapy. Clinicians may be especially hesitant to deliver virtual trauma therapy due to the paucity of research on safety in this area.

Recent studies show that digital delivery of trauma focused psychotherapy can be as effective as in-person delivery in terms of reducing PTSD and depressive symptomatology and facilitating engagement with mental health clinicians, while offering additional benefits such as improving access and reducing stigma and cost (Jones et al., 2020). However, issues related to safety, risk, privacy, and security have not been fully addressed (Jones et al., 2020). Little is known about potential harm in terms of suicidality, as well as mental health clinicians' concerns about risk management (Jones et al., 2020). While cognitive based therapies, such as Cognitive Behavioral Therapy (CBT) and Cognitive Processing Therapy (CPT), have been extensively studied in the literature, less research has been conducted on other psychotherapies such as Dialectical Behavior Therapy (DBT) and Eye Movement Desensitization and Reprocessing (EMDR) (David et al., 2018).

1.7 Research Objectives

The focus of this thesis is trauma therapy for individuals with suicidal ideation in a virtual care context. Given the rapid shift to virtual delivery of mental health services during the COVID-19 pandemic and the hesitation among clinicians to deliver trauma therapy for individuals with SI, there is a need for research to be conducted in this area. My work will explore gaps in the literature regarding trauma focused psychotherapy for individuals with suicidal ideation, strengths and weaknesses of virtual psychotherapy, the safety and effectiveness of a virtual trauma therapy for adults with SI, and general problems with suicide prediction and prevention efforts.

This thesis is divided into seven chapters. Chapter Two consists of a review of the literature on the safety and efficacy of trauma focused psychotherapy for individuals with suicidal ideation. To address the clinical belief that trauma therapy may exacerbate suicidal ideation, this review will assess whether trauma focused psychotherapy has been shown to increase risk of suicide.

Chapter Three consists of a review of the literature on remotely-delivered psychotherapy. This scoping review features an analysis of the literature from a health quality perspective using the Alberta Quality Matrix of Health (HQM) (Health Quality Council of Alberta, 2017), a tool which organizes information related to the complexity of the healthcare system in terms of areas of need and dimensions of quality. This review will assess whether the literature on remotely-delivered psychotherapy addresses the six quality dimensions of the HQM: acceptability, accessibility, appropriateness, effectiveness, efficiency, and safety.

Chapter Four describes the protocol for a randomized controlled trial investigating the safety and effectiveness of EMDR, an evidence-based trauma therapy, for adults with suicidal

ideation, delivered virtually due to the COVID-19 pandemic. Inclusion and exclusion criteria, recruitment approaches, data collection and analysis procedures, safety procedures, and ethical considerations are outlined in this chapter, as well as a rationale and discussion on the topic.

Chapter Five reports preliminary findings related to the EMDR study, including changes in SI, emotional dysregulation, and symptoms of depression, anxiety, dissociation and PTSD. This chapter also reports on dropouts and adverse events, and the overall significance of the preliminary results.

Chapter Six presents a conceptual analysis on the current problems with suicidal prediction and prevention, as well as potential solutions, including machine-learning based risk algorithms and a reverse engineering approach to suicide prediction with a focus on trauma in early life.

Chapter Seven serves as a conclusion which summarizes key research findings within the context of virtual trauma-focused care for individuals with SI. The implications of this research along with potential future research directions will also be discussed.

Chapter 2 Trauma focused psychotherapy in patients with suicidal ideation: A scoping review

2.1 Abstract

Individuals with suicidal ideation are often excluded from trauma focused psychotherapy (TFT), and from related research trials, based on a belief that focusing on traumatic memories may exacerbate suicide risk. This review evaluated the scope of research on TFT with patients who have suicidal ideation.

Following PRISMA extension for Scoping Reviews guidelines, Medline, EMBASE, APA PsychInfo, and CINAHL were searched on March 18, 2021. Peer reviewed studies in English, reporting on safety and/or efficacy of TFT in patients with suicidal ideation or borderline personality disorder (BPD) were included without limit on study design or publication year. From 3,272 publications, 43 studies (all quantitative; no mixed-methods or qualitative articles) were included. Eighty one percent of studies were from the United States, Germany, or Netherlands, with 81% published within 10 years.

Utilized TFT predominantly included Prolonged Exposure, Eye Movement Desensitization and Reprocessing, Cognitive Processing Therapy, and other exposure-based interventions, alone or in combination with another TFT or non-TFT intervention. Approximately 50% of studies utilized intensive (two sessions or more per week) delivery of the intervention. Studies mainly focused on clinical improvement of mental health symptoms, rather than suicidality. TFT improved symptoms of posttraumatic stress disorder, Major Depression

and BPD. Suicidal ideation, suicide attempts, and non-suicidal self-injury generally improved with TFT, and there were no suicides reported across all studies in the TFT groups.

Despite a recent increase in research in this area, there remains a paucity of research on TFT in patients with suicidal ideation, possibly reflecting a belief that TFT may exacerbate suicidal ideation. The results of this review indicate that TFT, including intensive delivery, does not increase suicide risk. Due to methodological issues, further studies are needed to confirm this observation and to determine any increased risk for special patient subgroups or specific TFT interventions.

2.2 Introduction

Suicidality is a worldwide public health issue, causing approximately 700,000 deaths per year and resulting in a global suicide rate of 9.0 per 100,000 (World Health Organization, 2021b). The role of trauma and adversity as a risk factor in the development of suicidality is well documented (Dube et al., 2001; Afifi et al., 2008; 2009; 2016; Asgeirsdottir et al., 2018; Baldessarini & Tondo, 2020; de Araujo & Lara, 2016; Dube et al., 2001). Research on the effects of Adverse Childhood Experiences (ACEs) in the 1990s found that each additional item of childhood abuse or adversity on the 10-item ACE Scale increases the likelihood of later poor mental health outcomes, including suicidal ideation (SI) and suicide attempts (SAs) (Dube et al., 2001). In addition to predisposing to suicidality and suicide attempts, a growing body of evidence now indicates that early stressful and/or traumatic experiences are also associated with the development of a wide variety of psychiatric symptoms and disorders, including posttraumatic stress disorder (PTSD), mood and anxiety disorders (most commonly major

depressive disorder (MDD) and generalized anxiety disorder (GAD)), substance use disorders (SUDs), personality disorders such as borderline personality disorder (BPD), dissociative disorders, and psychosis (Afifi et al., 2008; 2009; Baldessarini & Tondo, 2020; Kisely et al., 2018). This also applies, to a lesser extent, to trauma experienced by adults (Carr et al., 2013; Walsh et al., 2017b). In addition to trauma being a common risk factor for later suicidality, suicidality is a common feature of many of these disorders (Baldessarini & Tondo, 2020).

Trauma focused therapies (TFTs) are psychotherapies that may target emotions, cognitions, sensations, imagery or other sensory perceptions, and/or action urges associated with explicit or implicit memories of past adversity. The most established and evidence supported TFTs include exposure-based therapies such as Prolonged Exposure (PE), Cognitive Processing Therapy (CPT), Trauma-focused Cognitive Behavior Therapy (TF-CBT), and Eye Movement Desensitization and Reprocessing (EMDR). TFTs are thought to work by activating the traumatic memory network and modifying these traumatic memories. Upon retrieval of a memory, it becomes temporarily labile and open to modification, and new contextual information added during therapy can be incorporated into the memory upon reconsolidation. TFTs also activate the fear circuitry, allowing for habituation and extinction of the fear response (Kida, 2019). This process often evokes intense negative emotion and distress at some point during treatment. TFTs, developed for PTSD, have been successfully utilized for the treatment of a range of mental disorders, including MDD, anxiety disorders, SUDs and chronic pain (Carletto et al., 2021; Scelles & Bulnes, 2021; Valiente-Gómez et al., 2017; Yan et al., 2021), indicating that addressing a risk factor such as traumatic memories may be an effective strategy for treatment beyond PTSD.

Given the distress involved in TFT, treating individuals with active suicidality and past trauma traditionally occurs in stages, with stabilization, acquisition of coping skills, and reduction of suicidality as prerequisites for delivery of TFT in this population. This approach is based on expert consensus and practice guidelines which recommend against TFT for acutely suicidal patients, regardless of the diagnosis (Cloitre et al., 2012a; Courtois & Ford, 2009; Herman, 1992; Linehan, 1993). As a result, clinicians are often hesitant to offer TFT for those with suicidal ideation. One study reported that in a sample of licensed psychologists, including those with expertise in TFT, 80% considered suicidal ideation and a history of suicide attempts to be a contraindication for the use of TFTs (Becker et al., 2004). Training programs for TFTs may also discourage working with those with suicidal ideation. The PE treatment manual (Foa et al., 2007) recommends that individuals at imminent risk of suicide and those who have attempted suicide or engaged in serious non-suicidal self-injury in the past 3 months should be excluded from treatment until these behaviors are sufficiently stabilized. These guidelines have also been adopted in most studies of PE therapy (Rauch et al., 2012).

Recent studies are challenging the notion that TFTs may destabilize patients with suicidal ideation. Some research suggests that trauma focused treatment of PTSD may in fact reduce suicidal ideation (Bryan et al., 2016b; Cox et al., 2016; Gradus et al., 2013; Norr et al., 2018; Resick et al., 2017; Smith et al., 2020; Stayton et al., 2019). Even among higher risk suicidal populations such as those in acute crisis, and those with BPD and MDD, emerging research has reported improvement in suicidality after TFT (Fereidouni et al., 2019; Harned et al., 2012; Proudlock & Peris, 2020). The objective of this scoping review was to map the currently available peer-reviewed research on the safety and efficacy of TFTs for persons experiencing

acute or chronic suicidal ideation. Proposed directions for future research in this field are also discussed.

2.3 Methods

2.3.1 Search strategy

This scoping review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews guidelines (Tricco et al., 2018) and was registered a priori with the Open Science Framework (Center for Open Science) on April 4, 2020. The review was driven by the question: *What is known from the literature about the safety and efficacy of using trauma specific psychotherapies in patients with acute or chronic suicidal ideation?*

The following bibliographic databases were searched from database inception until March 18, 2021: Medline (Ovid platform), EMBASE (OVID platform), APA PsycInfo (OVID platform), and CINAHL Plus with Full Text (EBSCOhost platform). The search strategy, developed in consultation with experienced medical librarians at the Scott Health Sciences Library at the University of Alberta, included controlled vocabulary and free-text terms without limit on study design, publication year, or trauma focused therapy. In this review, we searched for and included TFT modalities that focus on processing traumatic memories, although many other forms of psychotherapy can be helpful to patients with trauma. In addition to "suicide" and related terms, "borderline personality disorder" and "emotionally unstable personality disorder" were also used as a subject headings and keywords. These additional search terms served as

proxies for suicidal ideation because of the ubiquity of suicidal ideation and trauma in patients with borderline personality disorder and the high prevalence of these patients in clinical practice. The search strategy for MEDLINE was adapted for each database. The final search strategies for all databases can be found in Appendix A, along with the resultant number of citations generated for each database.

Medline Search Strategy

1. exp Suicide/
2. suicid*.mp.
3. Borderline Personality Disorder/
4. (borderline personality disorder or emotionally unstable personality disorder).mp.
5. (Emotion* regulation or emotion* dysregulation).mp.
6. (trauma adj5 (psychotherap* or treatment* or therap* or CBT)).mp.
7. exp Desensitization, Psychologic/
8. somatic experiencing.mp.
9. (cognitive processing therapy or CPT).mp.
10. (prolonged exposure or exposure therapy).mp.
11. sensorimotor psychotherapy.mp.
12. ("Eye movement*" or EMDR).mp.
13. "virtual reality".mp.
14. "accelerated resolution therapy".mp.

15. "imagery rehearsal therapy".mp.

16. or/6-15

17. 1 or 2 or 3 or 4 or 5

18. 17 and 16

2.3.2 Eligibility criteria

2.3.2.1 Inclusion criteria

Any peer-reviewed primary study investigating the safety and/or efficacy of TFT in populations including participants with acute or chronic suicidal ideation and/or borderline personality disorder were included. All age ranges were included. Eligible TFT interventions had to involve processing explicit and/or implicit traumatic memories.

The following trauma therapies were also explicitly included: CPT, TF-CBT, EMDR, Accelerated Resolution Therapy (ART), Image Rehearsal Therapy (IRT), and exposure therapies (which include PE, narrative exposure therapy (NET) and virtual reality exposure (VRE)). Somatic Experiencing and Sensorimotor Psychotherapy were included as TFT, due to their increasing popularity.

Studies were also eligible for inclusion if the intervention involved a TFT component, even if the full TFT protocol was not administered. For example, a study combining Dialectical Behavior Therapy with trauma exposure would be included.

The reason for these criteria is that the review is attempting to determine what is known about the impact of directly targeting memories of traumatic or adverse experiences, rather than teaching ways of coping or focusing on modifying thinking or behavior in the present moment.

2.3.2.2 Exclusion criteria

The following studies were excluded: (1) those that excluded participants with suicidal ideation; (2) grey literature; (3) case reports; and (4) articles in a language other than English.

2.3.3 Justification

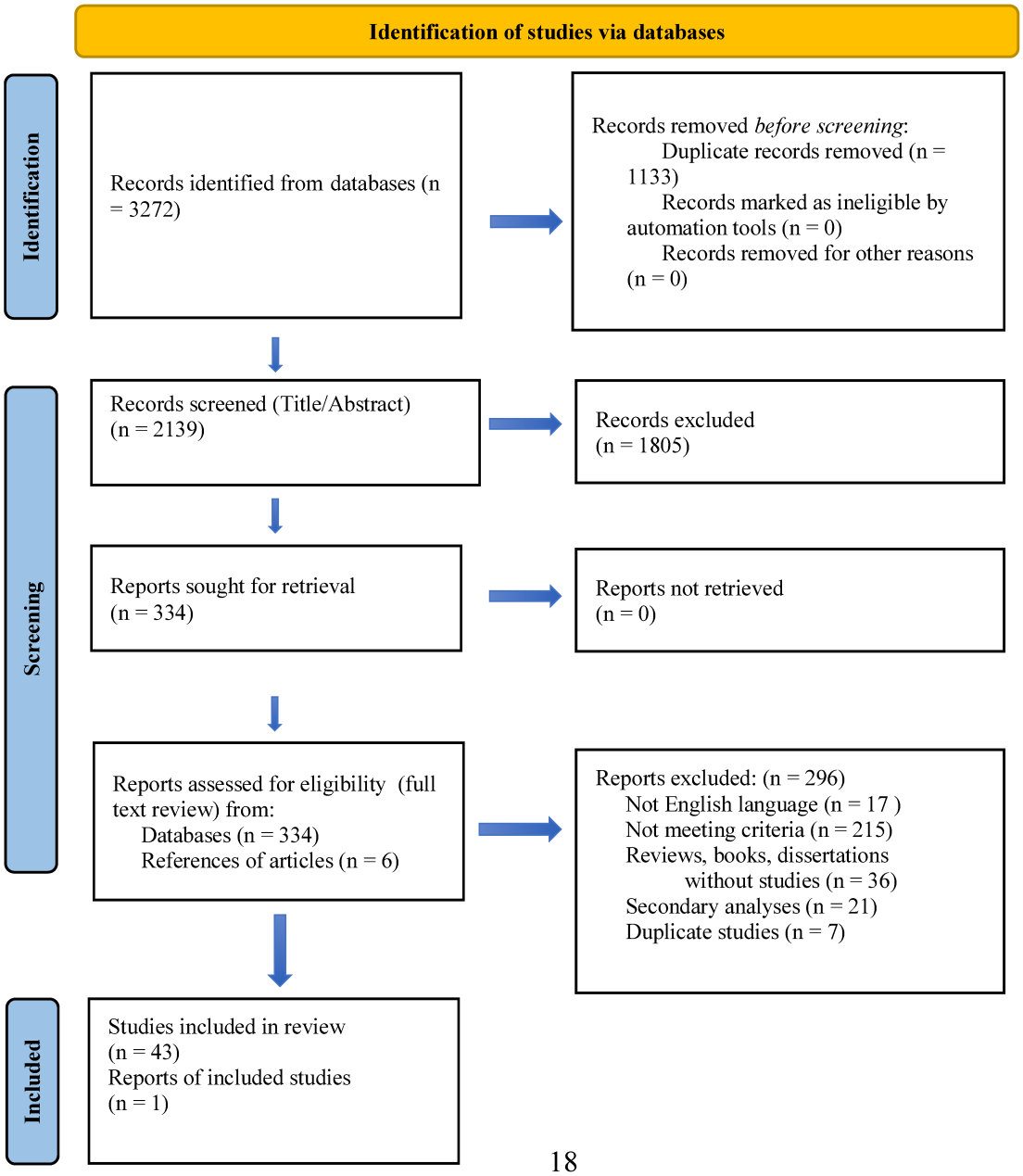
The justification for excluding these studies is as follows: (1) The primary aim of this review was to examine the impact of TFT on participants with suicidality, therefore studies which excluded participants with suicidal ideation were irrelevant to this review; (2) Grey literature was excluded because these studies are not peer-reviewed; (3) Case reports were excluded due to the low methodological quality and limited generalizability of this study design; (4) Articles in a language other than English were excluded due to feasibility.

2.3.4 Study selection

Reviewers used a standardized screening process throughout the review. The initial search results (n =3272) were exported into Covidence software (Veritas Health Innovation). The

first 200 citations were reviewed by all review team members to establish consistency amongst reviewers. This was followed by each citation abstract being reviewed by two reviewers independently by title and abstract, then again by full-text pdf using the Covidence software, screening out articles which did not meet review criteria. Discrepancies or disagreements were discussed and resolved by team consensus. See Fig 2.1 PRISMA Flow Diagram for details.

Fig 2.1 PRISMA Flow Diagram



2.3.5 Data extraction and synthesis

A data extraction form was developed and piloted by the study team *a priori*. Two reviewers independently extracted the data for each publication considered. Inconsistencies in the extraction sheet were verified by going to the source material. The following information was extracted for this review: study and author country, study type, objective, sample size, age range and mean, sex and gender, participant description, including civilian or military population, setting, methodology, outcome measures, and results. Specific information about suicidality (e.g., number of participants with suicidal ideation and self-harm, whether studies reported on dissociation, SUDs, other psychiatric comorbidities, or previous hospitalizations; any reported change in suicidal ideation or suicide attempts, self-harm, adverse effects, hospitalizations, emergency visits, and dropouts) was extracted. Additionally, data were also extracted regarding whether the study excluded participants with previous suicide attempts (and if so, how recently) and reported trauma type (e.g., multiple traumas, complex trauma, childhood trauma, and childhood sexual abuse). A narrative synthesis approach was used to aggregate study findings.

2.4 Results

2.4.1 Theme 1: Study and population characteristics

From 3,272 publications, 43 studies (all quantitative; no mixed-methods or qualitative articles; two citations reported on the same study) were included in the synthesis (Fig. 2.1). The study designs included quantitative non-randomized (24, 55.8%), quantitative randomized (16, 37.2%) and quantitative descriptive (3, 7.0%) (see Table 1). 81% of all studies had first authors

from the US, Germany, or the Netherlands, and 81% were published in the last 10 years (from 2011-2021). A total of 6178 participants were included. Most studies were conducted in the adult (37, 86.0 %), civilian (32, 74.4%), or outpatient (26, 60.5%) population. Only four studies enrolled any participants over the age of 65. Totals of those enrolled across all studies showed the assumed female to male biological sex ratio was quite similar (45.1% female and 54.9% male); however, females were overrepresented in most of the civilian studies, whereas male sex was overrepresented in the military studies. Forty two of 43 studies reported participants as being either male or female sex. One study reported on a "gender based" multimodal intervention (Menefee et al., 2016), but all of the included participants in the study were identified as simply male or female (see Appendix A for further details).

Table 2.1 Study and Participant Characteristics

Study type	Objective	Participants	Description of intervention (s)	Sample Size (groups)	Mean age (SD)	N (%) Male	Civilian (C) or Military (M)	Setting (I, O, R)	Author, year (Country)
Quantitative randomized[$]	Determine efficacy of DBT-PTSD program	women with PTSD related to CSA. At least 1 of: current Eating Disorder, MDD, substance abuse, or ≥4 BPD criteria.	12 week DBT-PTSD, including education, skills, mindfulness, & exposure-based individual sessions.	N=74 DBT/PTSD n =36 TAU-WL n = 38	[§] DBT-PTSD: 35.14 (NR) TAU-WL: 36.71 (NR)	0%	C	R	Bohus 2013 (Germany)
Quantitative randomized[$]	To compare the efficacy of DBT-PTSD vs CPT for PTSD	Women with CA associated PTSD and 3 or more DSM-5 criteria for BPD.	DBT-PTSD including exposure or CPT, up to 45 sessions within 1 year and 3 during a 3 month follow up.	N=193 DBT-PTSD n = 98 CPT n= 95	36.3 (11.1)	0%	C	O	Bohus 2020 (Germany)
Quantitative randomized[$]	Explore if PTSD treatment reduces SI in adolescents	Adolescent females with chronic or subthreshold PTSD and sexual abuse	14 sessions PE-A Three phases: Psychoeducation, exposure, and skill generalization/relapse prevention.	N=61 PE-A n= 31 Client Centred Therapy n = 30	15.3 (1.5)	0%	C	O	Brown 2019a (USA)

Quantitative Randomized[$]	Assess a TFT treatment for CA and associated PTSD, emotion dysregulation, and IP difficulties	Adults (18-64) with PTSD related to CSA and/or CPA. Excluded BPD but 48% had history of SAs or NSSI.	16 sessions/12 weeks; 2 phases: 1) 8 weekly 60 min STAIR sessions 2) modified 90min PE twice weekly	N=58 STAIR n= 31 WL n= 27	34 (7.22)	0%	C	O	Cloitre 2002 (USA)
Quantitative randomized[$]	To examine effect of add-on sertraline to TF-CBT for PTSD in children with CSA	Age 10-17 years; CSA elated PTSD symptoms;	TF-CBT + placebo or TF-CBT + SERT	N=22 SERT n = 11 Placebo n = 11	NR	0%	C	R	Cohen 2007 (USA)
Quantitative randomized[$]	To assess PTSD intervention in former child soldiers	Former child soldiers aged 12-25 years in northern Uganda with PTSD	NET or "an academic catch-up program with elements of supportive counselling"	N = 85 NET n =29 Academic catch up n= 28 WL n = 28	18.4 (NR)	44.7 %	C	O	Ertl 2011 (Uganda)
Quantitative randomized[$]	Effect on EMDR on SI in MDD	DSM 5 MDD with SI, and no previous SAs.	45-90 min standard EMDR 3x per week for total of 9 sessions, alternate days for 3 weeks.	N=70 EMDR n= 35 Control n =35	35.94 (12.29)	33%	C	I	Fereidouni 2019 (Iran)
Quantitative randomized[$]	Evaluate integrated PTSD treatment into DBT for suicidal and self-injuring BPD patients with PTSD	Females with BPD, PTSD, recent, recurrent intentional self-injury	1 year of DBT, followed by "DBT-PE Protocol"	N = 26 DBT n = 9 DBT followed by DBT-PE n= 17	32.6 (12)	0%	C	O	Harned 2014 (USA)

Quantitative randomized[$]	Examine effect of EMDR for PTSD, mind wandering, and SI	women with childhood abuse, PTSD and SI	EMDR twice a week in 90-min sessions (8 sessions)	N=30 EMDR n= 15 WL n= 15	[§] EMDR: 21.66 (4.71), WL: 21.11 (3.21)	0	C	O	Jamshidi 2020 (Iran)
Quantitative randomized[$]	Evaluation of a CBT for PTSD program specifically designed for individuals Serious Mental Illness (SMI).	Adults with SMI and MDD, Bipolar disorder, Schizophrenia or Schizoaffective disorder, and current PTSD	CBT for PTSD program: 12-16 sessions; structured format with handouts, worksheets, and homework assignments.	N=108 CBT n= 54 TAU n= 54	44.21 (10.64)	21.3 %	C	O	Mueser 2008 (USA)
Quantitative randomized[$]	Examine the efficacy of NET in asylum-seekers with PTSD	Asylum-seekers, PTSD, with history of victimization by organized violence	NET: median of 9 weekly or biweekly sessions with average duration of 120 minutes.	N=32 NET n= 16 TAU n =16	[§] TAU: 31.6 (7.7) NET: 31.1 (7.80)	68.8 %	C	O	Neuner 2010 (Germany)
Quantitative randomized[$]	determine if group CPT improves PTSD in military personnel; evaluate iatrogenic effects	Soldiers with PTSD, after deployment to or near Iraq or Afghanistan. Excluded severe SI or homicide risk warranting hospitalization	Group CPT-C or Present Centered Therapy (PCT) group. Groups (90min) met twice weekly for 6 weeks.	N=108 CPT n= 56 PCT n =52	32.70 (7.51)	92.6 %	M	O	Resick 2015 (USA)
Quantitative randomized[$]	Compare group vs individual CPT for PTSD; examine variables that predict PTSD improvement	Active duty military with PTSD seeking treatment following Afghanistan or Iraq deployment.	Group (90min) or individual (60min) CPT treatment: 12 sessions 6 weeks.	N=268 Group n =133 Individual n= 135	33.2(7.4)	91%	M	O	Resick 2017 (USA)
Quantitative randomized[$]	To examine if developmentally adapted cognitive processing therapy	Child sexual and/or physical abuse– related PTSD	D-CPT: CPT with modifications for youth: Integrated emotion management, increased frequency (15 sessions in 4 weeks), and	N=88 CPT n = 44	18.1 (NR)	15%	C	O	Rosner 2019 (Germany)

	(D-CPT) is more effective than a wait-list condition with treatment advice (WL/TA) among adolescents with PTSD		attention to developmental tasks. D-CPT to be completed in 30 x 50-minute sessions in 16 to 20 weeks.	WL n =44					
Quantitative randomized[$]	To compare cognitive therapy to imaginal exposure (IE) for chronic PTSD and examine factors associated with outcome.	PTSD but not CSA as index trauma	16 sessions (60 min) Cognitive therapy (Not TF-CBT) focused on belief modification vs imaginal exposure (IE).	N=72 IE n = 35 CT n=37	36.82 (11.60)	58%	C	O	Tarrier 1999 (United Kingdom)
Quantitative randomized[$]	Safety and efficacy of PE and EMDR in psychotic disorders and comorbid PTSD	Psychotic disorder and PTSD. Excluded: "extremely high acute suicide risk".	8 weekly sessions of 90min PE or EMDR. No stabilization or skills training. Standard protocols used. TAU for psychosis also provided.	N=155 PE n = 53 EMDR n = 55 WL n= 47	41.2 (10.5)	45.8 %	C	O	van den Berg 2015 (Netherlands)
Quantitative non-randomized	Examine relationship between in PTSD, SI, negative cognitions, perceived burdensomeness & thwarted belongingness.	Veterans in a gender-specific PTSD residential rehabilitation program, full or subthreshold PTSD	7-week program. Twice weekly group & individual CPT, educational & recreation groups.	N=107	51.04 (10.60)	63.6%	M	R	Blain 2020 (USA)
Quantitative non-Randomized	Examine effectiveness of intensive CPT program for PTSD.	Full (85%) or subthreshold (15%) PTSD	individual, daily, 12-session CPT, without a written trauma account.	N=20	NR	60%	M	R	Bryan 2018 (USA)

Quantitative non-randomized	Investigate changes in SI for veterans receiving PE via routine clinical care.	Veterans receiving PE for PTSD in 3 outpatient PTSD specialty VA clinics.	PE typically administered over 8 to 13 weekly 90-minute sessions.	N=289	50.4 (15.10)	89%	M	O	Cox, 2016 (USA)
Quantitative non-randomized	To investigate the effects of a brief TFT program for PTSD on BPD symptom severity.	Adults with PTSD, and no SAs 3 months prior to beginning of therapy	Intensive 8 day trauma-focused program with daily EMDR (90min), PE (90min), group physical activity (6hrs/d), & group psychoeducation (2hrs). psychologists.	N=72	38.85 (13.21)	18.1 %	C	R	De Jongh, 2020 (Netherlands)
Quantitative non-randomized	pilot testing combined DBT-PE protocol that can be added to DBT to treat PTSD	BPD, PTSD, and recent and/or imminent suicidal behavior or serious NSSI.	1 year standard DBT, followed by "DBT-PE Protocol" if criteria met.	N = 13	39.4 (11.4)	0%	C	O	Harned 2012 (USA)
Quantitative non-randomized	Investigate safety & effectiveness of intensive PE program for adolescent with multiple IP traumas and complex PTSD symptoms	12-18 years old, multiple interpersonal trauma, full PTSD	Intensive PE program: 5 days/3 x 90 min PE sessions/day (total 15 sessions).	N=10	15.9 (1.52)	20%	C	O	Hendriks 2017 (Netherlands)
Quantitative non-randomized	explore effectiveness and safety of intensive PE (iPE) targeting chronic PTSD patients (ICD-11 Complex PTSD) following multiple interpersonal trauma	Adults, multiple IP traumas (repeated sexual abuse and/or physical abuse); (c) PTSD and (d) multiple treatment attempts.	The intensive phase (4 days), with 3 daily individual 90-minute sessions (4.5 hours of treatment per day).	N=73	35.9 (11.3)	13.7 %	C	O	Hendriks 2018 (Netherlands)
Quantitative non-randomized (naturalistic study)	evaluation of two gender specific inpatient PTSD treatment programs on PTSD, SI,	Veterans in a voluntary intensive group therapy program in inpatient VA psychiatric setting. "	5 to 7 hours of therapy per weekday and a minimum of 2 hours per day on the weekends.	N=584 (559 consented) Men: 282	36.3 (10.4)	50%	M	I	Menefee 2016 (USA)

	depression, resiliency, & ER			Women: 277					
Quantitative non-randomized	To test a 12-week intensive outpatient program combining DBT and PE for veterans with PTSD and BPD symptoms	Veterans with PTSD sx, prior TFT attempt, and interfering factors for TFT were due to BPD sx.	The full DBT plus PE over 12-weeks. Individual DBT, 3 skills groups, IP & mindfulness practice groups weekly. PE (90 min twice weekly) started in Week 2.	N=33	43.21 (9.92)	51.5 %	M	O	Meyers 2017 (USA)
Quantitative non-randomized	Men with PTSD and SUD who received at least one PTSD-related psychotherapy session	PTSD and substance dependence, active substance use within past 60days.	Seeking Safety (SS) + Exposure Therapy-Revised (ET-R) (adapted PE). Maximum of 30 x 1 hour sessions over five months.	N=5	37.6 (5.6)	100%	C	O	Najavits 2005 (USA)
Quantitative non-randomized	Open feasibility study of NET for comorbid PTSD and BPD.	BPD with comorbid PTSD treated at outpatient centre in Germany	NET 1 to 2x/week, 90 min sessions, average 14 sessions per patient (range 11-19).	N=12	33 (NR)	0	C	mixed I/O	Pabst 2012 (Germany)
Quantitative non-randomized[$]	To test the efficacy of NET compared to standard treatment by experts for BPD (TBE)	BPD and PTSD. Excluded "acute suicidal behavior"	NET: 90 minutes once or twice a week. TBE: 90min DBT/CBT based sessions carried out by experienced therapists. Included some group therapy as well.	N=22 NET n=11 TBE n=11	[§] NET: 30.36 (8.64) TBE: 29.45 (11.57)	0	C	Mixed I/O	Pabst 2014 (Germany)
Quantitative non-randomized	Feasibility, acceptability, safety, tolerability, effectiveness of trauma focused CBT for IP Trauma in Transitional Age Youth	Ages 15-22 with at least subthreshold PTSD Excluded "high risk of self harm or suicide (ASIQ 31 or more)	15 TF-CBT sessions over 25 weeks	N=20	19.5 (3.2)	35%	C	O	Peters 2021 (Australia)

Quantitative non-randomized	To examine the efficacy of EMDR delivered to patients in acute suicidal crisis	18yrs or older, inpatients and CRHTT team patients with SI, at least one traumatic event	EMDR 1-1.5 hrs, 2-3x per week. Ended when SUDS decreased, patient declined further treatment, or when no further progress made	N=66	34.91 (12.34)	50.8 %	C	O/I	Proudlock 2020 (United Kingdom)
Quantitative non-randomized	Evaluate a specific psychodynamically oriented inpatient TFT for women with complex PTSD and concomitant BPD, NSSI, and depression.	Inpatients at Psychiatric State Hospital who had experienced complex psychological trauma	2 week inpatient stay then discharged and readmitted mean 7.5 months later for TFT inpatient program: EMDR & psychodynamic treatment. Mean 2 EMDR sessions per month, with psychodynamic sessions in between.	N=258 Grp 1 n = 153 Grp 2 n = 75 Grp 3 n = 30	32.4 (8.24)	0%	C	I	Sachsse 2006 (Germany)
Quantitative non-randomized	Explore EMDR impact on PTSD severity, dissociation, insomnia, NSSI and auditory verbal hallucinations in patients with Personality Disorders (PDs)	Adults with a DSM IV personality disorder and PTSD, and score ≥18 on Posttraumatic Diagnostic Scale (PDS)≥18	EMDR plus TAU for personality disorders. EMDR was primarily focused on traumas associated with the current PTSD symptoms, to most distressing memory first. Each EMDR session lasted 60–90 min.	N=47	37.4 (NR)	13%	C	O	Slotema 2019 (Netherlands)
Quantitative non-randomized	Examine the prevalence and correlates of 4 courses of SI in veterans receiving residential PTSD treatment	Veterans who initiated residential PTSD treatment within Department of Veterans Affairs during Fiscal Year 2017.	Veterans received PE, CPT (individual or group), neither, or had previously been treated with an evidence based psychotherapy.	N=1,807	45.55 (12.58)	88.2 %	M	R	Smith 2020 (USA)

Quantitative non-randomized	The current study examined (a) changes in SI across a residential CPT treatment program and (b) influence of demographic variables on SI during treatment.	Veterans admitted to a men's or women's PTSD/Traumatic Brain Injury program at a VA Medical Centre. Most Veterans met full or subthreshold PTSD criteria.	7-week CPT, individual & group, delivered in two, 75-min group sessions and two, 50-min individual sessions per week. Individual sessions focused on trauma processing & cognitive challenge. Also included education and skills groups	N=303	43.95 (11.05)	79.2 %	M	R	Stayton 2019 (USA)
Quantitative Non-Randomized	feasibility, acceptance and safety of DBT-PTSD in an outpatient treatment setting by therapists who were novice to the treatment	Women with PTSD after CSA and at least 4 BPD criteria base on IPDE; Excluded current SUD and lifetime schizophrenia or bipolar disorder, MR, BMI < 16.5,	Up to 24 weekly sessions (max 40 hours of individual treatment), which were flexible in length and could last between 50 and 120 minutes. Novice therapists but 90 min weekly supervision. Use of DBT, TF-CBT, and exposure within DBT-PTSD intervention.	N=21	34.05 (9.34)	0	C	O	Steil 2018 (Germany)
Quantitative non-randomized	To evaluate NET without a stabilizing period in a highly burdened sample with current NSSI, and effect of NET on PSTD, BPD, depression, dissociation, and quality of life.	BPD and PTSD.	NET + Standard Inpatient Care (SIC): Two 50 min education & skills practice sessions, then exposure phase: 90-120 min, twice a week, for total of 12 sessions. SIC included art, music, supportive, body and/or movement therapy.	N=11	34.9 (9.71)	9.1%	C	I	Steuwe 2016 (Germany)
Quantitative non-randomized[$]	Assess effect of 4 EMDR sessions on symptoms related to Typhoon Morakot	Adolescents with significant disturbance (PTSD, MDD, or current moderate or high suicide risk) after Typhoon Morakot	Up to 4 weekly EMDR sessions, starting 3 months after typhoon Morakot. Session 1 lasted 60 minutes and other sessions lasted 30-40 min.	N=83 EMDR n= 41 TAU n = 42	[§] EMDR: 14.24 (0.99) TAU: 14.48 (0.92)	41%	C	O	Tang 2015 (Taiwan)

Quantitative non-randomized	To study the relationship of ER difficulties to TFT outcomes of adults with severe PTSD (including impact of age of sexual abuse) and dissociative type PTSD)	Psychotrauma Expertise Centre (PSYTREC) participants: adults with PTSD, Did NOT exclude psychosis, dissociative disorder, SI, SIB/NSSI	8 day program (over two weeks). Two 90 min daily therapy sessions (PE followed by EMDR), with 2 hour group education session. Also, group physical activity	N=111	42.03 (12.03)	14.5 %	C	O/R	Van Toorenburg 2020 (Netherlands)
Quantitative non-randomized	to determine the effectiveness of an intensive 8 day TFT program for severe PTSD.	Adults with DSM IV PTSD, never having had a conviction for sexual assault, and no recent suicide attempts (within the past 3 months).	8-day program (over two weeks). Two 90 min daily therapy sessions (PE followed by EMDR). Also, group physical activity and psychoeducation	N=347	38.32 (11.69)	30%	C	O/R	Van Woudenberg 2018 (Netherlands)
Quantitative non-randomized	determine if those with CPTSD can benefit from an intensive trauma-focused treatment, resulting in decreased PTSD and CPTSD symptoms, and loss of diagnoses.	Adults with PTSD	8-day program (over two weeks). Two 90 min daily therapy sessions (PE followed by EMDR). Also, group physical activity and psychoeducation	N=308	41.26 (12.70)	22.4 %	C	I	Voorendonk 2020 (Netherlands)
Quantitative descriptive	report therapy results in 14 consecutive young patients with SI and/or previous NSSI and SAs	14 consecutive youth (ages 10 to 18) with SI and/or previous self-harm & SAs	Individualized "active multimodal psychotherapy" (mood mapping, education, mind-body, trauma (psychodrama & EMDR). Support to parents.	N=14	14.7 (NR)	21.4 %	C	O	Hogberg 2008 (Sweden)
Quantitative descriptive	to examine the relationships between PTSD symptoms and SI.	160 veterans who completed a TFT in a VA PTSD outpatient clinic.	CPT, PE or CBT. Most veterans were offered PE or CPT, but 4 received TF-CBT due to preference.	N=160	50.8 (15.8)	87%	M	O	Horwitz 2019 (USA)

Quantitative descriptive	To study occurrence of suicidal behavior, treatment completion, and response (PTSD symptoms) after CPT	Veterans with PTSD, most (52%) at increased suicide risk	'Full treatment": 12 sessions of CPT.	N=290	44 (13.68)	NR	M	O	Roberge 2021 (USA)

$ denotes controlled or with comparator group.

§ denotes studies where mean age (SD) for overall sample was not reported

Abbreviations: CA, Childhood abuse; CSA, Childhood sexual abuse; CPA, Childhood physical abuse; DBT-PTSD, Dialectical Behavioral Therapy (DBT) for PTSD; PE-A: PE for Adolescents; ER, Emotion Regulation; SI, suicidal ideation; STAIR, Skills Training in Affect and Interpersonal Regulation.

The predominant inclusion diagnosis in the studies was full or subthreshold PTSD, accounting for 40 (93.0%) of all studies. Other main inclusion diagnoses included BPD or BPD traits (nine, 20.9% of studies), both PTSD and BPD (full or subthreshold) (nine, 20.9%), psychosis or serious mental illness (six, 14.0%), MDD (four, 9.3%), and SUDs (one, 2.3%). Most studies included participants with a mixed or unspecified trauma type (23, 53.5% of all studies). Of the 40 PTSD studies, 23 (57.5%) reported the presence of comorbidities in the study sample; the most commonly reported comorbidities in these studies included MDD (20, 50.0% of studies), Anxiety Disorders (15, 37.5%), SUDs (six, 15.0%), Eating Disorders (four, 10.0%), Personality Disorders (three, 7.5%) and Psychotic Disorders (two, 5.0%). Comorbid dissociation was rarely reported on, with three studies mentioning participants with dissociative subtype of PTSD and one study reporting participants with Dissociative Disorders (see Appendix A for further details).

2.4.2 Theme 2: Types of trauma focused therapy

The predominant TFT in the included studies was exposure therapy, mostly utilizing either PE or NET, accounting for 24 (55.8%) of studies (see Table 2.2). EMDR and CPT accounted for 12 (27.9%) and 11 (25.6%) of studies, respectively. Combinations of trauma therapies with each other and with other non-trauma focused modalities were present in an additional 17 (40%) of studies. Dialectical Behavioral Therapy with exposure (DBT-PE or DBT-PTSD) was the most common combination, followed by EMDR with PE, EMDR with multiple other therapies, and an eclectic mix of trauma focused treatments. Intensive TFT, defined as therapy sessions delivered twice or more per week, was utilized in 23 (53.5%) of all studies. Of

the studies that used intensive treatment, seven (30.4%) used EMDR (either alone or in combination with PE), followed by six studies (26.1%) which used stand-alone CPT, and only two (4.7%) that used stand-alone intensive PE. Differences among the types of trauma therapies used were also noted by population, with military populations most frequently utilizing CPT or PE, whereas EMDR was only found in civilian population studies.

Table 2.2 Features of TFT Interventions in the Included Studies

PE or exposure (full or partial)	NET	CPT	EMDR	TF-CBT	DBT[a]	Other non-TFT therapy[b]	Emotion Regulation Skills (non-DBT)[c]	Intensive[d]	Author, year
		x				x		x	Blain 2020
x				x	x	x		x	Bohus 2013
		x		x	x	x			Bohus 2020[e]
x									Brown 2019a
		x						x	Bryan 2018
x							x	x	Cloitre 2002
				x					Cohen 2007
x									Cox, 2016
x			x					x	De Jongh, 2020
	x							x	Ertl 2011
			x					x	Fereidouni 2019
x					x			x	Harned 2012
x					x			x	Harned 2014
x								x	Hendriks 2017
x								x	Hendriks 2018
			x			x			Hogberg 2008
x		x		x					Horwitz 2019[f]
			x					x	Jamshidi 2020
x		x			x	x	x		Menefee 2016
x					x			x	Meyers 2017
				x					Mueser 2008
x							x		Najavits 2005

	x							x	Neuner 2010
	x								Pabst 2012
	x								Pabst 2014
				x					Peters 2021
			x					x	Proudlock 2020
		x						x	Resick 2015
		x						x	Resick 2017
		x							Roberge 2021
		x					x	x	Rosner 2019
			x			x			Sachsse 2006
			x						Slotema 2019
x		x							Smith 2020 [g]
		x						x	Stayton 2019
x				x	x				Steil 2018
	x					x		x	Steuwe 2016
			x						Tang 2015
x									Tarrier 1999
x			x						van den Berg 2015 [h]
x			x					x	Van Toorenburg 2020
x			x					x	Van Woudenberg 2018
x			x					x	Voorendonk 2020

a) DBT as a component of the TFT. Where DBT is part of a TFT protocol, components of that protocol are also indicated, even if the protocol does not include the full therapy (for example, PE or TF-CBT components as part of DBT-PE or DBT-PTSD).
b) non-TFT psychotherapy modality as part of TFT intervention (psychodynamic therapy, art therapy, etc.). Does not include trauma psychoeducation, as this is a component of most TFTs. Does not include non-psychotherapy interventions such as recreation or physical activity.
c) other non-DBT present-centred emotion regulation skills based interventions (STAIR, Seeking Safety)
d) Intensive is defined as at least twice per week, but not "once to twice per week"
e) CPT is a comparator to DBT-PTSD.
f) CPT or PE or CBT in this study
g) CPT or PE in this study
h) EMDR vs PE in this study

A pattern emerged for studies that recruited participants with childhood sexual or physical abuse and/or BPD. Almost all the studies that included BPD or high percentages of those with childhood trauma used interventions that either (a) included stabilization or emotion regulation skills prior to or during delivery of the trauma focused component of the intervention, (b) used an intensive therapy schedule, or (c) were multimodal, using a combination of therapies, including non-trauma focused components (See Tables 2 and 3). Stabilization protocols, intensive delivery, and combination therapies were not as commonly employed in studies that recruited participants treated for single event or adult-onset trauma such as military trauma.

2.4.3 Theme 3: Outcomes

Within the included studies, the predominant reported outcome of interest was change in PTSD symptoms, accounting for 39 (90.7%) studies; changes in depressive symptoms were reported in 24 (55.8%) studies, whereas effects of TFT on BPD symptoms were reported in an additional 13 studies (30.2%) (see Table 2.3). Changes in suicidal ideation or non-suicidal self-injury (NSSI) were the focus of 25 (58.1%) and 12 (27.9%) studies, respectively. 'Safety' was reported as a separate category in an additional five (11.6%) studies.

Table 2.3 Results Reported

Trauma type	PTSD symptoms	MDD symptoms	BPD symptoms	Change in SI	Change in NSSI	Author, year
Mixed (sexual abuse, assault, combat)	+	NR	NR	+	NR	Blain 2020
100% CSA	+	+	+ (similar to WL)	0	+	Bohus 2013
CPA and CSA	+	+	+	NR	NR	Bohus 2020
100% CSA	NR	NR	NR	+	NR	Brown 2019a
Mixed	+	0	NR	+	NR	Bryan 2018
CPA and/or CSA	+	+	+ Affect regulation	NR	NR	Cloitre 2002
Mixed	+	+	NR	+	NR	Cohen 2007
Military service related	+	NR	NR	+	NR	Cox 2016
Mixed	+	NR	+	NR	NR	De Jongh, 2020
Mixed; former child soldiers	+	NR	NR	+	NR	Ertl 2011
Mixed	NR	NR	NR	+	NR	Fereidouni 2019
Mixed (61.5% CSA)	+	+	NR	+	+ (urges)	Harned 2012
Mixed (50% CSA)	+	+	NR	Improvement in SA frequency	+	Harned 2014
Adolescents with multiple IP trauma; CSA in 7 (70%)	+	+	NR	+ (NS)	+ (NS)	Hendriks 2017
Mixed (63% CSA)	+	NR	NR	0	0	Hendriks 2018
Mixed	NR	NR	NR	NR	NR	Hogberg 2008
Military (combat related and military sexual trauma)	+ for group with reduced SI	NR	NR	Improved for 28, and 29 had either no change (N=15) or increase (n=14) in SI.	NR	Horwitz 2019

Childhood abuse	+	NR	NR	Improved for EMDR, minimal change for WL	NR	Jamshidi 2020
Mixed	+	+	+	+	NR	Menefee 2016
NR	+	NR	NR	+	NR	Meyers 2017
Mixed	+	+	NR	NR	NR	Mueser 2008
Mixed, multiple	+	+ (NS)	NR	+ (NS)	NR	Najavits 2005
Asylum seekers victimized by organized violence	+	0	NR	NR	NR	Neuner 2010
NR	+	+	+ (NS)	NR	NR	Pabst 2012
Mixed, multiple	+	+	+	NR (transient increase in SI)	+ (as PTSD remitted)	Pabst 2014
Multiple interpersonal trauma	+	+	NR	0	Decrease in self-harming behavior noted at the end of Phase 1, this was sustained throughout all phases of TF-CBT	Peters 2021
Mixed	+	+	NR	+	NR	Proudlock 2020
Military PTSD	+	+	NR	+	NR	Resick 2015
military Resnick 2017 mixed: combat related, non-combat related, sexual and physical assault, accident	+	+	NR	+	NR	Resick 2017
NR	+	NR	NR	NR	NR	Roberge 2021
CSA or CPA	+	+	+	NR	Self-harming in last 6 months excluded. No NSSI reported.	Rosner 2019
Mixed; Multiple in 2/3 of sample	+	0	+	NR	Reduction at end of treatment and 1-year follow-up	Sachsse 2006
Mixed; complex	+	NR	0	NR	+ (NS)	Slotema 2019
Combat trauma	Remitted SI course	NR	NR	SI: 23% remitted, 37% chronic SI	NR	Smith 2020

	had greatest pre-posttreatment PTSD improvement			and 6% new onset.		
NR	NR	NR	NR	+	NR	Stayton 2019
CSA	+	+	+	0	Decrease in recent SHB (52% to 35.7%). No worsening for any participant	Steil 2018
Mixed	+	+	+	NR	NR	Steuwe 2016
Typhoon Morakot	+	+	NR	NR	NR	Tang 2015
Mixed	+	+	NR	NR	NR	Tarrier 1999
Mixed	+	NR	NR	+	During treatment period (TFT vs WL) self-harm 15.4% vs 10.3%; during follow-up (TFT vs WL) self-harm 11.4% vs 10.3%	van den Berg 2015
Mixed (almost all had sexual abuse or physical assault)	+	NR	Decreased DERS[1]	NR	NR	vanToorenburg 2020
Mixed (multiple; 74.4% had "sexual abuse")	+	NR	NR	NR	NR	VanWoudenberg 2018
Mixed	+	NR	NR	NR	NR	Voorendonk 2020

[1]Not included in studies reporting on change in BPD symptoms because study was not focused on BPD but rather generally emotion dysregulation symptoms.
Abbreviations: + = improvement, 0 = no change, - = worsening, NR = not reported; NS = not statistically significant
NSSI, Non-suicidal self-injury; CPA, childhood physical abuse; CSA, childhood sexual abuse; DERS, Difficulties in Emotion Regulation Scale; SI=suicidal ideation; WL=Wait list

When reported, the vast majority of studies found that TFT improved PTSD, MDD, and BPD symptoms (see Table 3). With regards to the impact of TFT on PTSD, the majority (37 out of a total of 39 studies that reported on PTSD symptoms) reported improvement in PTSD symptoms and none reported a detrimental outcome. Out of the 24 studies reporting impact of TFT on depressive symptoms, 20 reported improvement and four reported no change. A similar pattern of overall symptom improvement TFT was reported for BPD symptoms, with 10 of 12 studies reporting improvement, and two reporting no change (see Table 2.3).

2.4.4 Theme 4: Suicidality, risk, adverse events, and dropouts

Suicidality. All included studies reported having some participants with suicidal ideation, borderline personality disorder, or both at baseline. Only four studies specifically included suicidal ideation as an inclusion criterion. Of those four, one was a randomized controlled trial of EMDR for suicidal ideation in depressed inpatients; the other three were small uncontrolled studies with a range of diagnoses: two using EMDR and one using multimodal therapy with an EMDR component. Out of the studies that reported on suicidal ideation at baseline, the percentage of recruited participants with suicidality ranged from 17.6% to 100%. Suicidal ideation and suicidal risk were addressed in different ways across the included studies; sometimes they were only reported at baseline, sometimes they were tracked over time, and sometimes they were reported as an adverse event. Across all 43 included studies, there was no clear indication that suicidality or self-harm worsened with TFT (See Table 2.3). When change in suicidal ideation was quantitatively assessed as an outcome (n =24), 16 of those studies showed improvement in suicidal ideation, six showed no change, and two reported mixed results,

with some participants improving and others experiencing worsening or no significant change (Table 3). Two studies of NET and one of CPT reported temporary worsening of suicidal ideation during initial assessment or treatment, with improvement when the trauma therapy was continued and completed. Across all studies, only three participants undergoing a TFT, from two separate studies, were hospitalized due to suicide risk. The number of suicide attempts were reported by 16 studies, with most reporting no suicide attempts in the group receiving TFT (10 studies). A total of eight participants, within five different studies, undergoing a TFT attempted suicide; there were no completed suicides reported in any participant undergoing a TFT across all studies, whereas two study participants completed suicide in a non-trauma focused intervention group (Ertl et al., 2011; Harned et al., 2014) (See Table 2.4 and Appendix A for further details).

Table 2.4 Risk, Adverse Events, and Dropouts

Recent Suicide Attempts Excluded ?	Borderline Personality Disorder Diagnosis (N, %)	Baseline Suicidal ideation (N, %)	Baseline NSSI (N, %)	Suicide attempts during or after study	Hospitalizations for suicide prevention during or after study	Completed Suicides during or after study	Adverse events (AEs) in trauma focused group	Adverse events in control group	Dropouts in trauma focused group (N, %)	Author, year
Unclear	NR	66.4%	NR	NR	NR	NR	NR	NR	NR	Blain 2020
Yes (life threatening behaviour in last 4 months)	33, 44.6%	34 (46%)	21 (62%) of DBT-PTSD group (Kruger)	None	NR	NR	0 had worsening of PTSD	6 had worsening of PTSD	DBT-PTSD: 2 (5.6%)	Bohus 2013
Serious SAs in last 2 months	93, 48.2%	NR	75 (39.1%)	1 (TFT group)	NR	None (TFT group)	NR	NR	CPT:37 (39%) DBT-PTSD: 25 (25%)	Bohus 2020
Unclear	NR	40%	NR	NR	NR	NR	NR	NR	NR	Brown 2019a
Unclear	NR	65%	NR	None	NR	NR	NR	NR	CPT: 8 (40%)	Bryan 2018
Yes (no attempts in the last 3 months)	0, 0%	NR, but 29% had used psychiatric emergency services in last year	NR	None	NR	NR	1 had symptom worsening	6 had symptom worsening	STAIR-PE: 9 (29%)	Cloitre 2002
Unclear	NR	NR? 5 (22.7%)	NR	None	NR	NR	1 overnight hospitalization for pre-existing Oppositional	NR	TFT-CBT: 1 (9.1%)	Cohen 2007

							Defiant Disorder after running away from home. No other adverse events			
No	NR	127 (44%)	NR	NR	NR	NR	NR	NR	NR	Cox 2016
Yes (within 3 months)	35, 48.6%	58 (80.6%)	NR	NR	NR	NR	None	NR	EMDR-PE: 0 (0%)	De Jongh 2020
Unclear	NR	52 (61.2%)	NR	NR	NR	1 (control)	NR	NR	NET: 4 (13.8%)	Ertl 2011
Yes (no previous suicide attempts)	NR	70 (100%)	NR	NR	NR	NR	NR	NR	EMDR: 0 (0%)	Fereidouni 2019
No	13, 100%	NR, but mean Suicidal Behaviors Questionnaire score 10.8 (5.0) 23%	11 (92.3%)	1 (TFT group)	NR	NR	2 crisis services use by the same patient that attempted suicide	NR	DBT-PE: 3 (23.1%)	Harned 2012
Yes (2 months)	26, 100%	NR 100%?	96.2%	1 (TFT group)	NR	1 (control)	2 experienced relapses of self-injury during treatment 1 SA	NR	DBT-PE: 7 (41.2%)	Harned 2014
Yes (Within 8 weeks)	NR; BPD-47 subscales; 10, 100%	6 (60%)	4 (40%)	None	NR	NR	None	NR	PE: 0 (0%)	Hendriks 2017

Yes (no attempts within the last 8 weeks)	NR but many had BPD sx	NR but 33 (48.5%) had "medium to high suicide risk"	NR	None	1 (TFT group)	NR	<3% had PTSD symptom exacerbation post treatment 1 hospitalization for suicide prevention	NR	PE: 4 (5.5%)	Hendriks 2018
Unclear	NR	11 (79%)	NR or 8 (57%)	NR	NR	NR	NR	NR	NR	Hogberg 2008
Unclear	NR	47 (29%)	NR	NR	NR	NR	NR	NR	NR	Horwitz 2019
NR	NR	30 (100%)	NR	NR	NR	NR	NR	NR	EMDR: 0 (0%)	Jamshidi 2020
NR (imminent suicide risk requiring 1:1 supervision)	15% men; 67% women	186 (31.8%)	NR	NR	NR	NR	NR	NR	Multimodal: 92 (16.5%) Men: 71 (25.2%) Women 21 (7.6%)	Menefee 2016
NR (hospitalization in past 3 months)	16 (48.5%)	NR	0% (needed to be NSSI free x 4 weeks prior to PE).	None	NR	NR	None	NR	DBT-PE: 11 (33.3%)	Meyers 2017

Yes (No attempts within the last 3 months)	27 (25%)	NR	NR	NR	NR	NR	NR	NR	CBT for PTSD: 16 (29.6%)	Mueser 2008
NR	NR	4 (80%) in the prior 3 months, 3 (60%) had a plan	NR	NR	NR	NR	NR	NR	NR	Najavits 2005
No	NR	TAU: 12 (75%) NET: 7 (43.8%)	NR	NR	2(TFT group)	NR	2 had increased scores on Posttraumatic Stress Diagnostic Scale 2 admissions for SI	8 had increased scores on Posttraumatic Stress Diagnostic Scale	NET: 2 (12.5%)	Neuner 2010
NR	12 (100%)	NR	NR	NR	NR	NR	Temporary increase in SI *before* discussing events in some receiving TFT	NR	NET: 2 (16.7%)	Pabst 2012
Yes (serious SA in last 8 weeks)	22 (100%)	NR	NR (NSSI excluded)	None	NR	NR	Temporary increase in SI and problem behavior.	NR	NET: 2 (18.2%)	Pabst 2014
"Excluded high risk for self-harm and suicidality"	11 (55%)	13 (65%)	n= 20 or 100% have experienced self harm at some point	NR	NR	NR	NR	NR	TF-CBT: 2 (10%)	Peters 2021

NR	NR	66 (100%)	NR	NR	NR	NR	NR	NR	EMDR: 9 (13.6%)	Proudlock 2020
No	NR	19 (17.6%)	NR	None	NR	NR	"No significant differences" in AE between TFT and control Almost all AE related to a temporary increase in PTSD symptoms early in treatment Temporary increase in SI in 4 (21.1%) participants with pre-existing suicide ideation	"No significant differences" in AE between TFT and control 1 hospitalization, considered not study related	CPT: 3 (5.4%)	Resick 2015
"SI intent if crisis intervention needed"	NR	47 (17.5%)	NR	2 (TFT group), before starting treatment	NR	NR	17 psychological events "possibly related" to the study often evoked during baseline assessment 4 had increased PTSD symptoms	NR	CPT: 113 (42.2%)	Resick 2017

							evoked by baseline assessment procedures (4 patients) 13 had increased PTSD symptoms during trauma focus of therapy			
NR	NR	42% endorsed SI	NR	3(TFT group)	NR	NR	3SA, no deaths	NR	CPT: 168 (57.9%)	Roberge 2021
Yes (within the last 6 months)	14 (16%)	NR	N/A, self-harm was excluded	1 (control)	NR	NR	1 admitted to hospital (unrelated to the study)	6 admitted to hospital	CPT: 12 (27.2%)	Rosner 2019
Unclear	Group 1: 94 (61%) Group 2: 41 (55%) Group 3: 14 (47%)	NR	Group 1: 108 (71%) Group 2: 63 (84%) Group 3: 25 (83%)	NR	NR	NR	NR	NR	EMDR plus psychodynamic (phase 2): 12 (13.7%), but only 3 (3.4%) dropped out during active therapy	Sachsse 2006
Unclear	22 (47%)	NR	NR	NR	NR	NR	None	NR	EMDR: 15 (32%)	Slotema 2019

Unclear	NR	1029 (59.9%)	NR	NR	NR	NR	NR	NR	NR	Smith 2020
Yes (imminent suicide risk was excluded. Veterans with SI & plan could be accepted if they committed to a safety plan.)	NR	53.8%	NR	NR	NR	NR	NR	NR	NR	Stayton 2019
Yes (SAs or severe, life-threatening self-harm within the last 18 weeks)	16 (76%)	NR	52.3% in past 4 weeks	None	NR	NR	1 relapsed into alcohol dependence during the first phase of treatment and was excluded from the study.	NR	DBT-PTSD: 4 (19.0%)	Steil 2018
Yes (8 weeks prior)	11 (100%)	NR	11 (100%)	NR	NR	NR	NR	NR	NET: 1 (9.1%)	Steuwe 2016
No	NR	NR but included "moderate or high suicide risk"	NR	NR	NR	NR	None	NR	EMDR: 0, 0%	Tang 2015

No	NR	NR	NR	NR	NR	NR	9 (25.7%) had PTSD symptom worsening after treatment (imaginal exposure group)	3(8.1%) had PTSD symptom worsening after treatment (cognitive therapy group)	Imaginal exposure: 6 (17.1%)	Tarrier 1999
Yes (6 months)	NR	70 (45.2%) had moderate or high suicide risk on MINI-Plus	NR	NR	NR	NR	3 severe AE, none judged as related to the study	4 severe AE, none judged as related to study More NSSI in control than TFT group	PE: 13 (24.5%) EMDR: 11 (20.0%)	van den Berg 2015
Yes (no attempts within the past 3 months)	NR	48 (77%); risk high for 22 (36.1%), medium for 9 (14.8%), and low in 16 (26.2%)	NR	NR	NR	NR	NR	NR	EMDR-PE: 4 (3.6%)	vanToorenburg 2020

Yes (no attempts within the past 3 months)	NR	N=256, 73.9%; 22.7% high risk 16.6% moderate & 34.6% low	NR	NR	NR	NR	1.8% pts had increase in PTSD symptoms	NR	EMDR-PE: 8 (2.3%).	VanWoudenberg 2018
Yes, in the past 3 months.	NR	73.4%	NR	NR	NR	NR	None	NR	NR	Voorendonk 2020

+ = improvement, 0 = no change, - = decrease, NR = not reported

Abbreviations

DBT-PTSD, Dialectical Behavioral Therapy - post traumatic stress disorder; EMDR-PE, Eye Movement and Desensitization Reprocessing-Prolonged Exposure; MINI-Plus, Mini International Neuropsychiatric Interview; NSSI, non-suicidal self injury; SA, suicide attempt; SI, suicidal ideation; STAIR (Skills Training in Affect and Interpersonal Regulation).

Non-Suicidal Self-Injury (NSSI). NSSI was also overall reported as improved with TFT in the 12 studies where it was reported. No studies reported worsening of NSSI, and the vast majority reported an improvement during TFT treatment, follow up, or when compared to non-TFT intervention, although not always statistically significantly (Table 2.3). NSSI was not routinely monitored as either a baseline participant characteristic or a potential adverse effect of TFT in the included studies; only one study included NSSI as an inclusion criterion, whereas 11 studies (25.6%) reported the number of participants with self-injury at baseline as a participant characteristic, usually in studies which included those with BPD or BPD traits (nine of the 11 studies) (See Appendix A).

Adverse Events. Occurrence of adverse events was reported in 23 (53.5%) of the studies. Of those 23 studies, seven (30.4%) reported that TFT did not result in any adverse events. Suicidal ideation, suicide attempts, suicide-related hospitalizations, and NSSI were reported as adverse events in six (14.0%) studies, details of which were described previously; none of these studies specified if these events were related to TFT. Six studies reported some participants experiencing PTSD symptoms worsening with TFT, ranging from 1.8% to 25.7% of participants in the trauma focused intervention. In two of those six studies, PTSD symptom worsening occurred early on in treatment and improved with ongoing trauma focused work. Finally, two studies reported on relapse of pre-existing "problem behaviors" as adverse events, which included behaviors such as excessive substance use and oppositional defiant disorder related behaviors. Table 4 outlines details about risk, adverse events and dropouts.

Dropouts: 34 of 43 (79.1%) studies reported monitoring for dropouts. Out of the studies that reported dropouts in both the TFT group and a control within the same study, six (17.6%)

noted more drop-outs in TFT, and three (8.8%) had more drop-outs in the control group. The percentage of participants who dropped out from a trauma focused modality ranged from 0% in three studies that used PE, EMDR, or EMDR-PE to over 50% in one study that used CPT. Four of the five studies that reported no dropouts were delivered intensively, three utilized EMDR alone, one utilized PE alone and one used PE in combination with EMDR. One of the five studies was in a residential setting, and one was inpatient, with the remaining three delivered in an outpatient format.

2.4.5 Theme 5: Measurement

Measurement methods for suicidal ideation varied across studies, with a total of 12 (27.9%) studies utilizing a validated, suicide specific rating scale to assess suicidality. Among these suicide-specific scales, the Beck Scale for Suicide Ideation (BSS) was most commonly used, accounting for eight studies; others included the Suicide Behavior Questionnaire (SBQ; two studies), Adult Suicidal Ideation Questionnaire (ASIQ; one study), and the Interpersonal Needs Questionnaire (INQ; one study). Suicidal ideation questions from depression rating scales were used in six studies that reported on suicidal ideation at baseline and six studies that reported on suicidal ideation over the course of TFT. The most common depression rating scales used were the Patient Health Questionnaire -9 (PHQ-9) and the Beck Depression Inventory (BDI). The Mini International Neuropsychiatric Interview was used to assess for suicidality at baseline in seven studies, and longitudinally in two studies. Chart review and clinical assessment were utilized in the remainder of studies that commented on suicide at baseline and/or over time. Table 2.5 outlines suicidality measures used.

Table 2.5 Measurement of Suicidal Ideation (SI)

Studies that **measured** SI		Studies that used **Suicide Specific** rating scales to assess SI at baseline (Specify if ASIQ, BSS, INQ, SBQ)		N, % of studies that used **11-point Likert scale**		N, % of studies that used **MINI** diagnostic tool		**Studies that used depression scales** (Specify if BDI, MFQ, PHQ)		**N, % of studies that used other measures (Specify which ones)**		**Author, year (Country)**
At baseline	Over time	At baseline	Over time	At baseline	Over time	At baseline	Over time	At baseline	Over time	At baseline	Over time	
30, 69.8%	24. 55.8%	12, 27.9% ASIQ: 1 BSS: 8 INQ: 1 SBQ: 2	12, 27.9% ASIQ: 1 BSS: 8 INQ: 1 SBQ: 2	2, 4.7%	3, 7.0%	7, 16.3%	2, 4.7%	6, 14.0% BDI: 2 MFQ: 1 PHQ: 3	6, 14.0% BDI: 2 MFQ: 1 PHQ: 3	3, 7.0%	1, 2.3%	N, % of all studies
x	x	x (BSS)	x (BSS)									Blain 2020
	x		x (BSS)		x							Bohus 2013
x	x							x (BDI)	x (BDI)			Brown 2019a
x	x	x (BSS)	x (BSS)									Bryan 2018
x	x							x (MFQ)	x (MFQ)			Cohen 2007
x	x							x (BDI)	x (BDI)			Cox 2016

x						x						De Jongh 2020
x	x					x	x					Ertl 2011
x	x	x (BSS)	x (BSS)									Fereidouni 2019
x	x	x (SBQ)	x (SBQ)									Harned 2012
x	x			x	x							Hendriks 2017
x	x			x	x							Hendriks 2018
x										x (GAF)		Hogberg 2008
x	x							x (PHQ)	x (PHQ)			Horwitz 2019
x	x	x (BSS)	x (BSS)									Jamshidi 2020

x	x	x (BSS)	x (BSS)									Menefee 2016
x	x	x (BSS)	x (BSS)									Meyers 2017
x	x	x (SBQ)	x (SBQ)									Najavits 2005
x										x (Clinical assessment)		Neuner 2010
x	x	x (ASIQ)	x (ASIQ)									Peters 2021
x	x	x (INQ)	x (INQ)									Proudlock 2020
x	x	x (BSS)	x (BSS)									Resick 2015
x	x	x (BSS)	x (BSS)									Resick 2017

x	x									x (retrospective suicide risk coding based on chart review)	x (retrospective suicide risk coding based on chart review)	Roberge 2021
x	x							x (PHQ)	x (PHQ)			Smith 2020
x	x							x (PHQ)	x (PHQ)			Stayton 2019
x						x						Tang 2015
x	x					x	x					Van den Berg 2015
x						x						Van Toorenburg 2020
x						x						Van Woudenberg 2018
x						x						Voorendonk 2020

Glossary:
ASIQ = Adult Suicidal Ideational Questionnaire
BDI = Beck Depression Inventory
BSS = Beck Scale for Suicide Ideation
INQ = Interpersonal Needs Questionnaire

MFQ = Mood and Feelings Questionnaire
PHQ = Patient Health Questionnaire-9
SBQ = Suicidal Behaviors Questionnaire

2.5 Discussion

The results of this scoping review illustrate a recent increase in research regarding safety and efficacy of TFT in populations that include those with suicidal ideation. Over 80% of the included studies were published since 2011, highlighting the recent focus of this work despite some trauma therapies (e.g., PE, CPT) being available for decades. The previous lack of research may reflect a long held clinical belief that trauma therapy may exacerbate emotion dysregulation or suicidal ideation, or that it should be delivered in a phased approach (Cloitre et al., 2011). While both preliminary and heterogeneous, the evidence provided by this scoping review suggests that this clinical belief may not be evidence-based. Instead, our results indicate a contrary hypothesis that TFT (including intensive delivery) does not increase the risk of suicidality. However, caution should also be taken regarding overgeneralizing or inferring causation from these results given the heterogeneity of the study populations, study conditions, TFT interventions, and outcomes.

While a critical appraisal of the literature was not conducted, a cursory review of the literature would likely place the majority of it within the categories of poor to medium quality, mainly due to a dearth of randomized controlled trials. However, randomized controlled trials of suicidal populations face practical concerns, such as the ethical need to ensure adequate and timely access to evidence based treatment for these high-risk patients. Therefore, it would not be possible to enroll participants in a TFT trial to the exclusion of other standard of care treatments. Additionally, despite some studies specifically including suicidal participants, immediately suicidal persons were often excluded by study inclusion and exclusion criteria due to safety concerns. This creates a double-edged sword for establishing a rigorous and comprehensive body

of evidence for using TFT in populations with suicidal ideation. This scoping review was also hampered by the lack of standardized operational definitions in the included studies of what suicidality entailed (i.e., suicidal ideation or suicidal behaviour) and how that was measured. Among the studies explicitly selected because they reported on suicidal ideation in some form, suicidal ideation was not measured in a consistent way. This was further compounded by the lack of a universal measurement tool, the use of non-suicidal ideation specific measurement tools, and the selection of single suicide items, impairing reliability and validity. There is a need to establish consistent assessment and measurement of suicidality for TFT interventions, to allow adequate cross-data comparisons between studies for a more accurate knowledge base. Finally, it was interesting to note the lack of qualitative studies.

Gaps in the research include a paucity of research on the impact of gender rather than assumed biological sex. While there was an almost equal mix of male and female participants, studies failed to explore other gender-identifying participants. Also, the split of female vs. male participants does not consider the reality that female participants were proportionally more civilian, while male participants were significantly more military. These sex differences raise difficult questions regarding applicability of this research to male civilian or female military participants. Research into female military personnel has, for example, identified increased risk of mental illnesses including PTSD and MDD, and some studies point to higher rates of military sexual trauma, which is not commonly represented in research on military PTSD (Haskell et al., 2020; Maguen et al., 2012a; 2012b). If military sexual trauma was found to be a major cause of female military personnel rates of PTSD, MDD or suicidal ideation, it would raise significant questions regarding appropriate and effective clinical treatment.

Military-related, or specifically combat-related, PTSD is often particularly difficult to treat, and is associated with increased risk for comorbid mood disorders, anxiety disorders, emotional dysregulation, substance abuse, and suicidality (Crum-Cianflone et al., 2014; Norman et al., 2018; Richardson et al., 2017). Equally, early or repeated interpersonal trauma, arising from childhood physical or sexual abuse, is associated with worse treatment outcomes, in addition to significant risk of emotional dysregulation, suicidal ideation and BPD (Schilling et al., 2015). Debates in the literature raise questions as to whether civilian trauma and military trauma can and should be compared, or whether the classification should be between simple versus complex trauma (arising from early or repeated traumatic experiences) regardless of the population or environment (Brewin et al., 2017; Hodges et al., 2013; Karatzias et al., 2016). This debate is relevant to the discussion of suicidality and TFT since military members and Veterans have some of the highest rates of completed suicide (Bryan et al., 2012). Research is needed that compares the same trauma focused therapeutic interventions in military and civilian populations, stratified for the presence of complex trauma. Data on simple and complex trauma are needed to better understand if certain treatments are safer or more effective for certain populations.

The impact dissociation, including dissociative type of PTSD, may also be significant. The recent addition of a dissociative PTSD subtype to the DSM-5 was partly based on evidence that those with PTSD and significant depersonalization and derealization have a different response to trauma related cues. Non-dissociative PTSD is marked by limbic overactivity and emotional under regulation by the medial prefrontal cortex, whereas dissociative PTSD has the opposite pattern with medial prefrontal overregulation of the limbic system (Lanius et al., 2010; Terpou et al., 2019). This overregulation of the limbic system in dissociative PTSD may interfere

with the activation of the fear memory network necessary for processing and resolution of trauma inherent in trauma focused treatments (Lanius et al., 2010; Terpou et al., 2019). The impact of dissociation in the context of TFT with suicidal populations is unknown but may have important implications for assessment and treatment of those with PTSD, especially given the cumulative risk of suicidality in those with more severe dissociation (Calati et al., 2017).

Most studies used an exposure therapy, with fewer studies utilizing EMDR or CPT, over a third using combinations of therapies, and a large proportion (over 50%) using an intensive format, with two or more sessions per week. Military studies were more likely to use exposure-based therapies or CPT, and less likely to use EMDR, despite equivalent evidence to support EMDR in civilian samples. The reason for this is unclear; however, there are different recommendations about what constitutes first line PTSD treatment amongst different clinical groups. The American Veterans Affairs/Department of Defence (VA/DoD) 2017 PTSD guidelines state that there is strong evidence for the use of PE, CPT, EMDR, NET, specific cognitive behavioral therapies for PTSD, Brief Eclectic Psychotherapy, and written narrative exposure as frontline psychotherapies for PTSD (Veterans Affairs and Department of National Defence, 2017). On the other hand, the American Psychological Association (APA) recommended that only PE, CBT, and CPT should be considered as having strong evidence and therefore ranked as the priority treatment modalities; other modalities were considered as having lesser evidence and therefore labelled as second line treatments (American Psychological Association, 2017; Guideline Development Panel for the Treatment of PTSD in Adults, 2019). The reason for the discrepancy in guidelines between the VA/DoD and APA is unknown and has been subject to debate (Dominguez & Lee, 2017; Henning & Brand, 2019; Norcross & Wampold, 2019). Nonetheless, response rates to TFT in military samples are lower than in

civilian ones, with an estimated 31% response after a first TFT and two-thirds of Veterans continuing to meet criteria for PTSD after receiving PE or CPT (Steenkamp et al., 2015). Additionally, dropout rates for PE and CPT appear to be greater than other modalities, as reported in this review. Significant arguments have been provided for why military personnel and veterans may have responded differently to trauma focused treatment, however, one potentially compelling argument has been the introduction of the concept of moral injury (MI) within military trauma literature. MI, defined as the distress experienced when one is required to violate deeply held personal values and morals (Litz et al., 2009), has been found to be highly associated with military PTSD, MDD and GAD (Hall et al., 2021; Koenig et al., 2019). Moreover, MI (and associated guilt and shame) has been suggested to be a potentially more relevant factor in suicidality in military personnel and veterans than PTSD (Bryan et al., 2014; Levi-Belz et al., 2022; Schwartz et al., 2021). Given the recognition of PTSD as a complex disorder with multiple facets beyond the scope of fear circuitry, exploration and potential impact of MI and utilization of other therapies, including EMDR, are warranted within military populations.

Overall, studies reported improvement of symptoms for PTSD, MDD, and BPD, with no clear indication that TFTs have a significantly greater safety risk or dropouts compared to non-trauma focused therapy. However, some caveats apply: first, a significant proportion of studies excluded those with recent suicide attempts or severe active suicidal ideation; criteria to exclude participants based on risk to self were very heterogenous across studies. There was also great variability amongst studies with respect to reporting on suicidal ideation, with only a quarter of the studies using a validated, suicide specific rating scale to adequately measure and monitor suicidality. Only four studies specifically included suicidal ideation as an inclusion criterion, all

utilizing EMDR in whole or in part. Follow up periods to track possible recurrence of suicidality after treatment were also variable. This inconsistency with which suicidal risk was assessed and monitored during and after treatment makes the translation of research data to clinical practice difficult. In the context of expert guidelines recommending stabilization of suicidality prior to commencing TFT, clinicians may fear treating those with suicidality, especially those presenting with sequelae of repeated, prolonged, and early adversity trauma who may also suffer from impulse control and emotion regulation difficulties such as BPD (Cloitre et al., 2011). However, while participants with BPD may have higher symptom levels, emerging evidence suggests BPD diagnosis alone does not imply worse outcomes compared to other client populations (Harned et al., 2015; Holder et al., 2017).

It is important to note that most of the studies enrolling the highest risk patients (those with childhood trauma and those with BPD or BPD traits) included protocols that either utilized emotion regulation or stabilization skills before or during TFT or used an intensive treatment schedule of at least twice weekly. The protocols focusing on stabilization or emotion regulation skills may reflect the clinical caution in directly using TFT with populations at risk of suicidality. The impact of intensively scheduled TFT is less straightforward. Intensively scheduled treatment was, in fact, utilized in over half of all studies captured in this review. If TFT in those with suicidal ideation is as unsafe as most clinicians and experts advise, it would follow that delivering this therapy more frequently would increase this risk. However, this was not observed in this review. Instead, the present scoping review revealed that studies utilizing intensive TFT reported positive outcomes and minimal adverse effects or dropouts, even in complex populations without stabilization prior to memory work. It is possible that the intensive therapy schedule, with more frequent therapist contact, may provide containment in and of itself. It may

also be hypothesized that more frequent sessions allow for faster symptom reduction, as participants may have more frequent opportunities to access traumatic material, less opportunity to avoid that material between sessions, and a greater sense of safety due to more frequent therapist availability, therefore reducing dropouts, as has been suggested elsewhere (van Woudenberg et al., 2018). It is also possible that there may be subgroups within these complex populations that will find frequent sessions to be too distressing or that require preparation and stabilization prior to trauma work. Therefore, further investigation is needed regarding the impact of intensively scheduled treatment in high-risk patients, including its risks and benefits, impact on efficacy and participant retention, and which patients need, and which may forgo stabilization. Qualitative studies regarding participant experiences may be beneficial here, to capture contextual and patient variables important for complex and suicidal patients specifically.

Mechanisms underlying the observed changes in suicidal ideation during the course of TFT require further study. Reduction in suicidal ideation has been reported even when the TFT intervention does not explicitly address suicidal ideation (Fereidouni et al., 2019; Gradus et al., 2013; Holliday et al., 2018; Jamshidi et al., 2020; Proudlock & Peris, 2020); some studies report that suicidal ideation improves as PTSD and depressive symptoms improve (Boffa et al., 2018; Brown et al., 2019a; 2019b; 2020; Bryan et al., 2016b; Cox et al., 2016; Gradus et al., 2013; Johnson et al., 2021; Norr et al., 2018). There are multiple theories about how suicidal ideation is generated and what can contribute to it, including hopelessness, negative self-cognitions, overwhelming negative emotions, physiological arousal, unbearable somatic sensations, perceived burdensomeness and thwarted belongingness (Baumeister, 1990; Rudd, 2006; Van Orden et al., 2010). It may be that different TFT modalities impact suicidal ideation through different mechanisms, modified by participant characteristics, although this has yet to be

systematically investigated. It is also possible that the reduction in suicidal ideation may be, at least in part, due to its natural waxing and waning course over time or other nonspecific factors, such as the instillation of hope or self-efficacy (Tucker et al., 2013).

Additionally, a small minority of participants in a few studies experienced symptom exacerbation during assessment or initial treatment, which resolved in studies that permitted the TFT to continue. This is in keeping with PTSD literature demonstrating symptom exacerbation in a minority of participants, which is not implicated in poor outcomes or drop-outs (Larsen et al., 2020). This is important to note, given the possibility that both clinicians and patients alike may interpret increased symptoms as a significant adverse effect and discontinue treatment prematurely. Within the context of suicidal ideation specifically, clinicians may already be hesitant to use TFT, particularly if there is an exacerbation of symptoms (Becker et al., 2004). However, as we have seen from this review, symptom exacerbation may not necessarily herald poor outcomes, and worsening of suicidal ideation during treatment may not be tied to symptom exacerbation. For example, Tripp et al. (2021) reported worse outcomes for suicidality in veterans with comorbid PTSD and Alcohol Use Disorder who underwent treatment with Seeking Safety (SS), a present centred skills group, compared to an intervention combining exposure with Cognitive Behavioral Therapy (COPE). Ten percent of the COPE group, compared to 15% of the Seeking Safety group, experienced reliable exacerbation in suicidal ideation. However, the exposure-based intervention reported more frequent symptom exacerbation; eight (20.5%) participants in COPE versus four (10.3%) in the SS group experienced worsened PTSD symptoms during treatment, and three (7.5%) vs. one (2.6%) reported increased alcohol use. Participants in both treatment conditions who demonstrated any clinical exacerbation still showed improvements at post treatment in PTSD, alcohol use, and overall suicidal ideation.

Further research to clarify the significance, if any, of symptom exacerbation during treatment in studies which specifically enroll those with suicidal ideation are needed, including to determine which symptoms may be important to treatment outcomes.

2.5.1 Limitations

Despite the comprehensive search strategy reducing the risk of publication bias, some studies may have been missed. The scope of this review was restricted to peer reviewed studies that explicitly focused on established trauma therapies which focus on addressing traumatic memories. Therefore, other trauma treatments that do not focus on traumatic memories were not included. Equally, not all TFT studies that included participants with suicidal ideation may have reported on it. Thus, some studies were likely excluded because of the lack of clarity regarding whether or not trauma-affected participants were suicidal. There may have also been appropriate studies within associated fields, such as BPD or substance abuse, which were missed because of different study or diagnostic classification issues. Finally, this scoping review only included research in the English language and excluded the gray literature as a source of evidence.

2.5.2 Future Directions

There is a clear and present need for consensus on what approach to TFT is most appropriate for persons with suicidality. This is an area that requires further systematic research, differentiating the analysis and discussion by suicidal ideation, therapy modality, and other subgroups such as those with significant dissociation, early childhood trauma, and gender. These considerations, adequately explored, would allow informed consent, and inform clinicians about

potential modifications required to ensure safe and effective trauma-therapy options for both the client and therapist.

Key recommendations from this review are:

- **Study and Population:** Increase the diversity of study designs (including qualitative and naturalistic studies) to gain a better understanding of lived experience of those with suicidal ideation undergoing TFT. A need exists for studies which report on both sex and gender, including diversity of gender identity. Prospective interventional studies that have suicidal ideation as an inclusion criterion are needed.
- **Trauma Focused Therapy:** There is a need for studies to explore the effect of TFT on symptoms associated with psychiatric diagnoses other than PTSD (e.g., MDD, GAD, SUDs, Eating Disorders, Psychotic Disorder). Research exploring TFT in suicidal patients with dissociative type PTSD and dissociative disorders is also urgently needed. A specific stream of research is needed to compare intensive vs. non-intensive TFT, particularly as over 50% of studies identified in this review used intensive treatments. Also needed are studies that compare TFTs that do, or do not, employ protocols with emotion regulation skills to determine if this factor is a significant determinant of outcomes for populations with suicidal risk. Another research opportunity is the paucity of military research on the impact of non-exposure and non-CPT trauma modalities on suicidality, especially within the female (sex and gender) population and those with military sexual trauma.
- **Risk**: The literature was heterogeneous in areas of study inclusion and exclusion criteria related to risk to self; definitions, assessment, and measurement of risk and suicidality

across studies; setting (inpatient, outpatient and residential), and duration of follow up. All of these elements need to be addressed in future studies to properly examine factors related to risk within trauma-affected populations with suicidal ideation receiving TFTs.

- **Measurement:** Future studies need to use standardized measurement tools to accurately assess suicidality and to allow comparison across studies.

Chapter 3 Synchronous Virtual Psychotherapy for Mental Disorders from a Health Quality Perspective: A Scoping Review

3.1 Abstract

Background: The COVID-19 pandemic has resulted in rapid changes to healthcare delivery, including a shift away from in-person to virtually delivered psychotherapy. While these changes ensured timely psychotherapy provision, many concerns exist, including, but not limited to legal, clinical, cultural, practical, and privacy and/or security issues.

Objective: This scoping review systematically mapped existing peer-reviewed research on synchronous, therapist-delivered virtual psychotherapy for individuals with a diagnosed mental illness. Data were analyzed through the lens of the Alberta Quality Matrix of Health (HQM).

Methods: Relevant studies were identified using seven online databases. The search process was documented and reported in adherence to PRISMA for Searching (PRISMA-S) extension. Two reviewers independently charted the data for each publication considered. Results were described according to the six HQM dimensions: acceptability, accessibility, appropriateness, effectiveness, efficiency, and safety.

Results: From 13 209 publications, 48 studies were included. Many studies measured treatment effectiveness (n=48, 100%) and acceptability (n=29, 60.4%), reporting that virtual delivery of psychotherapy was comparable to in-person delivery. Safety (n=5, 10.4%) was measured in fewer studies, while treatment accessibility, appropriateness, and efficiency were not measured

in any of the included studies and only mentioned in certain studies as a future direction, hypothesis, or potential outcome.

Conclusions: Although treatment acceptability and effectiveness are the main aspects of healthcare quality investigated, there is a lack of research surrounding treatment accessibility, appropriateness, efficiency, and safety. Future research should address these dimensions of quality to ensure that quality care is provided to those receiving virtual psychotherapies.

3.2 Introduction

The novel coronavirus disease 2019 (COVID-19) pandemic continues to impact the mental health of individuals and communities globally (Vindegaard & Benros, 2020). Government mandated physical distancing restrictions necessitated a rapid shift away from in-person mental health services to virtually delivered services (e.g., teletherapy, videoconferencing, eHealth, and mobile health) (Liu et al., 2020b). Disruptions in routines and activities stemming from the consequences of the COVID-19 pandemic have led to increased distress, anxiety, depression, and suicidal ideation both within the general population (Farooq et al., 2021; Wu et al., 2021) and clinical populations with existing psychiatric disorders (Murphy et al., 2021). Ensuring the ongoing, safe delivery of psychotherapies to treat mental health symptoms in the face of this challenge is imperative.

Synchronous virtual delivery of mental health services (i.e. delivered by a healthcare provider or therapist over the phone or online video conference) is not a novel concept (Cummins & Schuller, 2020). However, caveats surrounding virtual delivery (e.g., legal, clinical, cultural, practical, and privacy and/or security issues) remain to be fully addressed (Jones et al.,

2020). Before the COVID-19 pandemic, concerns regarding the equivalency of virtual services to face-to-face treatment, establishment of a therapeutic alliance, client and service provider acceptance of virtual health, technical connectivity challenges, patient privacy and confidentiality, software and equipment availability, usability and reliability, associated costs, and regulatory concerns slowed the widespread implementation of virtual health services (Smith-MacDonald et al., 2021). While these concerns still exist, the nature of the COVID-19 pandemic created an environment where the implementation of synchronous virtual mental health services, including psychotherapy, was accelerated to mitigate potential harm from a lack of accessible services.

A recent review reported that psychotherapies delivered via videoconferencing were effective and easy to access for patients; in particular, there was strong evidence supporting use of cognitive behavioral therapy delivered via videoconferencing for post-traumatic stress disorder and depression treatment (Thomas et al., 2021). That report did not fully address other concerns about virtual psychotherapies (e.g., safety of patients, acceptance of virtual psychotherapy by patients and clinicians, training for the use of virtual platforms). The lack of research addressing such concerns may contribute to mental health clinicians more often favoring in-person services compared to virtual services (Zentner et al., 2021) and may exacerbate clinician hesitancy to provide virtually enabled care. A pre-COVID-19 study investigating why psychologists did not use telepsychology in their practice found that concerns surrounding insufficient training, patient safety, and privacy issues were the main deterrents (Pierce et al., 2022).

With mounting evidence that synchronous virtual psychotherapy can be implemented successfully, acceptance and utilization of this modality may continue to increase over time. In

this context, analysis of the existing literature will enable further understanding of strengths and weaknesses of virtual psychotherapies while identifying ongoing knowledge and research gaps. To achieve this, we chose to analyze literature through the lens of the Alberta Quality Matrix of Health (HQM) (https://hqca.ca/about/how-we-work-health-quality-council-of-alberta/the-alberta-quality-matrix-for-health-1/), a tool which allows patients, providers, organizations, and the public to holistically evaluate health systems.

3.2.1 Rationale

The HQM was created following extensive consultation by the Health Quality Council of Alberta, Canada, to provide a framework for organizing information and thinking regarding the complexity of health systems (Health Quality Council of Alberta, 2017). The HQM has two components:

- Dimensions of quality, which focuses on aspects of the patient and client experience
- Areas of need, which divides services provided by the health system into four distinct, but related, categories (Being Healthy, Getting Better, Living With Illness or Disability, and End of Life).

In this scoping review, we assess whether peer-reviewed studies have addressed the six dimensions of the HQM:

- Acceptability: health services are respectful and responsive to user needs, preferences, and expectations
- Accessibility: health services are obtained in the most suitable setting in a reasonable time and distance

- Appropriateness: health services are relevant to user needs and are based on accepted or evidence-based practice
- Effectiveness: health services are based on scientific knowledge to achieve desired outcomes
- Efficiency: resources are optimally used in achieving desired outcomes
- Safety: services mitigate risks to avoid unintended or harmful results

Framing analysis around the HQM may help identify knowledge gaps surrounding virtual psychotherapy, while highlighting any disparity between previously prioritized dimensions of care and those requiring further attention.

3.2.2 Objectives

This scoping review aims to systematically map the existing peer-reviewed research on synchronous, therapist delivered virtual psychotherapy for individuals with a mental health disorder, through the lens of the HQM. Additionally, it strives to identify relevant methodologies and research gaps within the current literature.

3.3 Methods

3.3.1 Protocol

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018). The protocol was not registered a priori.

3.3.2 Eligibility Criteria

The current scoping review included peer-reviewed primary studies investigating synchronous (video or voice only) therapist-delivered remote psychotherapy delivered to adults (aged 18 and over) with a Diagnostic and Statistical Manual of Mental Disorders (DSM) or International Statistical Classification of Diseases (ICD) diagnosed mental illness. Synchronous therapist-delivered remote psychotherapy refers to psychotherapy that is delivered in real-time by a therapist who is not in the physical presence of the participant, including both telephone and videoconferencing formats.

3.3.3 Justification for eligibility criteria

The reason for the review's focus on human-delivered interventions is that evidence suggests the therapeutic alliance is an important predictor of psychotherapy success (Flückiger et al., 2018). Furthermore, the review aimed to determine what is known about therapist delivered online psychotherapy because a) therapists deliver most psychotherapy in health care systems, b) the rapid shift to online care quickly became the norm despite apprehension amongst therapists, and c) questions remain about the relative effectiveness of in-person versus online interventions (Connolly et al., 2020).

App-based interventions were excluded as they have been extensively reviewed in the literature (Lui et al., 2017). Chat groups, support groups, self-directed psychotherapy, text-based interventions, and fully computerized psychotherapeutic interventions were also excluded because they are not synchronous, therapist-delivered interventions. Therapist-assisted interventions, where the therapist is guiding or supporting an intervention but not fully delivering

psychotherapy, and blended interventions, where there is a mix of apps, computerized therapy and therapist intervention, were excluded, as the purpose of this review was to specifically examine the impact of remote psychotherapy delivered by a therapist. Engagement-only interventions (interventions limited to psychoeducation, motivational interviewing, rapport building, support, Strategic Brief Intervention and Referral to Treatment) and consultation- or assessment-only interventions were excluded because the current review was interested specifically on the impact of psychotherapeutic treatment, not assessment or engagement. Case reports were excluded because of the limited generalizability of this study design. Articles in a language other than English were excluded from the review due to feasibility concerns.

3.3.4 Information Sources

An expert health research librarian searched seven electronic health databases from database inception until March 18, 2021: MEDLINE, APA PsycINFO, EMBASE via OVID; Web of Science: Core Collection via Clarivate; Cochrane Library via Wiley; and Scopus via Elsevier.

3.3.5 Search Strategy

The search process was documented and reported in adherence to the PRISMA for Searching (PRISMA-S) extension (Rethlefsen et al., 2021). Methodological guidance for the systematic search was sought from the JBI Manual for Evidence Synthesis, Chapter 11: Scoping Reviews (Peters et al., 2020).

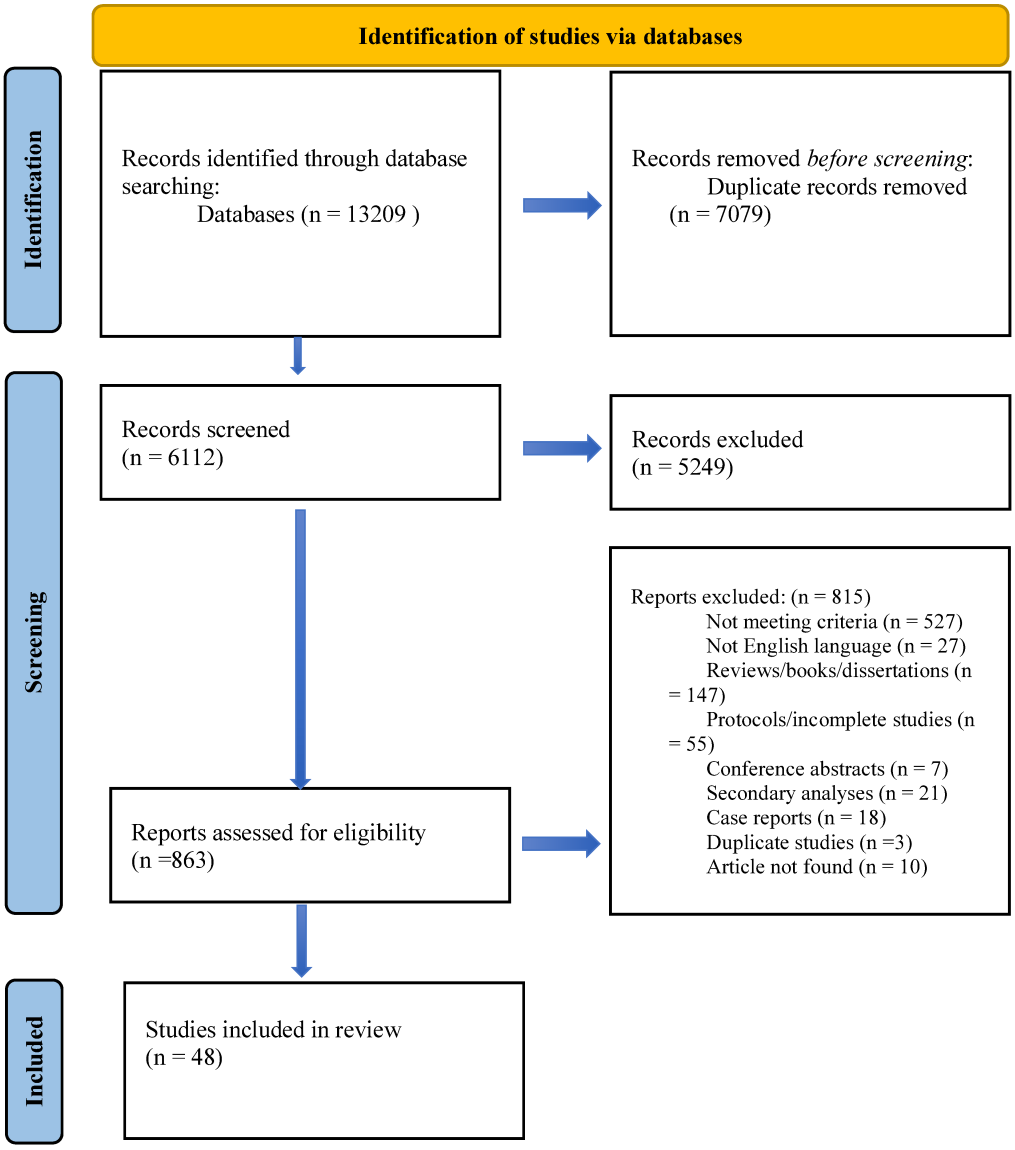
The search strategy was derived from three main concepts ((1) psychotherapy; 2) mental health diagnoses (as defined by the DSM or ICD); 3) online, virtual, or remote delivery or

telemedicine) in consultation with an experienced health sciences librarian at the John W. Scott Health Sciences Library at the University of Alberta using a combination of database medical subject headings and relevant keywords. To enhance search sensitivity, no limits, such as publication date or language, were applied to the searches. The final search strategies for all databases can be found in Appendix B.

3.3.6 Study Selection

Results of the database searches were uploaded into Covidence software (Veritas Health Innovation), which removed duplicate citations. Prior to title and abstract screening of citations, team members reviewed 100 citations to ensure consistency amongst reviewers. Then, two reviewers each independently screened the titles and abstracts of identified citations, with conflicts resolved by a third independent reviewer. After excluding citations in the title and abstract screening phase, articles were selected for full text review. The same process was followed, with pilot testing, followed by two independent reviewers screening each citation and a third independent reviewer resolving conflicts, with team discussions occurring as needed. Articles were then selected for inclusion in the scoping review. The reference lists of these relevant articles, as well as review articles already familiar to the authors, were hand searched to look for additional relevant publications. See Figure 3.1 (PRISMA Flow Diagram) for more details.

Fig 3.1 PRISMA Flow Diagram



3.3.7 Data Extraction and Synthesis

After selection of studies, team members pilot-tested a data extraction Google Form by random sampling of articles before commencement of data extraction. Two reviewers independently charted the data for each publication considered. In the case of data discrepancy, a third independent reviewer validated the information using the original article. The team discussed the results and continuously updated the data-charting form.

The following information was extracted for this review: author country, study design, inclusion and exclusion criteria, sample size, mean age, sex and gender, race or ethnicity, DSM or ICD diagnosis, data analysis strategies, outcome measures, dropouts, results, reported barriers and facilitators to the use of remote psychotherapy, recommendations, and study limitations. Specific information about the intervention (e.g., description of intervention, mode of delivery, group or individual therapy delivery, clinician's training or background) was also extracted. Additionally, data were extracted regarding whether the study addressed each HQM dimension, including treatment acceptability, accessibility, appropriateness, effectiveness, efficiency, and safety. Reviewers evaluated whether the study measured the dimension in question or whether the dimension was mentioned in the text as a potential outcome, future direction, or hypothesis. Results were described according to the six HQM dimensions.

3.4 Results

3.4.1 Search Results

The search strategy yielded 13 209 publications, from which 7,097 duplicate articles were removed. The titles and abstracts of 6,112 articles were reviewed. After excluding 5,249 citations, 863 articles were selected for full text review, with 815 articles being excluded. The remaining 48 articles were included in this review (Bouchard et al., 2000, 2004, 2020; Brenes et al., 2012, 2015, 2017; Celano et al., 2020; De Las Cuevas et al., 2006; Dennis et al., 2020; Dobkin et al., 2020; Dunstan et al., 2012; Egede at al., 2015; Fann et al., 2015; Frueh et al., 2007; Germain et al., 2009, 2010; Goetter et al., 2014; Griffiths et al., 2006; Gros et al., 2011; Hamatani et al., 2019; Heffner et al., 2015; Junkins et al., 2020; Kirkness et al., 2017; Lawn et

al., 2019; Liu et al., 2020a; Maieritsch et al., 2016; Marchand et al., 2011; Matsumoto et al., 2018; Mitchell et al., 2008; Mohr et al., 2011, 2012; Morland et al., 2010, 2011, 2014, 2015, 2019; Olden et al., 2017; Stecker et al., 2014; Stubbings et al., 2013; Taylor et al., 2003; Tuerk et al., 2010; Valentine et al., 2020; Vogel et al., 2014; Watts et al., 2020; Wierwille et al., 2016; Yuen et al., 2013, 2015; Ziemba et al., 2014). See Table B.8 in Appendix B and Figure 3.1 (PRISMA Flow Diagram) for details.

3.4.2 Study and Population Characteristics

The articles included in this review enrolled a total of 4,872 participants. The majority (n=46, 95.8%) of studies collected only quantitative data, with two (4.2%) mixed-methods studies collecting both quantitative and qualitative data. Study designs included randomized controlled trials (RCTs) (n=32, 66.7%), non-RCTs (n=8, 16.7%), pre/post tests (no control group) (n=6, 12.5%), and other study designs (n=2, 4.2%). Most (n=37, 77.1%) studies were published in the last 10 years (from 2011-2020), and 83.3% (n=40) were published in the United States (US) or Canada. The predominant DSM/ICD diagnoses were post-traumatic stress disorder (PTSD) (n=19, 40.0%), depressive disorders (n=11, 22.9%), and anxiety disorders (n=10, 20.8%). The vast majority (n=14, 73.7%) of the PTSD studies were conducted in a military population. All studies reported participants as being either male or female, with a total of 52.3% male and 47.7% female participants enrolled across studies, and none reported on gender diverse populations. Thirty-three (68.8%) studies reported on participants' race or ethnicity, with 58.2% (n=1937) of these studies' participants identifying as Caucasian. All studies were conducted within an outpatient population, with two thirds enrolling civilians and one third involving military populations (See Tables B.1-B.5 in Appendix B).

3.4.3 Intervention Characteristics

Most psychotherapies were delivered in a one-on-one setting (n=44, 91.7%), with few studies using group therapy (n=4, 8.3%). Psychotherapy was predominantly delivered via videoconferencing (n=31, 64.6%) (including, but not limited to: Tandberg videoconference system (n=10), Skype (n=3), Cisco Webex (n=2), Polycom (n=2), KMEA TV500SP (n=1), iChat via Mac computers (n=1), Facetime via iPad 2 (n=1)) or telephone (n=15, 31.3%). The most common psychotherapy interventions included Cognitive Behavioral Therapy (CBT) (n=27, 56.3%), exposure therapy or Prolonged Exposure (PE) (n=7, 14.6%), and Cognitive Processing Therapy (CPT) (n=6, 12.5%) (See Table B.6 in Appendix B).

3.4.4 Health Quality Matrix Dimensions

Most included studies measured treatment effectiveness (n=48, 100%) and acceptability (n=29, 60.4%). Treatment safety (n=5, 10.4%) was measured in a smaller number of studies. Treatment accessibility (n=44, 91.7%), appropriateness (n=2, 4.2%), and efficiency (n=2, 4.2%) were mentioned in certain studies (i.e., discussed as a future direction, hypothesis, or potential outcome) but none of these latter dimensions were measured in any of the included studies (See Table 3.1).

Table 3.1: Health Quality Matrix Dimensions

Dimension of Quality	Measured? (N, % of studies) (out of total 48)	Mentioned as a potential outcome? (N, % of studies) (out of total 48)	Mentioned as a future direction or hypothesis? (N, % of studies) (out of total 48)
Acceptability	**29 (60.4%)** Bouchard 2000, 2004, 2020; Brenes 2012, 2015; Celano 2020; Dennis 2020; Fann 2015; Frueh 2007; Germain 2009, 2010; Goetter 2014; Griffiths 2006; Hamatani 2019; Heffner 2015; Junkins 2020; Matsumoto 2018; Mitchell 2008; Morland 2010, 2011, 2014, 2015; Olden 2017; Stubbings 2013; Vogel 2014; Watts 2020; Yuen 2013, 2015; Ziemba 2014	**3 (6.3%)** Dunstan 2012; Tuerk 2010	**0 (0%)**
Accessibility	**0 (0%)**	**14 (29.2%)** De las Cuevas 2006; Dennis 2020; Frueh 2007; Germain 2010; Goetter 2014; Junkins 2020; Lawn 2019; Mohr 2012; Morland 2010, 2011, 2014; Valentine 2020; Yuen 2013; Ziemba 2014	**30 (62.5%)** Bouchard 2000, 2004, 2020; Brenes 2012, 2015, 2017; Celano 2020; Dobkin 2020; Dunstan 2012; Egede 2015; Fann 2015; Germain 2009; Griffiths 2006; Gros 2011; Hamatani 2019; Liu 2020a; Maieritsch 2016; Marchand 2011; Matsumoto 2018; Mitchell 2008; Morland 2015, 2019; Olden 2017; Stubbings 2013; Taylor 2003; Tuerk 2010; Vogel 2014; Watts 2020; Wierwille 2016; Yuen 2015
Appropriateness	**0 (0%)**	**2 (4.2%)** Junkins 2020; Lawn 2019	**0 (0%)**
Effectiveness	**48 (100%)** Bouchard 2000, 2002, 2020; Brenes 2012, 2015, 2017; Celano 2020; De las Cuevas 2006; Dennis 2020; Dobkin 2020; Dunstan 2012; Egede 2015; Fann 2015; Frueh 2007; Germain 2009, 2010; Goetter 2014; Griffiths 2006; Gros 2011; Hamatani 2018; Heffner 2015; Junkins 2020; Kirkness 2017; Lawn 2019; Liu 2020; Maieritsch 2016; Marchand 2011; Matsumoto 2018; Mitchell 2008; Mohr 2011, 2012; Morland 2010, 2011, 2014, 2015,	**0 (0%)**	**0 (0%)**

	2019; Olden 2017; Stecker 2014; Stubbings 2013; Taylor 2003; Tuerk 2010; Valentine 2020; Vogel 2014; Watts 2020; Wierwille 2016; Yuen 2013, 2014; Ziemba 2014		
Efficiency	**0 (0%)**	**2 (4.2%)** Maieritsch 2016; Vogel 2014	**0 (0%)**
Safety	**5 (10.4%)** Heffner 2015; Mohr 2012; Morland 2019; Olden 2017; Tuerk 2010	**5 (10.4%)** Hamatani 2019; Morland 2010, 2011, 2014, 2015	**1 (2.1%)** Taylor 2003

Studies measuring effectiveness did so using a variety of outcome measures (e.g., self-report or clinician-rated questionnaires assessing symptom severity, changes in frequency of psychiatric episodes following treatment, etc.). Common outcome measures included the Beck Depression Inventory (BDI) (n=18, 37.5%), the PTSD Checklist (PCL) (n=10, 20.8%), the Clinician-Administered PTSD Scale (CAPS) (n=9, 18.8%), the Patient Health Questionnaire (PHQ-9) (n=6, 12.5%), the Generalized Anxiety Disorder Scale (GAD-7) (n=4, 8.3%), the Penn State Worry Questionnaire (PSWQ) (n=4, 8.3%), the State-Trait Anxiety Inventory (STAI) (n=4, 8.3%) and the Hamilton Depression Rating Scale (HAM-D) (n=4, 8.3%) (See Table B.9 in Appendix B). Nine (18.8%) studies used only self-report validated scales, while one (2.1%) study used only clinician-administered validated scales. Both self-report and clinician-administered outcome measures were used in 38 (79.2%) studies. Most studies reported that remote delivery of psychotherapy was not inferior to in-person delivery of psychotherapy (n=32, 66.7%), whereas 12 (25.0%) studies did not have an in-person comparator but reported positive results. Four (8.3%) studies found that remote delivery of psychotherapy was inferior to in-person delivery (See Table B.7 in Appendix B).

Studies measuring treatment acceptability (n=29) also used a variety of instruments to assess patient-therapist relationship or patient satisfaction with treatment. The full or short-form

version of the Working Alliance Inventory (WAI) was used in 55.2% (n=16) of studies measuring treatment acceptability. Other validated scales used to assess treatment acceptability included the Client Satisfaction Questionnaire (CSQ-8) (n=5, 17.9%), the Charleston Psychiatric Satisfaction Scale (CPOSS-VA) (n=4, 14.3%), the Telemedicine Satisfaction and Acceptance Scale (TSAS) (n=4, 14.3%), the Group Therapy Alliance Scale (GTAS) (n=3, 10.7%), the Distance Communication Comfort Scale (DCSS) (n=2, 7.1%), the Videoconference Therapy Questionnaire (VT-Q) (n=2, 7.1%), the Service Delivery Perceptions Questionnaire (n=2, 7.1%), the California Psychotherapy Alliance Scale (CALPAS) (n=1, 3.6%), the Client Satisfaction Questionnaire (CSS) (n=1, 3.6%), the Reaction to Treatment Questionnaire (n=1, 3.6%), and the Patient Satisfaction Survey (PSS) (n=1, 3.6%) (See Table B.9 in Appendix B). Non-validated surveys were used to assess acceptability in 25% (n=7) of studies. Additionally, three (6.3%) studies mentioned acceptability as a potential outcome without measuring the dimension. These studies found that age, experience, and positive attitudes toward videoconferencing may be factors modifying treatment acceptability (Dunstan et al., 2012; Lawn et al., 2019), and that veteran populations may be more amenable to the virtual delivery format (Tuerk et al., 2010).

Studies measured safety by tracking the number of adverse events or safety issues that arose during treatment, including suicidal ideation and suicide attempts. All the studies that measured safety (n=5, 10.4%) reported no adverse events or safety issues related to virtual psychotherapy. Safety was also mentioned as a potential outcome in five (10.4%) studies and as a future direction in one (2.1%) study.

Treatment accessibility was mentioned as a potential outcome in 29.2% (n=14) of studies and as a future direction or hypothesis in 62.5% (n=30) of studies. These studies discussed access to psychotherapy in various populations, including rural veterans (Morland et al., 2010,

2011, 2014), psychiatric outpatients living in remote areas (De las Cuevas et al., 2006), and ethnically diverse women living in underserved rural and urban areas (Dennis et al., 2020). Treatment appropriateness and efficiency were mentioned as potential outcomes in 4.2% (n=2) of studies. However, none of the studies measured these dimensions.

3.5 Discussion

This scoping review explored the available peer-reviewed research regarding synchronous, therapist delivered virtual psychotherapy for individuals with a DSM or ICD diagnosis, through the lens of the HQM. The results of this review indicate that treatment effectiveness is the primary dimension of health quality researched for virtual psychotherapy interventions, with 75% of included studies comparing the efficacy of virtual psychotherapy to in-person psychotherapy. This is not surprising, given that the rapid increase in virtual psychotherapy over the past decade, especially during the COVID-19 pandemic, has generated questions about relative efficacy compared to in-person psychotherapy (Batastini et al., 2021). The majority of included studies reported significant improvements in symptoms of depression, PTSD, and anxiety and that the efficacy of virtual delivery of psychotherapy was not inferior to in-person delivery. These findings suggest that virtual, synchronous delivery of psychotherapy may be effective for individuals with DSM or ICD diagnoses, at least for CBT and exposure-based interventions.

Significant gaps remain in relation to the scope of efficacy data. A wide variety of other empirically supported psychotherapies in clinical practice are not represented in this review, including Dialectical Behavior Therapy (DBT) and Eye Movement Desensitization and

Reprocessing (EMDR), which represent a research gap in the current literature. This is important, since other modalities may include higher risk populations (DBT for suicidal behavior), require specific procedures (e.g., alternating eye movements and other dual attention tasks in EMDR) or may rely more heavily on fine observations of body language or movement (e.g., somatic psychotherapies), which may be impacted by virtual technologies. Group therapy, in particular, was underrepresented; group therapy has long been seen as an efficient and effective use of resources but may present challenges in a virtual context (McRoberts et al., 1998). In addition, some populations are not represented in these studies, including those with non-binary gender identities, those with social phobia, or those with Serious Mental Illnesses (SMI) such as schizophrenia spectrum disorders, who may have unique characteristics impacting the effectiveness, acceptability, appropriateness, or safety of virtual psychotherapy. Of the 48 reviewed studies, all collected quantitative data and two studies collected qualitative data. This lack of qualitative data represents a major opportunity for future research focusing on the lived experiences of patients and psychotherapy providers using virtual psychotherapies.

In studies that measured treatment acceptability, most participants noted that therapeutic alliance was similar for virtual and in-person psychotherapy, suggesting that the relationship between therapists and clients was not negatively impacted by the virtual delivery format. Selection bias may have been a factor, with the recruitment of participants who were already accepting of virtually delivered mental health services. For example, one third of included studies were conducted in military populations, which may be more open toward virtual psychotherapy due to fear of encountering trauma-related cues at in-person clinics (Tuerk et al., 2010). Most studies addressed acceptability of virtual psychotherapy from the client's perspective and did not examine the acceptability of virtual psychotherapy from the therapists'

perspective. This is a gap in research concerning the acceptability of virtual psychotherapy as much of the hesitancy regarding wider use and implementation of virtual psychotherapy comes from therapists themselves (Békés et al., 2021). This indicates a need for expanded research specifically addressing therapists' attitudes toward and experiences with virtual psychotherapies.

While treatment accessibility was mentioned as a potential outcome, future direction, or hypothesis in many of the reviewed studies, none of the studies measured this dimension. This indicates that treatment accessibility was not a primary focus of the reviewed studies and research is needed to explore the accessibility of virtual psychotherapy. Perhaps the lack of literature evaluating accessibility is a result of the absence of a validated research instrument which quantitatively measures differences in treatment accessibility between modes of delivery. Regardless, it may be prudent for future research to include a battery of questions centered around treatment accessibility. For example, researchers could obtain qualitative and quantitative data regarding differences in time, expense, and/or support for accessing psychotherapies via virtual or in-person mediums. It is possible that certain populations may benefit from increased access due to virtual psychotherapy more than others (mothers with young children, those with transportation issues, remote locations, etc.), which is an important consideration for health care system quality.

Treatment appropriateness, defined as whether services are relevant to users' needs and based on accepted or evidence-based practice, was mentioned as a potential outcome within the text of only two studies; this represents a clear gap within current research. While not stated explicitly in the HQM, treatment appropriateness has implications for equity, diversity, and inclusion (EDI) within the healthcare system. For example, one of the reviewed studies which mentions treatment appropriateness emphasizes that "culturally appropriate examples and

language were used to reflect life experiences and context among African American women" in the study intervention (Junkins et al., 2020). Almost all reviewed studies did not report taking gender and cultural identity, economic background, or other EDI factors into account, to improve the relevance of the treatment to the study population. The virtual delivery of psychotherapies represents an enormous opportunity to deliver care that is more personalized for the patient. For example, it is possible to "match" patients with mental health clinicians who are from similar cultural or socio-economic backgrounds as virtual delivery can bypass physical barriers. This overlaps with accessibility, in that some underserved populations may live in more remote areas, with less access to in-person psychotherapeutic care. Furthermore, virtual psychotherapies can be tailored to be conducted within the patient's preferred therapeutic environment (one-on-one therapy vs group therapy) more readily than in-person therapy. Virtual psychotherapy delivery offers a great opportunity to create therapeutic environments which are more familiar and comfortable for the patient, potentially leading to greater therapeutic effectiveness. It is of utmost importance that treatment appropriateness is addressed in future research.

Much like treatment appropriateness, treatment efficiency was only mentioned in the text of two reviewed studies. One reason for this gap may stem from difficulties in making comparisons about how resources are used within different therapeutic environments. For example, virtual delivery may be less resource intensive for therapists delivering virtual psychotherapies at mental health clinics compared to therapists delivering it from home, as a therapist working from home may not have the same access to personnel, technological, and/or financial resources; at present, however, such comparisons have not been made. Due to the general absence of treatment efficiency within the reviewed studies, we suggest that future research should identify whether virtual psychotherapy delivery leads to reductions in missed

psychotherapy sessions compared to in-person delivery. In addition, more focus should be granted to group psychotherapies, which may be more resource efficient compared to one-on-one psychotherapies (i.e., one therapist can tend to multiple patients at once).

Another gap is the relative lack of safety data in the included studies, which may mean that treatment safety was not a primary focus of the reviewed studies or may relate to difficulties in operationally defining safety. There was no consistency among the included studies regarding how safety was defined and evaluated, as some studies focused on suicide attempts and suicidal ideation, while others did not explain how safety issues were measured. There is a clear need for researchers to establish consistent operational definitions of safety, which would allow for adequate comparisons of safety between virtual and in-person psychotherapy interventions. Although no safety issues were reported in the five studies that measured safety, it is important to note that 11 studies excluded individuals with suicidal ideation, and none included populations with personality disorders, including borderline personality disorder (BPD), which often have safety risks, high service needs, and challenges with therapeutic alliance (Bender, 2005). It is unknown if virtual psychotherapy is suitable for certain high-risk patient populations, and how to optimally assess and manage safety virtually, given the lack of control in emergency situations inherent in remote contexts (Gilmore and Ward-Ciesielski, 2019; Stoll et al., 2020). To ameliorate hesitancy among clinicians regarding the use of virtual psychotherapy in high-risk populations, there may be a need to expand protocols and training programs that assist clinicians with risk mitigation.

3.5.1 Limitations

We acknowledge several limitations to this review. First, as only studies published in the English language were included, we may have missed peer reviewed articles in other languages. Second, we did not include grey literature, potentially introducing publication bias for selected studies and missing relevant information from non-peer-reviewed sources. Finally, we only included populations with mental health diagnosis as defined by the DSM/ICD, possibly leading to the exclusion of other informative literature not reporting DSM/ICD diagnoses.

3.6 Conclusions

Following review of existing literature, it is clear that research into virtual psychotherapy delivery has largely focused on treatment acceptability and effectiveness. Thus, there are multiple gaps within the extant literature: efficacy data are largely based on cognitive and exposure-based interventions, there is a lack of quantitative research regarding the differences in treatment accessibility between virtual and in-person delivery, and little research has focused on treatment appropriateness, efficiency, and safety. Bridging these gaps would greatly increase our understanding of the strengths and weaknesses of virtual psychotherapy delivery, including what works for whom, and in what context. Without such knowledge, healthcare providers risk providing substandard care; to ensure that quality care is provided to those receiving virtual psychotherapies, future research should address gaps identified in this review.

Chapter 4 Web-Based Eye Movement Desensitization and Reprocessing for Adults With Suicidal Ideation: Protocol for a Randomized Controlled Trial

4.1 Abstract

Background: Adversity and traumatic experiences increase the likelihood of suicidal thoughts and behaviors. Eye Movement Desensitization and Reprocessing (EMDR) is an evidence-based, trauma-focused psychotherapy that desensitizes painful memories, so that reminders in the present no longer provoke overwhelming emotional responses. Preliminary evidence suggests that EMDR can be used as an acute intervention in suicidal patients, including those with major depressive disorder. In addition, because of social distancing restrictions during the COVID-19 pandemic, clinicians have been using EMDR on the web and, in the absence of formal evaluations of web-based EMDR, informal reports indicate good results.

Objective: The primary aim of this randomized controlled trial is to investigate whether remotely delivered EMDR (targeting experiences associated with suicidal thinking) reduces suicidal thoughts. Secondary aims include examining the impact of remotely delivered EMDR on symptoms of depression, anxiety, posttraumatic stress, emotional dysregulation, and dissociation. We will also report on adverse events in the EMDR group to explore whether targeting suicidal ideation with EMDR is safe. Finally, we will compare dropout rates between the treatment groups.

Methods: In this randomized controlled trial, 80 adults who express suicidal ideation and meet the study criteria will receive either 12 sessions of twice weekly EMDR plus treatment as usual or treatment as usual alone. EMDR sessions will focus on the most distressing and intrusive

memories associated with suicidal ideation. Data for primary and secondary objectives will be collected at baseline, 2 months, and 4 months after enrollment. A subsequent longer-term analysis, beyond the scope of this protocol, will examine differences between the groups with respect to the number of posttreatment emergency room visits, hospitalizations, and overall health care use in the year before and after therapy.

Results: The protocol was approved by the University of Alberta Research Health Ethics Board (protocol ID Pro00090989). Funding for this study was provided by the Mental Health Foundation (grant RES0048906). Recruitment started in May 2021, with a projected completion date of March 2023.

Conclusions: The results of this trial will contribute to knowledge on whether web-based delivery of EMDR is a safe and effective treatment for reducing suicidal ideation and potentially reducing the incidence of suicide attempts in this patient population.

4.2 Introduction

4.2.1 Trauma, Suicide and Psychopathology

Suicide is the second leading cause of death among those aged 10-29 years and the ninth leading cause of death overall, with reports of 4000 completed suicides per year in Canada (Public Health Agency of Canada, 2018). Psychiatric disorders that most strongly predict subsequent suicide attempts are bipolar disorder, posttraumatic stress disorder (PTSD), and major depressive disorder (MDD) (Klonsky et al., 2016). Epidemiological evidence also indicates that adverse or traumatic experiences increase the likelihood of developing both

suicidal ideation (SI) and a range of psychiatric disorders (Afifi et al., 2008, 2009, 2016; Ásgeirsdóttir et al., 2018; de Araújo et al., 2016; Dube et al., 2001; Kisely et al., 2018). Among over 30 psychological risk and protective factors identified for suicidal behavior, the strongest associations were with depression, hopelessness, impulsivity, adverse childhood experiences (ACEs), and trauma (Afifi et al., 2008, 2009, 2016; Ásgeirsdóttir et al., 2018; de Araújo et al., 2016; Dube et al., 2001; Kisely et al., 2018; Klonsky et al., 2016).

The psychological and neurobiological consequences of adverse or traumatic experiences may moderate the development of suicidal thoughts and behaviors (Shaperio et al., 2019). The neurobiological and psychological basis of suicidal thoughts and behaviors is outlined in reviews by van Heeringen and Mann (2014) and O'Connor and Nock (2014). ACEs are associated with a strong, graded relationship to later suicide attempts, which may be moderated through stress sensitivity and emotion dysregulation, and expressed as substance use, risky sexual behavior, depressed mood, or anxiety (Dube et al., 2001; Herzog et al., 2018; Petruccelli et al., 2019). Childhood adversity has been associated with deficits in executive function, including attention, working memory, cognitive flexibility, inhibitory control, and emotion regulation. These factors, particularly inhibitory control and emotion dysregulation are associated with an increased risk for the development of psychopathology and suicidality later in life (Dvir et al., 2014; Lund et al., 2020).

4.2.2 Eye Movement Desensitization and Reprocessing

Eye Movement Desensitization and Reprocessing (EMDR) is an evidence-based therapy, initially developed for PTSD, which desensitizes painful memories, so that present reminders no

longer provoke overwhelming emotional responses (Navarro et al., 2018). EMDR is effective for treating a variety of conditions, including anxiety, depression, trauma, substance misuse, and trauma in patients with severe mental illnesses such as psychosis or bipolar disorder (Carletto et al., 2021; Valiente-Gómez et al., 2017; Wilson et al., 2018). During a typical EMDR session, the client focuses on emotionally disturbing material while bilateral stimulation is applied, either in the form of alternating eye movements, a tactile stimulus such as alternating bilateral tapping, or auditory tones. Standard EMDR uses an 8-phase protocol, including history-taking, preparation, assessment and treatment-planning, desensitization, installation of a positive cognition, body scan, closure, and re-evaluation (Shapiro, 2018).

EMDR is guided by the Adaptive Information Processing (AIP) model, in which present symptoms are seen as unprocessed explicit and implicit memories stored in the brain that lead to maladaptive information processing and present as posttraumatic and other psychiatric symptoms. In theory, EMDR facilitates the accessing and processing of traumatic memories to an adaptive resolution, after which the disturbing affective distress is relieved, physiological arousal is reduced, negative beliefs are reformulated, and alternative ways of responding to future similar situations are considered (Shapiro, 2018).

4.2.3 EMDR and Suicidality

Suicide researchers have hypothesized that suicidal thoughts and behaviors may emerge when environmental triggers activate dimensions of risk in individuals who have been exposed to past adverse experiences and trauma. Two relevant theories include the Escape Theory and the Fluid Vulnerability Theory (Baumeister, 1990; Rudd, 2006). The Escape Theory suggests that

stressful life events activate painful affective states, leading to urges to escape the negative affect and self-awareness. The urge to escape painful affect may lead to reduced self-inhibition, increased passivity, disconnect from emotions, or increased negative thoughts such as suicidal thinking. In this context, SI becomes more accessible and acceptable over time. The more frequent and distressing the suicidal intrusions, the more likely the person is to see them as the best solution to the unescapable, intensely negative state (Baumeister, 1990).

The Fluid Vulnerability Theory, which focuses on the process of suicide risk rather than risk factors, posits that each person has both a baseline risk state and potential for at least one *suicidal mode*, a time-limited suicidal state with individual characteristic features related to the person's suicidal belief (cognitive) system, affective system, physiological system, and behavioral (motivational) system, which together work in synchrony. This theory proposes that the risk state and suicidal mode can be activated by either external or internal triggers, and usually ends in a state "characterized by specific or core cognitive themes (i.e., unlovability, helplessness, poor distress tolerance, and perceived burdensomeness), acute dysphoria and related physiological arousal (ie, Axis I symptomatology), and associated death-related behaviors" (Rudd, 2006). During these *suicidal modes*, motivational and behavioral systems may be engaged which activate specific motoric and physiologic responses, for example, fight, flight, or freeze, along with preparatory urges or behaviors. Sometimes, these states are misinterpreted cognitively as a threat in themselves, leading to escalation of distress. These modes are based on the original cognitive therapy model by Beck (1996) and defined as "specific suborganizations within the personality organization (that) incorporates the relevant components of the basic systems of personality: cognitive (or information processing), affective, behavioral, and motivational." Beck (1996) described a mode as an "integrated cognitive-affective-behavioral

network [that] produces a synchronous response to external demands and provides a mechanism for implementing internal dictates and goals" (Rudd, 2006). The Fluid Vulnerability Theory also assumes that a person's baseline level of risk is determined by historical and developmental factors that predict why activation of a suicidal state might occur in a particular context and with a particular intensity. This vulnerability also has cognitive, affective, physiological, and behavioral aspects, and improvements in any one area can reduce vulnerability across the system. This theory emphasizes the cognitive *suicidal belief system*, which may stem from historical factors such as adversity. Rudd (2006) proposed that the suicidal belief system is "potentially amenable to change during periods of activation, [and] activation is critical to treatment progress and success."

Both the Escape Theory and the Fluid Vulnerability Theory are compatible with the AIP model and the Working Memory Model of EMDR and may provide theoretical support for why EMDR could reduce suicidality (Andrade et al., 1997; Shapiro, 2018). In the AIP model, stressful and especially overwhelming experiences are conceptualized as affectively laden memories with explicit and implicit components that are incompletely processed. Multiple stressful experiences may be associated within networks linked by common themes, cognitions, emotions, implicit states, urges, or other similarities. These memories include a cognitive component, which may be the consequence of dysfunctional learning or overgeneralization, which may contribute to core beliefs. Activation of these memory networks, along with their cognitive, emotional, sensory, physiological, and behavioral components, represent the basis for symptomatology (Shapiro, 2018). The Working Memory Theory posits that memories are transferred to working memory during EMDR and that eye movements function to reduce the vividness and intensity of memory-related imagery, partly because they *tax* working memory by

using processing resources in the visuospatial sketchpad, which reduces the emotionality of the memory. This is corroborated by research showing reduced amygdala activation during EMDR (de Voogd et al., 2018). At the same time, while the experience is held in awareness in working memory, it is amenable to change and is ultimately reconsolidated into a different form, with altered and more adaptive meta-cognitive interpretations (Andrade et al., 1997).

Standard EMDR begins with accessing past associations to a current presenting problem by asking the participant about their current cognitions, emotions, or sensations. Holding all these elements together in awareness, the therapist then directs the person to *float back* to earlier times in life when these elements were experienced together, thus finding implicit past associations with the presenting problem. Alternatively, patients are asked to provide experiences that have *proven* their core beliefs, for example, *I am unlovable*, which are likewise processed. The targeted memory is desensitized and then paired with a positive core belief, which allows the person to access more adaptive information. Once the past experience is processed, present reminders and future fears of when a similar experience may happen are found in a similar fashion and then again processed. The Escape Theory would suggest that if EMDR desensitizes distressing memories associated with painful affective states fueling suicidal intrusions, SI would decrease. From the Fluid Vulnerability Model perspective, EMDR may address multiple aspects of the *suicidal mode*, as well as baseline risk, by targeting all 4 components (cognitive, affective, physiological, and behavioral) of the experiences contributing to risk. As the suicidal belief system shifts and internal and external cues no longer provoke arousal, vulnerability to activating future suicidal states may decrease. As cognitive, affective, and sensory (somatic or physiologic) aspects are addressed, in past, present, and future time

frames, we hypothesize that EMDR will be able to uniquely access and address multiple dimensions of risk for suicidality concurrently in an individualized manner.

Preliminary evidence indicates that EMDR may be an effective intervention for SI (Fereidouni et al., 2019; Proudlock & Hutchins, 2016; Proudlock & Peris, 2020). With populations experiencing suicidal thoughts, EMDR may decrease SI, even when SI is not addressed directly, as is the case when PTSD, anxiety, or depression are primary treatment targets (Fereidouni et al., 2019; Jamshidi et al., 2020; Proudlock & Hutchins, 2016; van den Berg et al., 2015). Most recently, Fereidouni reported a reduction in the Beck Scale for Suicide Ideation (BSS) scores in a randomized controlled trial (RCT) using intensive EMDR in 70 adult inpatients with MDD. Participants in the intervention group received individual EMDR for 45 to 90 minutes 3 times per week for 9 sessions. In that study, the mean BSS score dropped significantly from 26.48 to 11.11 in the EMDR group compared with no change in the control group. However, no other outcome measures were reported, and the participants were limited to those with depression (Fereidoui et al., 2019). Currently, most psychotherapeutic treatments target a specific diagnosis. Examples include EMDR treatment for PTSD and Dialectical Behavioral Therapy for borderline personality disorder (BPD), and changes in SI are usually reported as secondary outcomes (May et al., 2016; Navarro et al., 2018). Given the increasing public health need to improve treatment options for suicidality, this pragmatic real-world study was designed to assess the impact and safety of using EMDR to target SI across a wide spectrum of diagnoses.

4.2.4 Web-Based Delivery of EMDR

The COVID-19 pandemic has forced a rapid shift from in-person psychotherapy to remotely delivered psychotherapy services, both to reduce the spread of COVID-19 and to maintain service accessibility. This rapid shift to web-based care has raised concerns about whether therapy delivered via the web is as safe and effective as in-person therapy. A recent systematic review reported level 1a evidence that remote access, digitally delivered trauma therapies such as prolonged exposure therapy, cognitive processing therapy, and therapeutic exposure can be as effective as in-person treatment and may improve access to care (Jones et al., 2020). Although there is a paucity of research on the safety and effectiveness of web-delivered EMDR, remotely delivered EMDR has been adopted clinically around the world (Lenferink et al., 2020). This project will contribute to this area by exploring, with a focus on SI, whether remotely delivered EMDR can be delivered safely and effectively in a routine clinical practice setting. Remote access, rather than a face-to-face approach, has been chosen for our study as, locally in Edmonton, Alberta, Canada, the COVID-19 pandemic resulted in an increase in demand for mental health services at the same time as a reduction in the availability of in-person mental health support. Furthermore, public health measures have necessitated periodic self-isolation, leading to clinic cancelations. For these reasons, this project will deliver EMDR via end-to-end encrypted Zoom videoconferencing (Zoom Video Communications, Inc), rather than in person.

4.2.5 Objectives

This study aims to examine whether web-based delivery of EMDR reduces the intensity of SI in adults, as measured by the BSS and the Columbia Suicide Severity Rating Scale (CSSRS). We hypothesize that targeting memories that are associated with SI, including addressing the associated suicidal belief system, will reduce distress and emotional dysregulation driving SI.

SI is often associated with mood, anxiety, and posttraumatic symptoms, and emotion dysregulation and dissociation are common in populations experiencing intense negative emotional states and those at risk of SI, such as PTSD and BPD (Carlson et al., 2012; Choi et al., 2011; Korzekwa et al., 2009). The secondary study objectives, therefore, include measuring the impact of our modified EMDR treatment on symptoms of depression, anxiety, posttraumatic stress, emotional dysregulation, and dissociation. Measuring these symptoms will allow better characterization of our study sample and allow comparison with previous literature. In addition, we wish to learn if focusing on SI-associated experiences specifically leads to improvement in these common comorbid symptoms. Previous literature indicates that reductions in SI that occur during PTSD treatment, for example, may be mediated by improvements in PTSD or depressive symptoms (Brown et al., 2019a). It is unknown whether focusing specifically on SI, rather than a specific diagnosis such as PTSD, would also result in decreases in mood, anxiety, and PTSD symptoms.

A further objective is to report on the history of ACEs and the level of dissociative symptoms experienced by study participants (EMDR vs treatment as usual [TAU] group), as these may be markers of complexity (Lyssenko et al., 2018; Rafiq et al., 2018). Dissociative

symptoms have been linked to increased comorbidity, exposure to childhood adversities, clinical severity, and lower response to trauma-focused therapies (TFTs) (Bae et al., 2016; Lanius et al., 2010; Lyssenko et al., 2018; Rafiq et al., 2018). There is controversy as to whether dissociation is a barrier to using TFTs, such as EMDR (Lunch et al., 2008). The dissociative subtype of PTSD has been associated with midline prefrontal inhibition of limbic regions involved in emotion regulation, leading to emotional overmodulation (Lanius et al., 2020). One possible clinical implication is that such patients may have difficulty improving with TFTs because of impaired emotional regulation capacities and a tendency to dissociate upon exposure to distressing cues inherent in the processing of the trauma. This could impair the ability to adequately activate the fear network, leading to reduced effectiveness of TFTs (Lanius et al., 2020). Therefore, measuring dissociation at baseline and after treatment will provide important information about whether EMDR impacts dissociation, or if dissociative symptoms adversely impact treatment response.

We will compare dropout rates between treatment groups and report on any adverse events that arise in the EMDR group to explore the safety of using EMDR to target SI. Experts in the field of trauma have long believed that survivors of trauma should be treated using a phased approach (Cloitre et al., 2011; Herman, 1998; van der Kolk et al., 2000). The first phase focuses on stabilization and the introduction of coping skills to reduce self-harm and suicidality. Once phase 1 is completed and the person is no longer a risk to themselves or others, phase 2 may begin, with TFTs such as EMDR, which focus on distressing memories directly. However, this phased approach emphasizing stabilization before trauma processing has been criticized as lacking evidence (De Jongh et al., 2016). Therefore, studies reporting on the safety of TFTs, such as EMDR, in patients with SI can help address this controversy.

4.3 Methods

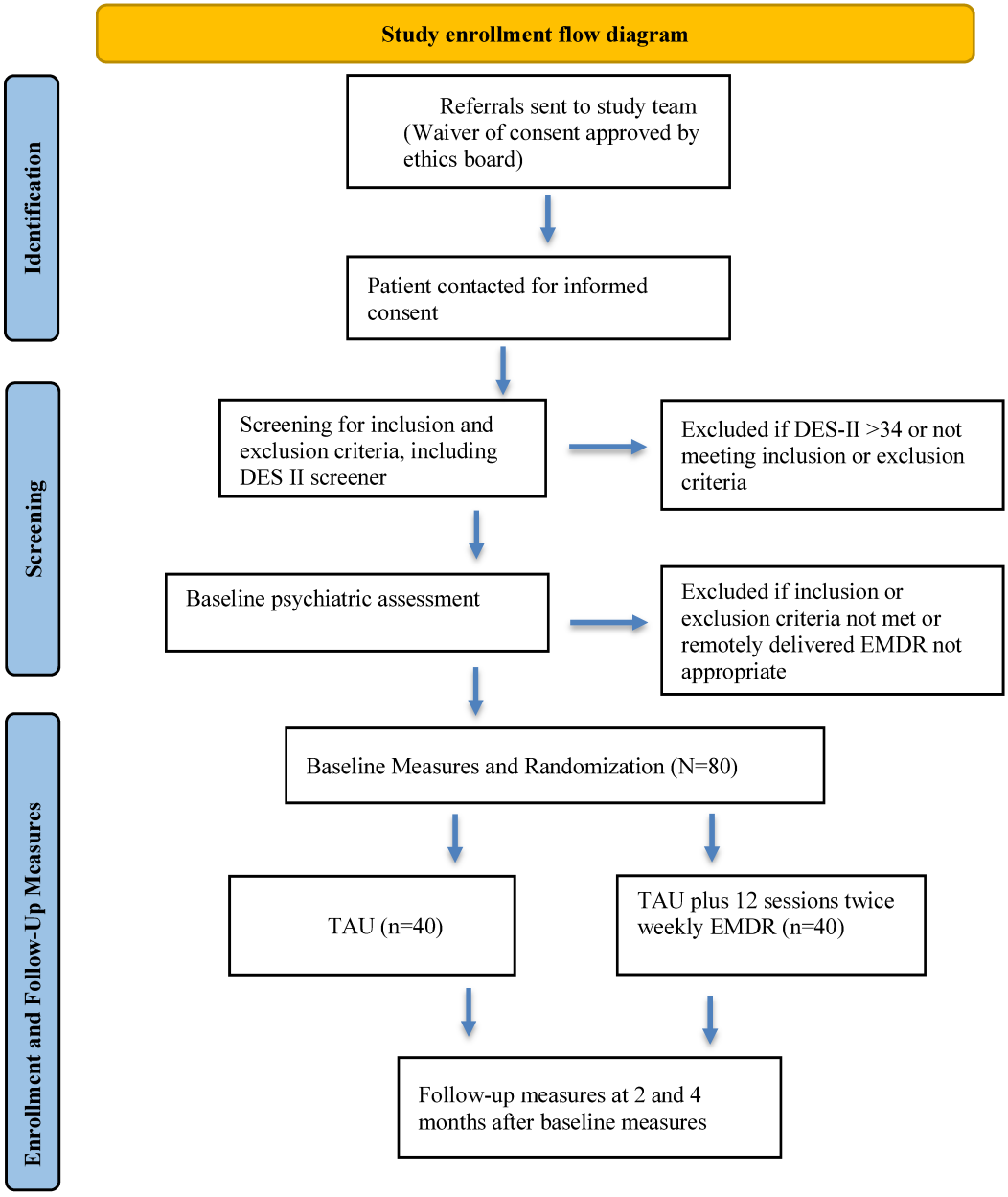
4.3.1 Study Design

The study is a nonblinded RCT that will evaluate the effects of remotely delivered EMDR in combination with TAU, compared with TAU alone for adult patients with SI. Owing to the nature of EMDR, trial blinding to the research team and clinical staff is not possible. All clinical contact will occur on the web via a health care–level encrypted Zoom platform. The anticipated flow of participant enrollment is shown in Fig 4.1, and details are included in the *Study Procedure* section. Participants will be randomized (by computer-generated random allocation) to receive either intensive 90-minute EMDR sessions twice per week plus TAU or TAU alone. A pilot study by Proudlock et al (2020) and an RCT by Fereidouni et al (2019) used a similar design, with intensive EMDR provided 2 to 3 times per week. In the study by Proudlock et al (2020), most of the participants were outpatients with an acute mental health crisis with SI. In the RCT, the participants were inpatients with major depression and suicidal thoughts (2019). The literature suggests that intensive (ie, multiple sessions per week) therapy is safe and effective and may reduce attrition (Fereidouni et al., 2019; Méndez et al., 2018; Proudlock et al., 2020; Van Woudenberg et al., 2018).

The primary outcome is the intensity of SI in adults, as measured by the BSS and the CSSRS. Secondary outcomes include mood (Beck Depression Inventory-II and Patient Health Questionnaire 9), anxiety (Generalized Anxiety Scale-7), posttraumatic symptoms (Impact of Events Scale Revised), dissociation symptoms (Dissociative Experiences Scale-II [DES-II]), and emotion dysregulation (Difficulties in Emotional Regulation Scale). Secondary outcomes include adverse events and dropout rates. A subsequent longer-term analysis, beyond the scope of this

protocol, will examine differences between groups with respect to the number of emergency room visits, hospitalizations, and overall health care use in the year before and after therapy.

Fig 4.1 Study Enrollment Flow Diagram



Abbreviations: DES-II: Dissociative Experiences Scale-II; EMDR: Eye Movement Desensitization and Reprocessing; TAU: treatment as usual.

4.3.2 Ethics

The Health Research Ethics Board at the University of Alberta approved the study protocol (protocol ID number: Pro00090989). The study is registered at ClinicalTrials.gov (ID number: NCT04181047). Although EMDR is a gold standard, evidence-based treatment for trauma (Navarro et al., 2018; Wilson et al., 2018), current practice guidelines do not generally endorse EMDR specifically for the treatment of suicidal thinking, and data on remote delivery of EMDR are limited (Jones et al., 2020). Some providers believe that trauma therapy should not be attempted in patients with SI, based on fears that exposure to traumatic memories may increase emotional dysregulation or worsen suicidality. EMDR may, in some cases, lead to temporarily increased PTSD symptoms, anxiety, nightmares, or distress during treatment. The web-based nature of the treatment may also add privacy and safety risks because of the use of electronic communications and the fact that the therapist is not in the same location as the participant. Therefore, clinical safety procedures were developed to monitor and manage increased SI and adverse events, in addition to ensuring informed consent from participants. These considerations were discussed with the Health Research Ethics Review Board, which approved the study.

4.3.3 Participants

Adults (aged 18-65 years) with SI in the last week are eligible for this study. SI may be chronic or acute and of any intensity as long as it is not accompanied by an active plan with intent, given the concerns about immediate safety and the need for stabilization in this population. As SI can occur across various diagnoses, participants are not limited to having one main diagnosis. Participants with suicidal thoughts and any or the following primary diagnoses:

mood and anxiety disorders, trauma and stress-related disorders, or personality disorders as primary diagnoses are eligible for this study. Participants must also be willing and able to volunteer to participate in the study, provide informed consent, and follow up twice weekly for EMDR sessions if they are randomized to the EMDR group (a total of 12 desensitization sessions). Participants must have a primary service provider, either a physician or a mental health professional, who they can access for care outside of EMDR sessions. Participants must have access to their own laptop or desktop computer that enables bilateral stimulation with a working screen, camera, and microphone, as well as access to a quiet, private, well-lit space for therapy. Participants must be willing to refrain from benzodiazepine, cannabis, or illicit substance use in the 24 hours before or after EMDR sessions to avoid interference with EMDR and memory consolidation. Participants must also be willing to adhere to the study safety precautions (see the *Clinical Safety Procedures* section).

Participants will be excluded from the study if, at the time of the baseline assessment, SI is accompanied by intent or a plan to follow through with suicide. The rationale is that those with intent or a plan may be more at risk of imminently following through with acting on the ideation. Clinical guidelines recommend that this warrants inpatient stabilization to ensure immediate safety (Jacobs et al., 2003). Participants will be excluded if they score above 34 on the DES-II or report severe dissociative symptoms during the baseline psychiatric assessment interview in keeping with a separate dissociative disorder, such as hearing internal voices, amnestic episodes, dissociative fugue states, passivity experiences, first rank symptoms under stress, the subjective experience of having alter personality self-states, or severe isolation of affect, with the inability to feel body sensations or emotions. Clinical experience and the scientific literature suggest that severe dissociative symptoms signal a poor response to standard EMDR therapy or require

special techniques or extensive stabilization. Participants with manic or psychotic symptoms will be excluded to reduce heterogeneity, as are those undergoing electroconvulsive therapy, which may have an impact on memory. Participants undergoing or planning to undergo another trauma-focused psychotherapy in the 4-month study period will also be excluded to reduce bias. Participants who are known to be pregnant will be excluded, as there is limited information about the impact of EMDR in pregnancy.

4.3.4 Study Sample Size and Duration

The only analogous trial published, to our knowledge, is an RCT by Fereidouni et al (2019), which also used the BSS to measure changes in SI, but in a depressed inpatient population. They reported a required sample size of 31 per arm, which was increased to 35 to account for attrition, calculated using a CI of 95%, a statistical power of 80%, and a minimum clinically significant difference of 5%. This previous trial enrolled 70 participants and had no dropouts.

In this study, the overall target sample size is 80 participants (40 in each group). To detect a within-group change (pre- and posttreatment changes in rating scale measures) of Cohen d=0.50, applying a 2-tailed α level of .05 and power at 0.80 (0.75 for between-group changes), the study will require 32 participants in each group. Our target sample size of 40 participants per group was chosen to account for an anticipated attrition rate of 20%, resulting in samples no smaller than 32. The attrition rate is based on clinical experience, as well as the literature reporting a mean dropout rate of approximately 18% in previous EMDR trials (Lewis et al., 2020; Proudlock et al., 2020).

4.3.5 Clinical Safety Procedures

To ensure participant safety during the study, the following measures have been instituted:

1. All participants must have access to a health professional, such as a family physician or psychiatrist, during the course of this trial, who is willing to provide general mental health care, as necessary. If a safety concern arises during the study, the participant's provider will be informed.
2. Before commencing EMDR, the participant will confirm their address, phone number, email address, and emergency contact person. This is necessary so that an emergency response can be activated if clinically indicated.
3. If the participant is enrolled in the EMDR treatment group, the study therapist will ensure that a written safety plan has been completed before treatment is initiated. This safety plan will include helping the participant to identify their warning signs for crisis, their internal coping resources, sources of helpful distraction, and helpful others, including professional resources, from whom they can access assistance in a crisis. Contact information for Edmonton crisis services will also be provided.
4. To ensure safety during EMDR sessions, participants will be asked to ensure that there is a supportive person who will be available to assist within 5 minutes, in the unlikely case of an emergency.
5. If there is a significant worsening in SI, the study therapist may pause EMDR and focus on crisis stabilization and the institution of the individualized safety plan.
6. The study research assistant (RA) was trained in a protocol for enrolling participants, which includes a safety protocol to manage any unanticipated situations in which a participant spontaneously expresses worsening or active SI (Appendix C). Consent for

EMDR therapy includes an understanding that in the case of imminent risk of harm to self or others, the therapist or RA may need to activate the safety plan or call emergency services.

7. For the EMDR group, adverse events will be queried and recorded at the beginning of each EMDR session, along with recording a self-report of the intensity of various symptoms, including SI, on a 0-10 scale. As therapy is taking place in the context of clinical care, progress will be documented in the electronic health record, which may be accessed by the participants' treatment team (see Appendix C for the items captured regarding adverse events). In addition, serious adverse events will be directly reported to the participants' treatment team. Each person participating in the study must agree to maintain a relationship with his or her community treatment team during the study to avoid a situation where the person has no access to care during or immediately after participating in the study.

Participant confidentiality and web-based security:

1. Informed consent for web-based EMDR therapy also includes an agreement that the patient will disclose their physical location, keep a working telephone with them in the case of internet disconnection, and connect in a private area. Health service–level encrypted Zoom, as authorized by Alberta Health Services, will be used for videoconferencing therapy to minimize security concerns. The participants will also be encouraged to use their own private computer and Wi-Fi.
2. Encryption will be used in the case that email is needed to send potentially identifying information, in accordance with Alberta Health Services policy.

4.3.6 Study Procedure

This study is being conducted in partnership with the outpatient mental health clinics of the Alberta Health Services Addiction and Mental Health, Edmonton Zone. Figure 1 shows the anticipated flow of subject enrollment and assessments.

1. Community clinicians will make a referral through email, fax, or phone to the RA. The research ethics board at the University of Alberta approved a waiver of consent to allow the RA to receive and screen referrals and contact the potential participants to set up a Zoom meeting to explain the study and obtain informed consent. If necessary, the RA can aid the potential participant in setting up Zoom and instructing the person on its use. During this initial Zoom meeting, the RA will obtain informed consent for participation in the study, which will be collected and managed using REDCap (Research Electronic Data Capture) tools hosted by the Women & Children's Health Research Institute at the University of Alberta, using a 2-factor authorization process (Haris et al., 2009). Participants will be informed that they may withdraw their consent and opt out of the study at any time during the 4-month study period, whereas participant data may be withdrawn at any point before treatment begins.
2. After obtaining consent, the RA will send a link from REDCap to the participant to complete the DES-II electronically. A DES-II score ≥34 will exclude a person from the study. If enrollment screening criteria are met, the participants will receive a psychiatric assessment by the study psychiatrist. The purpose of the psychiatrist assessment is to complete an in-depth assessment to rule out contraindications to web-based EMDR and to ensure eligibility criteria are met, including ruling out severe dissociation not apparent on the DES-II screening questionnaire. The psychiatrist will also perform a baseline

diagnostic assessment according to *Diagnostic and Statistical Manual of Mental Disorders - 5* criteria to evaluate the baseline diagnoses. If the person appears suitable for the study, baseline self-report measures will be completed electronically (Table 1). Once the baseline measures are complete, REDCap will randomly assign the person to either the EMDR group or the TAU group using random computerized allocation.

3. All patients will complete baseline and follow-up measures electronically through REDCap, as shown in Table 4.1.
4. Patients in the EMDR treatment group will receive live, twice weekly EMDR through Zoom videoconferencing. The study therapist will take a relevant history, provide limited psychoeducation, and explain EMDR to the patient. After developing a safety plan with the participant, up to 5 standard preparation exercises will be completed before therapy (container, safe state, internal meeting place, safe place for parts, and updating the emotional circuits (O'Shea, 2009a)). Patients will then receive EMDR, targeting the experiences or core beliefs associated with the SI. The standard EMDR protocol will generally be used, with the modification that the *future template* will be a *flashforward* of the *worst-case scenario future when suicide would again seem like an option*. Although the standard *future template* involves running a mental movie about the future, a *flashforward* targets the person's mental representation of future events in a similar fashion as past events are targeted (see the paper by Logie and De Jongh (2014) for details about this strategy).

Table 4.1 Timing and Content of Study Measures

Measure	Content of measure	Timing of measures		
		Baseline	2 months after enrollment	4 months after enrollment
Demographic questionnaire	Demographics	✓[a]		
ACES[b]	Adverse childhood experiences	✓		
DES- II[c]	Dissociative symptoms	✓		✓
BSS[d]	Suicidal ideation	✓	✓	✓
CSSRS[e] — (clinician rated)	Suicidal ideation	✓		
CSSRS — past week (self - rated)	Suicidal ideation	✓	✓	✓
BDI-II[f]	Depressive symptoms	✓	✓	✓
PHQ-9[g]	Depressive symptoms	✓	✓	✓
GAD-7[h]	Anxiety	✓	✓	✓
IES-R[i]	PTSD symptoms	✓	✓	✓
DERS[j]	Emotional dysregulation	✓		✓

[a]Indicates the timing of the respective measures.
[b]ACES: Adverse Childhood Experiences Scale.
[c]DES-II: Dissociative Experiences Scale.
[d]BSS: Beck Scale for Suicide Ideation.
[,e]CSSRS: Columbia Suicide Severity Rating Scale.
[f]BDI-II: Beck Depression Inventory- II.
[g]PHQ-9: Patient Health Questionnaire- 9.
[h]GAD-7: Generalized Anxiety Disorder- 7.
[i]IES-R: Impact of Events Scale Revised.
[j]DERS: Difficulties in Emotional Regulation Scale.

Some other modifications to the standard protocol are allowed. Specifically, intrusive or distressing memories may be targeted initially, if needed, instead of the first, worst, current, and future order of the standard protocol. If there is apprehension about doing EMDR, a flashforward of the worst thing that could happen may be used to address this resistance before targeting memories. This was reported as a successful strategy in an intensive treatment program (Van Woudenberg et al., 2018). In addition, therapists can use the EMDR early trauma protocol if there are significant attachment problems, add additional dual attention tasks to load working memory, or use shorter sets of bilateral stimulation if the standard protocol is not tolerated (Matthijssen et al., 2017; O'Shea, 2009b). Strategies in the Jim Knipe EMDR Toolbox can also be used as needed (Knipe, 2015). Modifications to the standard protocol will be recorded in REDCap and reported on.

EMDR will specifically target the traumatic memories or core beliefs associated with the SI. These targets may be easily identified by the patient in some cases. Alternatively, the standard floatback method may be used to identify memory targets, or therapists may target the somatic urge or state associated with suicidal thoughts. This strategy of targeting states or urges has been utilized in EMDR protocols such as the *DeprEnd protocol* for depression and the *DeTUR protocol* for urges associated with substance use disorders (Hofmann et al., 2016; Popky, 2005). Other possible targets for EMDR include memory of the circumstances surrounding the first occurrence of SI, memories at the origin of the negative beliefs associated with SI, or memories related to hopelessness and despair (Hoffman et al., 2016; Mosquera, 2018; Shapiro, 2018). If escape fantasies, including the fantasy of escaping through suicide, emerge during memory processing, the participant may be encouraged to notice the fantasy rather than avoid or suppress it. In addition, if nightmares arise during the course of treatment, they can also be

targeted directly using EMDR if clearly related to SI or the experiences being reviewed in therapy sessions.

Participants will be seen twice weekly until the therapy is completed (12 desensitization sessions in total). Symptoms and any adverse reactions will be recorded at the beginning of each session using a standard EMDR session progress note form.

4.3.7 Measures

4.3.7.1 Primary Outcome Measures

Beck Scale for Suicide Ideation

The BSS is a 21-item questionnaire on SI and behavior over the past week. The score ranges from 0 to 42, with higher scores indicating worse outcomes. Questions 6 through 19 are not completed if answers to both questions 4 and 5 indicate that the person has no suicidal desire and would try to save their life if in a life-threatening situation. Question 20 asks about previous suicide attempts, and question 21 asks about the wish to die during any such attempt (Beck et al., 1988) (Digital adaptation 2021 NCS Pearson Inc. All rights reserved. Adapted and used under license #LSR-262494).

Columbia Suicide Severity Rating Scale

The CSSRS is a questionnaire used for suicide assessment, developed by multiple institutions including Columbia University. Several versions exist; this study will use the clinician-rated version that assesses lifetime and recent SI (last week) and suicidal behavior at

baseline. In addition, a self-report version will be used at baseline, 2 months, and 4 months to assess SI in the *past 1 week*, which includes 5 questions about SI and 2 questions about suicidal behavior (Posner et al., 2011).

4.3.7.2 Secondary Outcome Measures

Adverse Childhood Experiences Scale

The Adverse Childhood Experiences Scale is a standard 10-item questionnaire that assesses the presence or absence of adversities experienced in the first 18 years of life, including emotional, physical, or sexual abuse, neglect, parental divorce, domestic abuse, familial substance abuse, incarceration, or mental illness. Higher scores are indicative of more childhood adversity and have been consistently associated with an increased risk of psychiatric illness, substance abuse, and physical illness (Felitti et al., 1998).

Dissociative Experiences Scale-II

The DES-II is a 28-item questionnaire that includes questions about common dissociative symptoms, which are scored based on the frequency of experiencing the symptom, from 0% of the time to 100% of the time. A higher score (range 0-100) indicates more severe dissociative pathology. The mean scores for PTSD, Dissociative Disorder Not Otherwise Specified, and Dissociative Identity Disorder in a previous study were 31, 36, and 48, respectively (Carlson & Putnam, 1993).

Beck Depression Inventory-II

The Beck Depression Inventory-II is a 21-item questionnaire focusing on symptoms of MDD, including one question on SI or wishes. Each question is scored on a 0-3 scale, with higher scores indicating a higher likelihood of MDD (Beck et al., 1988) (digital adaptation 2021 NCS Pearson Inc. All rights reserved. Adapted and used under license #LSR-262494).

Patient Health Questionnaire-9

The Patient Health Questionnaire-9 Self-Report is a self-report questionnaire for assessing depressive symptoms during the previous 2 weeks, using a 4-point Likert scale to indicate symptom frequency for each item (0=not at all; 3=nearly every day). Higher scores (range 0-27) indicate more severe depressive symptoms. Included is also a question about how difficult the symptoms made it for the participant to work, take care of things at home, or get along with people (rated from not difficult to extremely difficult, on a 4-point scale) (Kroenke et al., 2001).

Generalized Anxiety Disorder 7

The Generalized Anxiety Scale-7 is a 7-item self-report scale for anxiety symptoms, with each symptom rated for the past 2 weeks on a 4-point scale. The scale ranges from 0 (not at all) to 3 (nearly every day), with higher scores indicating worse anxiety symptoms. There is also a question about how difficult the problems endorsed made it for the participant to work, take care of things at home, or get along with people (rated from not difficult to extremely difficult, on a 4-point scale) (Spitzer et al., 2006).

Impact of Events Revised

The Impact of Events Scale Revised is a 22-item questionnaire, which rates the intensity of distress over the past 7 days, related to a past event. Symptoms related to distress are rated on a 5-point scale, from 0 for *not at all* to 4 for *extremely* distressing, with scores ranging from 0 to 88. Questions include symptoms generally indicative of posttraumatic stress, with a higher score indicating more severe symptoms (Weiss & Marmar, 1997).

Difficulties in Emotional Regulation Scale

The Difficulties in Emotional Regulation Scale is a 35-item questionnaire focusing on symptoms related to emotion regulation. Questions are rated on a 5-point scale, and participants rate how often the statements apply to them by providing a number, where 1 indicates *almost never* (0%-10% of the time) and 5 indicates *almost always* (91%-100% of the time) (Gratz & Roemer, 2004).

Session Forms

For the EMDR group, session forms will be used to track weekly progress. These forms include a scale of 0 to 10 (ranging from no difficulties to highest intensity) to record the intensity of suicidal thoughts, self-harm urges, and the following symptoms: worry thoughts, anxiety, guilt or shame, anger, sadness, flashbacks, sleep problems, substance use, suicidal thoughts or impulses, self-harm urges, concentration difficulties, lethargy or fatigue, appetite problems, and repetitive thoughts. These forms will also capture the session focus and any deviations from the standard EMDR protocol.

4.3.8 Statistical Analysis

Treatment groups will be compared for differences in demographics or clinical severity that may be relevant to differences in outcomes. The number of desensitization sessions will be reported, along with any adverse events.

The main statistical contrast will compare measures for the EMDR versus the TAU group; particular emphasis will be placed on the primary outcome variables of severity of SI before and after treatment in each group. Pre- and posttreatment effects on rating scales will be analyzed using parametric (2-tailed *t* tests and analysis of variance [ANOVA]) or nonparametric (Mann-Whitney and Wilcoxon and Friedman or Kruskal-Wallis ANOVA) tests, where appropriate. For multiple comparisons in the analysis, the error rates will be adjusted appropriately using Bonferroni corrections. ANOVA followed by multiple comparison tests will be applied where the number of within-subject test times k>2 (Table 1). For single time measures, for example, Adverse Childhood Experiences Scale or clinician-rated suicide ratings, simple contrasts will be assessed with *t* tests or nonparametric equivalents, as appropriate. The statistical criterion for type one errors will be a 2-tailed probability of $P \geq .05$, after appropriate adjustment for multiple comparisons.

4.4 Results

It is anticipated that the active recruitment, psychotherapy treatment, and data collection phase of this study will take 18 months to complete. We expect to report the primary and secondary outcomes by mid-2023. The primary outcome will be changes in SI; secondary outcomes will include changes in reported depressive, anxious, dissociative, and PTSD symptoms, as well as changes in emotional dysregulation. In addition, we will report on dropout rates and adverse effects that emerge during EMDR treatment. Study participants will be

informed about the trial results via a plain language summary that will be sent to them. Academic papers and summary reports will be provided to the Mental Health Foundation for knowledge dissemination. Evidence regarding the safety and efficacy of EMDR in the context of SI will be discussed with Alberta Health Services and presented in clinical academic settings to support knowledge translation and knowledge implementation.

4.5 Discussion

4.5.1 Principal Hypotheses

There exists a significant body of literature demonstrating that childhood and adult adverse experiences are strongly associated with SI, suicide attempts, self-injurious behavior, and the development of a wide range of psychiatric illnesses (Afifi et al., 2008, 2009, 2016; Ásgeirsdóttir et al., 2018; de Araújo et al., 2016; Dube et al., 2001; Kisely et al., 2018). If the AIP model of EMDR is correct, experiences lead to the development of explicit and implicit memories that drive or contribute to painful core beliefs or overwhelming affect. We hypothesize that targeting these memories directly will provide a direct treatment for emotional dysregulation and suicidal thinking.

Current treatment of SI usually focuses on treating comorbidities such as depression and teaching new ways of coping, thinking, or behaving. None of the currently recommended treatments for suicidality target memories directly. EMDR desensitizes the emotionality of traumatic memories, followed by reprocessing the associated negative core belief with a more adaptive one. A recent RCT using EMDR for suicidal thoughts in inpatients with depression

offers the first RCT evidence that EMDR can specifically reduce suicidal thoughts (Fereidouni et al., 2019). This adds to the uncontrolled data that suggest that EMDR can reduce suicidality in patients in crisis or those with suicidal thinking (Proudlock & Hutchins, 2016; Proudlock & Peris, 2020). This study aims to target SI from a transdiagnostic perspective, focusing on the memories driving or associated with the SI across a broad spectrum of diagnoses.

4.5.2 Implications for the Future

If the study results support the use of EMDR as a safe and effective treatment for people with SI, it would challenge current clinical norms. The PTSD literature suggests that treating PTSD with TFTs reduces SI, even after controlling for depression and hopelessness (Cox et al., 2016; Gradus et al., 2013). However, clinicians are often reluctant to offer TFT in suicidal patients for fear of worsening their suicide risk. Therefore, patients' trauma symptoms may go untreated or be addressed solely with medications, and they may experience repeated bouts of crisis or hospitalization, leading to further demoralization. This study may provide evidence to support clinicians in using TFTs for patients with SI earlier, potentially preventing the vicious cycle of repeated hospitalizations, suffering, and chronic psychiatric morbidity.

Chapter 5 Web-Based Eye Movement Desensitization and Reprocessing for Adults With Suicidal Ideation: Preliminary Findings of a Randomized Controlled Trial

5.1 Abstract

Background: Suicidal thoughts and behaviours are strongly correlated with adversity and trauma. Eye Movement Desensitization and Reprocessing (EMDR) is an evidence-based psychotherapy that desensitizes painful memories in individuals with mental disorders such as posttraumatic stress disorder (PTSD) and major depressive disorder (MDD). Preliminary evidence suggests that EMDR can be used to reduce suicidal thoughts. Because of COVID-19 social distancing restrictions, many clinicians have been delivering EMDR through videoconferencing. Currently, there are no published studies focusing on comparison of effectiveness of remote delivery of EMDR compared to in person delivery.

Objective: The purpose of this randomized controlled trial is to evaluate the safety and efficacy of EMDR, delivered remotely due to COVID-19 social distancing restrictions, compared to TAU for reducing suicidal ideation (SI) in adults.

Methods: In this trial, participants who met inclusion and exclusion criteria were randomized to either receive twice weekly EMDR for up to 12 sessions or treatment as usual (TAU). Clinical measures of anxiety, depression, post-traumatic symptoms, emotional dysregulation, and suicidal thinking were collected for both groups at baseline, 2 months, and 4 months after enrollment.

Results: Trial recruitment began in May 2021. From a total of 111 referrals, 20 participants were enrolled in the trial, with 10 participants randomized to the EMDR group and 10 participants randomized to the TAU group. No significant differences were found from pre-treatment to post-treatment in the EMDR group at this stage of patient evaluation.

Conclusions: The preliminary early analysis of our trial results did not meet sample size recruitment goals – our expectation is that a larger sample size will be required to yield sufficient statistical power for a valid comparison of outcomes in the EMDR group relative to the TAU group. Results from a larger sample will contribute to knowledge regarding possible safe and effective use of EMDR for reducing SI in adults.

Trial Registration:
ClinicalTrials.gov NCT04181047; https://clinicaltrials.gov/ct2/show/NCT04181047

5.2 Introduction

5.2.1 Suicide

Every year, over 700,000 people around the world die by suicide (World Health Organization [WHO], 2021a). Among individuals aged 15-19 years old, suicide is the fourth leading cause of death (WHO, 2021a). There is evidence that adversity and trauma are strongly associated with suicidal thoughts and behaviours (Dube et al., 2001). Adverse childhood experiences (ACEs) have been found to display a graded relationship to later suicide attempts, increasing the risk of attempted suicide by 2- to 5-fold (Dube et al., 2001). Usually, a reminder in

the present reactivates overwhelming emotions which stem from earlier traumatic experiences and this contributes to an individual's desire to escape through suicide (Luoma & Villatte, 2012; van Bentum et al., 2017).

5.2.2 Eye Movement Desensitization and Reprocessing

EMDR is an evidence-based psychotherapy that has been used to desensitize painful memories in individuals with mental disorders such as posttraumatic stress disorder (PTSD) and major depressive disorder (MDD) (Carletto et al., 2021; Navarro et al., 2018; Wilson et al., 2018). A study conducted by Fereidouni and colleagues (2019) offered the first controlled trial evidence that EMDR can specifically reduce suicidal thoughts. This therapy directs patients to focus on traumatic memories or core beliefs while bilateral stimulation (BLS) is applied, either in the form of alternating eye movements, bilateral tapping, or auditory tones (Shapiro, 2018). Through this process, the emotionality of the traumatic memories is desensitized, and the associated negative core belief is reprocessed to a more adaptive resolution (Shapiro, 2018).

5.2.3 Remote Delivery of EMDR

With social distancing restrictions during the COVID-pandemic, many clinicians have been delivering EMDR through videoconferencing (Lenferink et al., 2020). Although the rapid shift to web-based care has raised concerns about the safety and effectiveness of online psychotherapy, evidence shows that virtual trauma-focused therapies such as Prolonged Exposure (PE) and Cognitive Processing Therapy (CPT) can be as effective as in-person treatment (Jones et al., 2020). However, there is currently no published evidence about how

online EMDR compares to in person. The current study addresses this area by exploring the safety and effectiveness of remotely-delivered EMDR with a focus on SI.

5.2.4 Objectives

The primary objective of this study is to evaluate the safety and efficacy of remotely-delivered EMDR compared to TAU for reducing the intensity of SI in adults. We hypothesize that remotely-delivered EMDR will not be inferior to TAU and can be used safely and effectively to treat the experiences and/or beliefs driving SI.

The secondary objectives of this study are to measure the impact of remotely-delivered EMDR on symptoms of depression, anxiety, posttraumatic stress, emotional dysregulation, and dissociation.

Additionally, we report on the level of ACEs experienced by study participants in both EMDR and TAU groups. We also report on dropout rates in both groups and adverse events in the EMDR group.

5.3 Methods

5.3.1 Study Design

This study is a non-blinded randomized controlled trial (RCT) evaluating the effects of remotely-delivered EMDR compared to TAU for adults with SI. All clinical contact occurs online via a healthcare level encrypted Zoom platform. Patients referred to the study are screened for inclusion and exclusion criteria, and suitable patients receive a psychiatric assessment from one of the two psychiatrists on the treatment team. If found to be suitable for the study,

participants are randomized by computer-generated random allocation to receive either twice weekly 90-minute online EMDR sessions or TAU. The trial was prospectively registered on ClinicalTrials.gov and the study protocol has been previously published in JMIR Research Protocols (Winkler et al., 2021).

5.3.2 Participants

Participants are eligible for inclusion if they meet all of the following criteria: aged 18-65 years, experienced SI in the last week, have access to a computer and private space to receive EMDR online, able to participate in 90-minute online therapy sessions twice per week for 12 sessions in total, able to provide voluntary consent, have a "safety person" who is willing to be contacted in case of emergencies, have a regular primary mental health provider in the community, and willing to refrain from benzodiazepine, cannabis or illicit substance use in the 24 hours before or after EMDR sessions.

Exclusion criteria are suicidal thoughts accompanied by a strong intent and/or imminent plan to carry through with suicide, active psychotic or manic symptoms, currently receiving or planning to receive electroconvulsive therapy (ECT) or a trauma therapy in the next four months, DES-II score above 34 or symptoms of severe dissociation, and pregnancy.

5.3.3 Study Procedure

The study procedure and clinical safety procedures are described in detail in the published protocol (Winkler et al., 2021). Modifications to the registered trial protocol include the addition of a self-referral pathway in which patients can refer themselves to the study through a REDCap-based self-referral form.

5.3.4 Outcomes

The primary outcome of SI is measured by the Beck Scale for Suicidal Ideation (BSS) and the Columbia Suicide Severity Rating Scale (C-SSRS). Secondary outcomes, including mood, anxiety, posttraumatic symptoms, dissociation symptoms, and emotional dysregulation, are measured by the Dissociative Experiences Scale-II (DES-II), Beck Depression Inventory-II (BDI-II), Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7), Impact of Event Revised (IES-R), and Difficulties in Emotional Regulation Scale (DERS). Adverse events and dropout rates are also measured.

5.3.5 Statistical Analysis

Pre and post treatment effects on rating scales were analyzed using non-parametric statistics, including Friedman's ANOVA. A P-value ≤ 0.05 was considered statistically significant. An intention to treat analysis was used for all patients who completed at least one desensitization session.

5.4 Results

Trial recruitment began in May 2021. From a total of 111 referrals, 20 participants were enrolled in the study, with ten participants randomized to the EMDR group and ten participants randomized to the TAU group. At the time of preliminary data analysis in May 2022, seven participants in the EMDR group and four participants in the TAU group had completed the four-month follow-up questionnaires. In the EMDR group, one participant dropped out of treatment

and was lost to follow-up at two months. In the TAU group, two participants were lost to follow-up at two months and one participant was lost to follow-up at four months.

A total of 91 participants were not enrolled in study for various reasons, including: having a DES-II score above 34 (n=30), not being interested in participating in the study (n=18), EMDR not being indicated by the study therapist due to severe dissociative symptoms (n=12), not responding to phone or email contact attempts from the RA (n=10), computer-related issues (n=7), not being available for twice weekly sessions (n=4), not having suicidal ideation in the last week (n=4), receiving ECT (n=2), engaging in substance use judged to interfere with EMDR (n=2), and having active suicidal ideation with a plan (n=1). Additionally, one participant was excluded from the study after enrolment due to alexithymia which became more apparent during preparation and early trauma protocol.

The most common reason for exclusion from the study was having a DES-II score above 34. Among participants that were excluded due to the DES-II, scores ranged from 35.71 to 85. The most common referral sources for these participants included the Day Hospital (n=7), 108 Street Clinic (n=5), and Access 24/7 (n=4). Among participants who were screened out of the study after assessment with the study therapist due to severe dissociative symptoms, DES-II scores ranged from 2.14 to 33.93. Three of these participants had DES-II scores below 15. Common dissociative symptoms included memory gaps for important life events, fugue states, or major time lapses (n=7), times with no agency over parts of self (n=5), dissociative voices (n=4), and inability to feel emotions or body sensations (n=4).

Among the participants who were enrolled in the study, ACE scores ranged from zero to nine, with seven participants scoring five or more. A variety of mental health diagnoses were present, including MDD (n=12), PTSD without dissociation (n=6), GAD (n=6), Persistent

Depressive Disorder (n=5), BPD (n=3), substance use disorder (n=3), and social anxiety (n=3). Additionally, eight participants displayed BPD traits and four participants displayed OCPD traits. Seventeen participants had comorbid diagnoses. The most frequent comorbidities included MDD and BPD traits (n=6), MDD and PTSD without dissociation (n =4), and MDD and GAD (n=4).

Among the participants who were enrolled in the study, the most frequently reported reason for SI was to alleviate burden or distress (n=19) and the most frequently reported trigger for SI was strong emotion (n=18). Twelve participants also reported engaging in self harm, among which the most frequently reported reason was to alleviate burden or distress (n=10) and the most frequently reported trigger was strong emotion (n=10).

In the EMDR group, most participants attended 12 (n=3) or 11 (n=2) desensitization sessions in total, while one participant attended a total of 10 desensitization sessions. One participant terminated treatment after six sessions and stated that it was difficult for him emotionally during EMDR sessions and a huge time commitment. Another participant dropped out of treatment after the first session and cited having family issues she needed to deal with.

Tables 5.1-5.8 summarize the changes in scores on the primary and secondary outcome measures from baseline to 2 months and 4 months. Table 5.9 summarizes adverse events, which were reported in a total of five participants in the EMDR group. A Friedman test was conducted on the seven EMDR group participants to examine whether there were consistent changes in scores at the three time points. Results showed that the scores were not statistically significantly different at the three time points for any outcome measure, including the C-SSRS (Q=0.86), BSS (Q=3.50), DERS (Q=1.50), BDI (Q=3.50), PHQ-9 (Q=4.07), GAD-7 (Q=2.79), and IES-R (Q=5.43). See Appendix D for more details.

It must be noted that the present data presentation and analysis are preliminary. As stated in the published protocol, the target sample was 40 participants in each group. Estimated on the basis of a possible within-group change of Cohen *d*=0.50, applying a 2-tailed α level of .05 and power at 0.80 (0.75 for between-group changes), the study minimum sample size requirement is 32 participants in each group.

Table 5.1 C-SSRS (Past Week) Scores

	Mid (2 Months)	End (4 Months)
EMDR 1	-	-
EMDR 2	0	0
EMDR 3	+	0
EMDR 4	+	+
EMDR 5	0	-
EMDR 6	-	-
EMDR 7	0	0
TAU 1	+	+
TAU 2	0	0
TAU 3	+	0
TAU 4	-	-

Abbreviations: + = increase, 0 = no change, - = decrease

Table 5.2 BSS Scores

	Mid (2 Months)	End (4 Months)
EMDR 1	-	-
EMDR 2	+	0
EMDR 3	0	0
EMDR 4	+	0
EMDR 5	-	-

EMDR 6	+	+
EMDR 7	+	-
TAU 1	+	+
TAU 2	-	-
TAU 3	+	0
TAU 4	-	-

Abbreviations: + = increase, 0 = no change, - = decrease

Table 5.3 DERS Scores

	Mid (2 Months)	End (4 Months)
EMDR 1	-	-
EMDR 2	-	-
EMDR 3	+	0
EMDR 4	-	+
EMDR 5	-	-
EMDR 6	-	+
EMDR 7	+	-
TAU 1	+	-
TAU 2	-	-
TAU 3	-	+
TAU 4	-	-

Abbreviations: + = increase, 0 = no change, - = decrease

Table 5.4 BDI Scores

	Mid (2 Months)	End (4 Months)
EMDR 1	-	-
EMDR 2	-	+
EMDR 3	+	-
EMDR 4	+	0
EMDR 5	-	-
EMDR 6	-	-
EMDR 7	+	-

TAU 1	+	+
TAU 2	-	-
TAU 3	+	+
TAU 4	-	-

Abbreviations: + = increase, 0 = no change, - = decrease

Table 5.5 PHQ-9 Scores

	Mid (2 Months)	End (4 Months)
EMDR 1	-	-
EMDR 2	-	-
EMDR 3	-	-
EMDR 4	+	0
EMDR 5	-	-
EMDR 6	-	0
EMDR 7	+	-
TAU 1	0	+
TAU 2	-	-
TAU 3	+	+
TAU 4	-	-

Abbreviations: + = increase, 0 = no change, - = decrease

Table 5.6 GAD-7 Scores

	Mid (2 Months)	End (4 Months)
EMDR 1	-	+
EMDR 2	-	-
EMDR 3	-	-
EMDR 4	0	+
EMDR 5	-	-
EMDR 6	-	+
EMDR 7	-	-
TAU 1	0	0
TAU 2	-	-

TAU 3	+	+
TAU 4	-	-

Abbreviations: + = increase, 0 = no change, - = decrease

Table 5.7 IES-R Scores

	Mid (2 Months)	End (4 Months)
EMDR 1	-	-
EMDR 2	-	-
EMDR 3	-	-
EMDR 4	+	+
EMDR 5	+	+
EMDR 6	-	-
EMDR 7	-	-
TAU 1	+	+
TAU 2	-	-
TAU 3	-	-
TAU 4	-	-

Abbreviations: + = increase, 0 = no change, - = decrease

Table 5.8 DES-II Scores

	End (4 Months)
EMDR 1	+
EMDR 2	-
EMDR 3	-
EMDR 4	+
EMDR 5	-
EMDR 6	-
EMDR 7	-
TAU 1	-
TAU 2	-
TAU 3	+
TAU 4	-

Abbreviations: + = increase, 0 = no change, - = decrease

Table 5.9 Adverse Events

Type of Adverse Event	Number of Participants	Relation to Treatment
Nightmares/sleep disturbances	4	Definitely related (n=3) Possibly related (n=1)
Increased anger	2	Definitely related (n=1) Possibly related (n=1)
Increased sadness	1	Definitely related (n=1)
Change from passive SI to active SI	1	Possibly related (n=1)
Overdose on antidepressants with ER visit	1	Possibly related (n=1)
Increased anxiety	1	Possibly related (n=1)
Increased blood pressure	1	Possibly related (n=1)
Self-harm	1	Unknown (n=1)
Cannabis use	1	Unknown (n=1)
ER visit after punching car and injuring knuckles	1	Not related (n=1)
Resurgence of SI	1	Not related (n=1)

5.5 Discussion

The purpose of this study is to evaluate the safety and efficacy of remotely-delivered EMDR compared to TAU for adults with SI. The purpose of this Chapter is to provide a preliminary analysis, which showed that there were no significant changes from pre-treatment to post-treatment for participants in the EMDR group at the current recruitment level for this ongoing study. The lack of consistent change in the EMDR group is likely due to the small

sample size in the study. Furthermore, it is difficult to determine the validity of the preliminary findings because scores on outcome measures may be due to sensitivity to life adversity rather than an effect of treatment. The current sample size of 20 participants was not large enough to statistically compare outcomes in the EMDR group to the TAU group. A larger sample size is needed to make conclusions about the safety and efficacy of remotely-delivered EMDR compared to TAU for adults with SI. With an anticipated attrition rate of 20% and 37.8% of referred participants being screened out of the study due to high DES-II scores or severe dissociative symptoms, a heavier emphasis on trial recruitment is required.

With regard to the profiles of participants enrolled in the study, many displayed suicide risk factors which are consistent with those found in the literature. 35% of enrolled participants had ACE scores of five or more, which is consistent with the literature showing higher risk of suicidality with experiences of childhood adversity (Dube et al., 2001). Psychiatric disorders most commonly associated with suicide were seen in this study, as 60% of enrolled participants had MDD and 30% had PTSD without dissociation (Klonsky et al., 2016). Furthermore, 85% of enrolled participants had comorbidities, with evidence in the literature showing that comorbid disorders increase the risk of suicide (Bachmann, 2018). However, the reasons for SI reported by participants enrolled in the study were not consistent with those reported in the literature. 95% of enrolled participants reported that the reason for their suicidal thinking was to alleviate burden or distress, although the literature mainly reports on interpersonal factors (Levi-Belz et al., 2019). Therefore, this trial may provide new insights about significant cognitions and beliefs within suicidal populations.

This study has several limitations. Firstly, outcome measures are self-reports. It is possible that participants may report lower scores on questionnaires to appease the research

team. Future EMDR intervention trials may include clinician-rated outcome measures along with self-reports. Secondly, 12 sessions of EMDR may not be enough to treat SI and some participants may need additional sessions. Some participants reported difficulties transitioning from twice weekly sessions to no sessions at all. Future intervention trials including a higher number of EMDR sessions may be beneficial. Thirdly, a large number of participants referred to the study were screened out of the study due to high DES-II scores or severe dissociative symptoms. Future recruitment efforts should emphasize the impact of dissociative symptoms to community mental health providers so they will be more likely to refer suitable participants for the trial.

In conclusion, a larger sample size on completion of this study may provide significant results with regard to the safety and efficacy of remotely-delivered EMDR compared to TAU for adults with SI. This may extend the literature in important ways and will help to establish whether remotely-delivered EMDR can be used to impact suicidal thoughts across a broad range of diagnoses.

Chapter 6 A Reverse Engineering Approach to Suicide Prediction

The conceptualization of suicide has varied tremendously throughout history (Solano et al., 2017). The Berlin Museum houses the earliest known suicide note from ancient Egypt, consisting of four poems in which the author reveals his depressive feelings and deeply emotional state of mind through a conversation with his soul (Thomas, 1980). Some argue that it must have been necessary for the human mind to develop higher-level cognitive skills, including mental simulation and counterfactual reasoning, in order to consider suicide as a possibility (Humphrey, 2018). Several ancient Greek philosophers, including Plato and Aristotle, condemned suicide as an act of cowardice (Browne, 1853; Jowett, 1999), in contrast to the Stoics, who emphasized the acceptability of the act as a part of human freedom (Solano et al., 2017). Likewise, some Latin authors believed that suicide was an appropriate course of action in response to relational or political matters (Hill, 2004). In certain cases of suicide in ancient Greece and Rome, the act was recognized as appropriate, and justified by unbearable pain or loss of honour (Lykouras, et al., 2013). Nevertheless, in legal terms, suicide in Ancient Rome was perceived to be a crime against society and nature, and therefore punishable by Roman law through requisition of the victim's possessions (Farberow, 1975).

Mediaeval Christianity considered suicide to be a severe crime against God, and religious funerals and burials for suicide victims were denied up until 1962 (Solano et al., 2017). The word 'suicide' comes from Latin *sui* "of oneself" and *cide* "killing of the person" (Barraclough & Shepherd, 1994; Online Etymology Dictionary). The first use of the word occurred in 1643 by

Thomas Browne in his book "Religio Medici" at a time of conflicting perspectives regarding the morality of suicide ranging from those who emphasized the criminality of the act by referring to it as self-murder, self-homicide, or self-killing and others who saw it as an autonomous decision (Barraclough & Shepherd, 1994). Around the 18th century, European medical viewpoints of suicide gained prevalence, which often linked the act to mental illness, reaffirming a connection between suicide and medical conditions recognized at least as early as the ancient Greek physicians, who used the term "melancholy" to refer to a depressive state which may degenerate into suicidal tendency (Jones, 1931; Potter, 1988; Solano et al., 2017).

In 1897, Emile Durkheim presented a sociological theory of suicide and coined the term "anomie" to refer to an abrupt loss of social regulation which may lead individuals toward suicide (Selkin, 1983). After Durkheim, mental health researchers have focused on suicide risk factors and prediction for several decades, which has given way to various theories of suicide (Klonsky et al., 2016). Many psychological theories have been proposed throughout the years, such as the theory of psychache, which postulates that suicide is caused by psychological pain, and the interpersonal theory of suicide, which suggests that suicidal desire emerges through the simultaneous presence of perceived burdensomeness and thwarted belongingness (Joiner, 2005; Shneidman, 1993). More recently, mental health research has seen the development of biological theories of suicide which implicate abnormalities in the serotonergic system and the downstream effects of dysregulated stress response systems (Oquendo et al., 2014).

Each of these theories adds to the diversity of the suicide research field by identifying unique risk factors associated with suicidal thoughts and behaviours (Franklin et al., 2017). This has led to the development of risk factor guidelines by various organizations, including the National Institute of Mental Health (NIMH) and Centers for Disease Control (CDC), to aid the identification of suicide risk by both professionals and non-professionals (Franklin et al., 2017). However, many of the established risk factor guidelines do not include previous suicide attempt, which is identified as the greatest predictor of suicide by the World Health Organization (Franklin et al., 2017; World Health Organization [WHO], 2019a). The WHO also indicates mental disorders, including depression and alcohol use disorder, and life stressors, including financial problems, disaster, and isolation, as major risk factors for suicide (WHO, 2019a).

Approximately 700,000 people die by suicide every year, resulting in a global suicide rate of 9.0 per 100,000 (WHO, 2021b). Differences in suicide exist with respect to location, culture, socioeconomic status, age, gender, and method of suicide. For example, 79% of global suicides occur in low- and middle-income countries (LMICs), but high-income countries have a higher age-standardized suicide rate of 11.5 per 100,000 (WHO, 2019b). In terms of global regions, the Eastern Mediterranean region has the lowest reported suicide rate of 4.3 per 100,000, while the South-East Asian region has the highest reported suicide rate of 13.4 per 100,000 (WHO, 2019b). Certain vulnerable groups, such as Indigenous peoples in Canada and Māori in New Zealand, have disproportionately higher suicide rates compared to the general population, as discussed below (Kumar & Tjepkema, 2019; Ministry of Health of New Zealand, 2018). Globally, the overall suicide rate for males is 13.7 per 100,000, which is higher than the global

female suicide rate of 7.5 per 100,000 (WHO, 2019b). The male:female suicide ratio is more equal in LMICs as compared to high-income countries, where the male:female suicide ratio is close to 3 (WHO, 2019b). However, in some countries, such as Bangladesh, China, and Morocco, the female suicide rates exceed the suicide rates for males (WHO, 2019b). For both sexes, suicide rates are highest between 15 to 29 years of age (WHO, 2019b). Men are more likely to use violent methods of suicide such as firearms or hanging, while women often use less violent methods such as poisoning or drowning (Ajdacic-Gross et al., 2008). This situation is more complex in gender diverse populations, as outlined below.

Firearm suicide is most commonly used in the United States, Argentina, Switzerland, and Uruguay, whereas jumping from a height is often seen in smaller urbanized regions, such as Hong Kong, Luxembourg, and Malta (Ajdacic-Gross et al., 2008). Poisoning with pesticides has become a major issue in rural Latin American countries, including Peru and Nicaragua, and Asian countries, including Thailand and South Korea (Ajdacic-Gross et al., 2008). Asian countries such as Hong Kong, Taiwan, and Japan have also seen an epidemic of suicides resulting from burning barbeque charcoal, which causes death by carbon monoxide poisoning (Chang et al., 2014). There was a 9.8% decrease in global suicide rates from 2010 to 2016, ranging from a 4.2% decrease in the South -East Asian region to a 19.6% decrease in the Western Pacific region, as well as a 6.0% increase in the Americas, indicating that suicide trends continue to change over time and across locations (WHO, 2019b).

Certain vulnerable groups are at increased risk for suicide, including youth, elderly individuals, first responders, Indigenous peoples, and as mentioned above, LGBTQ+ populations, who display differential suicide rates compared to the general population (WHO, 2019a). After traumatic events such as road injury, suicide is the second leading cause of death among young people aged 15 to 29 years and is correlated with higher rates of psychopathology, childhood maltreatment, peer victimization, and impulsivity among this age group (Bilsen, 2018; WHO, 2019b).

Among individuals older than 60, suicide rates increase with age, reaching a rate of 48.7/100,000 for older men in USA and 140/100,000 for older men in China (Conwell & Thompson, 2008; Shah et al., 2015). Older women display lower suicide rates compared to older men, which may be related to different coping strategies between genders (Canetto, 1992). Elderly individuals may be particularly vulnerable to suicidal thoughts and behaviours due to the increased prevalence of physical illnesses and neurocognitive disorders among this age group, including chronic obstructive pulmonary disease (COPD), cancer, and Alzheimer's disease (Fassberg et al., 2015). The underdiagnosis and undertreatment of mental illnesses such as depression among older adults may be involved, although depression rates in the elderly are declining and are less prevalent among older adults than middle-aged adults (Allan et al., 2014; Fiske et al., 2009). Isolation, retirement, and bereavement may limit social connection in older adults and lead to suicidal behaviour, as postulated by Emily Durkheim's theory of suicide (Fassberg et al., 2012; Taylor, 1982). Firefighters, emergency medical technicians (EMT), and

police officers die by suicide at a significantly higher rate than the general population, with law enforcement workers facing a 69% higher suicide risk compared to the working population in USA, potentially due to exposure to job-related stressors that increase risk for posttraumatic stress disorder (PTSD), easy access to lethal means such as firearms, and shift work which may cause sleep disturbances and strains in familial relationships (Stanley et al., 2016, Vallières et al., 2014; Vigil et al., 2021; Violanti et al., 2013).

The suicide rate for First Nations people in Canada is three times higher than the rate for non-Indigenous people and is even higher for First Nations people living on reserve (Kumar & Tjepkema, 2019). Suicide rates are highest among Inuit in Canada, approximately nine times the rate of non-Indigenous people (Kumar & Tjepkema, 2019). Similarly, Māori in New Zealand have suicide rates that are nearly twice as high as non-Māori New Zealanders (Ministry of Health of New Zealand, 2018). Indigenous mental health is connected to the years of colonization and marginalization Indigenous peoples have experienced which have resulted in a higher prevalence of mood disorders, alcohol and drug use, and intergenerational transmission of trauma among this population (Gracey & King, 2009). Recent research offers epigenetic explanations for the intergenerational transmission of historical trauma among Indigenous peoples, involving alterations in stress response systems that place Indigenous descendants at high risk for mental health problems (Gone & Kirmayer, 2020). The lack of culturally competent mental health services for Indigenous peoples also presents a risk factor for suicide. (Department of Economic and Social Affairs, 2018).

As indicated above, men in same-sex domestic partnerships are 8 times more likely to die by suicide compared to heterosexual males, and 4 times more likely to attempt suicide across the lifespan (Mathy et al., 2011). Lesbian and bisexual females are almost twice as likely to attempt suicide compared to heterosexual females (King et al., 2008). In India, the suicide rate among transgender individuals is 31% (Virupaksha et al., 2016). In the United States, 41% of transgender individuals have attempted suicide at least once in their life (Tranis, 2010). These numbers may be associated with higher rates of mental illnesses in this population, including major depression, generalized anxiety disorder, and substance use disorder, as well as a higher prevalence of bullying, harassment, and physical violence (Haas et al., 2011; King et al., 2008). Discrimination in the form of parental rejection has been associated with elevated risk of suicide attempts among lesbian, gay, and bisexual youth (D'Augelli et al., 2005). The various risk factors among these vulnerable groups interact in different ways and continue to be affected by changes in the external environment.

The significance of external change can be seen by the effect of disasters and disease outbreaks on suicidal thoughts and behaviours. (Kahil et al., 2020; Kõlves et al., 2013). During the 26-month period following the 1999 earthquake in Nantou County, Taiwan, severely affected areas observed a 42% increase in mean monthly suicide rates (Yang et al., 2005). Compared to the two years prior to the earthquake, there was a 90% increase in suicide rates in males aged 45

to 64 during the two years following the earthquake, which may be linked to higher rates of unemployment and responsibilities involving familial financial support among this age group (Liaw et al., 2008). The psychological impact of disaster-related stressors during Hurricane Katrina may have been substantial, as residents of areas affected by the hurricane experienced a significant increase in suicidal ideation from 2.8% to 6.4% in the year following the disaster, as well as an increase in suicide plans from 1% to 5% (Kessler et al., 2008). Disruption of social life due to closure of public facilities and fear of negative health consequences may have contributed to the increase in suicide rates during the 1918 influenza pandemic (Wasserman, 1992). The 2003 severe acute respiratory syndrome (SARS) epidemic in Hong Kong was linked to a 31.7% increase in suicide deaths in individuals aged 65 and over (Chan et al., 2006). Suicide in older adults during this time may have been associated with fear of contracting SARS, social disconnection, and feelings of being a burden to their families (Yip et al., 2010). After the 2016 wildfire in Fort McMurray, Alberta, the rate of suicidal ideation in grade 7-12 students was significantly elevated at 16%, compared to students in Red Deer, Alberta who had a 4% suicidal ideation rate (Brown et al., 2019c). This is very relevant to the current COVID-19 pandemic, as discussed below.

The links between suicide and disasters or disease outbreaks can be explained by several fundamental theories. The stress and frustration brought about by unemployment, bereavement, and disruption of daily social life during pandemics and disasters may contribute to a sense of normlessness and weakened social cohesion, which can be connected to Durkheim's idea of anomic suicide (Barnerjee et al., 2021; Taylor, 1982). The simultaneous presence of perceived

burdensomeness and thwarted belongingness, as described in Joiner's Interpersonal Theory of Suicide, may arise during disasters and disease outbreaks in the form of decreased social connection, financial problems, hopelessness, health concerns, and existential issues (Joiner, 2005). These factors may lead to suicidal behaviour through the acquired capability to overcome fear of death, which may be impacted by exposure to traumatic experiences during disasters and disease outbreaks (Banerjee et al., 2021). Furthermore, Baumeister's Escape Theory (1990) suggests that stressful life events generate painful self-awareness and negative affect, thus contributing to a desire to escape from the self and the world through suicide

Central to these issues is the current COVID-19 pandemic, during which efforts to control the spread of infection, including physical distancing guidelines, stay-at-home orders, travel restrictions, and school closures, have been met with concerns regarding the exacerbation of suicide risk factors, such as depression, posttraumatic stress disorder (PTSD), substance abuse, domestic violence, and unemployment (Government of Alberta, 2021; John et al, 2020). Millions have felt the devastating effects of job loss and social isolation and consequently, many alarmist messages in the literature and social media have predicted that suicide rates will increase during COVID-19 pandemic (Appleby, 2021). A viral tweet stating that "suicide rates are up 200% since lockdown" gained 31,000 reposts before BBC fact-checked and found this statement to be false (Appleby, 2021; BBC, 2021). Roman Baber, a former Member of Provincial Parliament in Ontario, Canada, sent an open letter to the provincial government in which he postulated that public health restrictions were leading to "an avalanche of suicides" (Fletcher, 2021). COVID-19 related experiences, including physical safety concerns and general distress,

have been found to be positively associated with a greater likelihood of past-month suicidal ideation and past-month suicide attempts (Ammerman et al., 2021). High suicide risk during the COVID-19 pandemic has been associated with high COVID-19 related perceived stress, risk of depressive episode, and insomnia (Caballero-Domínguez et al., 2020). Those who have undergone a period of quarantine due to COVID-19 symptoms or close contact with someone who has symptoms are more likely to experience suicidal ideation and deliberate self-harm than those who have not (Daly et al., 2021). Google searches related to general mental health and help-seeking have increased during the COVID-19 pandemic, as well as searches related to financial difficulty, which have been linked to suicide rates (Halford et al., 2020). The increased number of firearm sales in the United States during the COVID-19 pandemic may also predict increased suicide rates as individuals gain easier access to lethal means (Reger et al., 2020). A suicide prediction model has projected various scenarios based on changes in Canada's unemployment rate associated with the COVID-19 pandemic (McIntyre & Lee, 2020). A moderate increase in unemployment rate predicts a 5.5% increase in suicides per year and 418 excess suicides over the 2020-2021 period, while an extreme increase in unemployment rate predicts a 27.7% increase in suicides per year and 2114 excess suicides over the 2020-2021 period (McIntrye & Lee, 2020).

Despite these speculations, the current data collected from 21 countries around the world, including USA, Australia, and Canada, indicate that suicide rates have not increased during the COVID-19 pandemic (Pirkis et al., 2021). In fact, suicide rates have decreased in some areas, such as Chile, New Zealand, South Korea, and Japan, which saw a 14% decline in monthly

suicide rates from February to June 2020 (Tanaka & Okamoto, 2021). The Canadian province of Alberta had 468 deaths by suicide in 2020, showing a decline from the previous 4 years which had more 600 deaths by suicide (Fletcher, 2021). Similar declines have been seen in other Canadian provinces, such as Saskatchewan and British Columbia (Fletcher, 2021). This situation displays major shortcomings regarding the accuracy of current suicide prediction models.

Furthermore, it may be crucial to examine the long-term impact of the COVID-19 pandemic on suicide risk factors, which may result in a delayed increase in suicides (Botchway & Fazel., 2021). Pandemic-related stressors, such as unexpected economic hardships, health challenges, loss of social support networks, and increased danger in abusive relationships, may be triggering events that increase risk of suicide for individuals who have endured prior trauma, or may serve as sources of early life trauma for children (Gerber et al., 2020; Hill et al, 2021). China had a relatively high prevalence of suicidal ideation among the general public during the COVID-19 pandemic, particularly in frontline workers, individuals with pre-existing mental disorders, and individuals with suspected or confirmed infection (Shi et al., 2021). Although there was a decline in Japan's suicide rates during the first wave of the pandemic, the second wave had a rapid 16% increase in suicide rates, which shows that the effect of protective factors may not be sustained after the initial crisis of the pandemic has ended (Tanaka & Okamoto, 2021). While government subsidies and reduced working hours may have served as protective factors that reduced psychological stress during the initial stages of the COVID-19 pandemic, these effects are not likely to last very long (Tanaka & Okamoto, 2021). The conversations

surrounding post-pandemic suicide risk emphasize the urgent need for accurate prediction of population suicide trends, as well as accurate suicide risk prediction for individual patients.

With the COVID-19 pandemic as a stimulus, it is unfortunate that traditional suicide prediction tools have low sensitivity and low positive predictive value (Kessler et al., 2020). Two-thirds of individuals who complete suicide in the United States come into contact with the health care system in the year before their death, but the quality of clinical suicide risk assessment remains poor (Ahmedani et al., 2014; Franklin et al., 2017). More than 75% of individuals who died by suicide in a 10-year period in England and Wales were judged to be low or no risk at their last clinical contact (Appleby et al., 2018). A recent meta-analysis by Franklin and colleagues (2017) outlined the various problems posed by traditional suicide prediction tools, in which the accuracy in prediction of risk for both suicide attempts and suicide deaths was found to be slightly better than chance. The authors found that although thousands of clinicians use risk factor research to inform their treatment decisions, risk factors only correctly identify 26% of suicide attempts and 9% of suicide deaths. It is difficult to evaluate suicide theories and risk factor guidelines due to a lack of available data and constrained study methods. Eighty percent of suicide risk factors fit into one of the top five risk factor categories, indicating that suicide risk factors are very homogeneous. No single risk factor category or subcategory has demonstrated substantial superiority. Furthermore, suicide risk factors have had little change since pre-1985 studies, which may be a reason why predictive ability has not improved over the past 50 years. The authors concluded that it may be helpful to consider complex relationships

among hundreds of predictors, indicating a need to shift focus from risk factors to machine learning-based risk algorithms.

A significant disadvantage of traditional prediction models is their limited ability to analyze contingent interactions among large sets of variables (McHugh et al., 2020). Machine learning models may be more effective at predicting suicide than traditional methods because the optimal algorithm for prediction is determined by the machine, rather than a human deciding the set of variables and relationships among predictors, which has resulted in the equivalent of fairly simple algorithms (Franklin et al., 2017; Linthicum et al., 2019). Furthermore, machine learning models use various techniques to model the complexity of relationships among predictors (Franklin et al., 2017). While machine learning approaches capture multidimensional aspects of data, traditional approaches are not capable of that degree of complexity (Whiting & Fazel., 2019). Machine learning models are also able to display generalizability as they use numerous strategies to prevent overfitting (Franklin et al., 2017). Clinical significance is maximized because machine learning models are evaluated using metrics such as area under the receiver operating curve (AUC), sensitivity, and positive predictive value (PPV), which relate to predictive accuracy, rather than just statistical significance (Linthicum et al., 2019). Currently, suicide risk assessments are time-intensive and require large numbers of adequately trained mental health providers, which is challenging given the shortages of mental health professionals (Health Resources and Services Administration, 2018; Linthicum et al., 2019). On the other hand, machine learning algorithms can be applied to widely available data systems are and then

translated into less time-intensive clinical tools involving limited use of personnel (Linthicum et al., 2019).

The first study using a computer-generated algorithm to predict suicide risk was published in 1974 (Greist et al., 1974). Since then, the majority of machine learning studies have been conducted in the past decade (Linthicum et al., 2019). Although machine learning is a fairly new area of suicide research, the results to date have been promising (Linthicum et al., 2019). Machine learning was applied to electronic health records within a large medical database to predict suicide attempts among adults and produced an AUC of 0.84 (Walsh et al., 2017a). Predictive accuracy was seen to improve from 720 days to 7 days before the suicide attempt and predictor importance within algorithms varied across time points (Walsh et al., 2017a). A machine learning model aiming to predict adolescent suicide attempts was applied to electronic health record data and produced accurate prediction from an optimized combination of over 600 risk factors (Walsh et al., 2018). Electronic health record data spanning 15 years were used to predict future suicidal behaviour in a machine learning model. The model displayed 33% to 45% sensitivity and 90% to 95% specificity and was able to produce accurate predictions 3 to 4 years in advance on average (Barak-Corren et al., 2017). Overall, the prediction accuracy estimates of machine learning models are in the high 0.80s to low 0.90s range, which is a significant improvement from the 0.50s prediction accuracy estimates of conventional approaches (Barak-Corren et al., 2017; Franklin et al., 2017; Walsh et al., 2017a, 2018). A diverse range of algorithms have been used across these various studies, including regularized regression, neural nets, sand support vector machines (Linthicum et al., 2019). This indicates that there is no

"ultimate" algorithm for suicide prediction, but that different algorithms should be within specific populations or data sources to obtain optimal performance (Linthicum et al., 2019).

Although machine learning models have improved classification accuracy, perfect prediction is still unlikely because suicide is a rare occurrence (Linthicum et al., 2019). The low base rate of suicides is a significant limitation to the predictive power of both traditional and machine learning models (McHugh & Large, 2020). Due to the low incidence of suicides, most high-performance prediction models have low PPVs, which results in high false positive rates (Belsher et al., 2019). In fact, 99 of every 100 individuals who are predicted to die by suicide will not (Belsher et al., 2019). This is a problem because misclassification of risk affects the distribution of available resources, and those who are misclassified may be stigmatized and face adverse effects with regard to career, family life, and social network (Belsher et al., 2019; Linthicum et al., 2019).

Predictive value may be improved by utilizing samples of individuals with suicidal ideation instead of general population samples, which suffer from the low base rate problem (Ryu et al., 2019). Since the proportion of individuals who attempt suicide is higher in those with suicidal ideation than in the general population, this method has potential for high prediction accuracy. Ryu and colleagues (2019) displayed the effectiveness of this approach by first using a machine learning algorithm to identify individuals experiencing suicidal ideation among the general population, and then using another algorithm within the suicidal ideation sample to classify individuals at high risk for suicide attempt. Results for this two-step method displayed

an accuracy of 78.1% to 82.1% for predicting individuals with suicidal ideation in the general population, along with an AUC 0f 0.947 and an accuracy of 88.9% for predicting suicide attempters.

Even with improvements in suicide prediction, several unanswered ethical questions remain, as discussed by Linthicum and colleagues (2019). If a machine learning model classifies an individual as high risk for suicide, what can be done to protect the individual? Is it ethical to involuntarily confine an individual based on the results of a machine learning prediction model? To what extent should the healthcare system rely on machine learning algorithms to inform decision making? Who is responsible for classification errors? Perhaps it would instead be more practical to use machine learning models to identify antecedents of suicidal ideation and suicidal attempts through a reverse engineering approach.

Reverse engineering involves starting with an outcome, analyzing the sequence of events that happened before the outcome, coding these events as variables, and determining which of those variables may have predictive value for the outcome. The strategy for reverse engineering in terms of suicide prediction may involve applying machine learning models to databases of individuals who have died by suicide, coding early life events as variables, and using those events as predictors and early targets for suicide prevention. It may be helpful to focus these models on specific predictors related to childhood trauma and adversity, as research has displayed that adverse childhood experiences have negative effects on health outcomes (Felitti et al., 1998). Further work has demonstrated strong linkages between adverse childhood

experiences and suicide (Dube et al., 2001). Findings from the Adverse Childhood Experiences study indicate a 2- to 5-fold increase in risk of attempted suicide with an adverse childhood experience in any category, including emotional, physical, or sexual abuse, household substance abuse, mental illness, or incarceration, and parental domestic violence, separation, or divorce (Dube at al., 2001). In-utero and perinatal characteristics, such as high birth order, low maternal and paternal education, and low birthweight, have been associated with increased suicide risk throughout the lifespan (Orri et al., 2019). Traumatic experiences in adulthood may also be important to consider in a reverse engineering model, as PTSD has been found to significantly increase risk for suicide, such that individuals with PTSD have a suicide rate 13 times higher than individuals without PTSD (Gradus et al., 2018). Furthermore, as suggested by Durkheim, suicide risk may be heightened by disconnection from society, which is often seen in elderly individuals who experience isolation, retirement, and bereavement (Fassberg et al., 2012; Taylor, 1982).

Change may be implemented by preventing the development of early factors which lead to suicide risk, as identified by a reverse engineered model, and providing targeted care for individuals who have experienced such events. Prevention efforts may include policies and funding for culturally-informed parenting education to ensure proper bonding and attachment between children and caregivers, as well as community-based family support programs to improve overall family functioning and child wellbeing (Larkin et al., 2014). For families impacted by adverse childhood experiences, evidence-based clinical interventions such as trauma-focused cognitive behavioural therapy (CBT) may be beneficial (Larkin et al., 2014).

Healthcare systems may require improvement of trauma-informed care to ensure that individuals who have experienced trauma are able to rebuild a sense of control and empowerment and engage in healing through a protective patient-clinician relationship (Gerber et al., 2020). Communities may benefit from initiatives to promote social connection in elderly individuals (Brooks et al., 2019). As an expanding body of research indicates the powerful role of resilience as a protective factor against suicide, increased focus on building resilience may be essential (Sher, 2019). This could be done through active efforts to educate the general public about resilience and coping strategies for stress and integrating resilience enhancement in psychosocial and pharmacological treatments for psychiatric patients (Sher, 2019).

Besides the reverse-engineering approach described above, practical applications for machine learning in suicide prediction and prevention remain unknown (Linthicum et al., 2019). While machine learning models may not be practically useful for identifying suicide risk, some researchers suggest various advantages of utilizing machine learning in areas of safety planning, lethal means reduction, and providing supportive contacts for interventions, or driving more sophisticated interventions such as virtual counsellors (McHugh & Large, 2020). Currently, however, targeting antecedents of suicide through the improvement of social determinants of health may be a more impactful approach for communities to take in terms of effectively preventing suicide. Fortunately, there are several cohort studies being conducted around the world, such as the Generation R Study in the Netherlands, which provide rich sets of data on which reverse engineering could be performed (Jaddoe et al., 2006).

Although looking at determinants of health may be the key to improving suicide prediction and prevention in the long term, meaningful changes may also be made in the short term with increased access to community support services. As addressed by Durkheim, connectedness to others is major protective factor against suicide, and suicide prevention strategies involving promotion of social connectedness have been shown to be quite effective (Durkheim, 1951; Rao et al., 2017). Community-based social support programs are thought to build resilience and thus contribute to reduced suicidal behaviours (Rao et al., 2017). Even though suicide prediction is extremely difficult and such programs might not specifically target individuals at high risk for suicide, increasing the overall social support cushion in the community is likely to have positive effects in terms of improving mental health, especially for individuals in crises.

Chapter 7 Conclusion

This thesis contributes to knowledge regarding the use of virtual trauma-focused therapy for individuals with SI. Despite a belief among clinicians that trauma focused psychotherapy may exacerbate suicidal ideation, this thesis presents results from a review which indicate that trauma focused psychotherapy does not appear to increase suicide risk, although some caveats apply due to the heterogeneity of the study populations, study conditions, TFT interventions, and outcomes. Future research may help to establish the most appropriate approach to trauma focused psychotherapy for specific patient subgroups.

This thesis also presents results from a review on virtual psychotherapy delivery which indicate multiple gaps within the extant literature, including a lack of efficacy data for non-cognitive or non-exposure-based interventions, a lack of quantitative research regarding the differences in treatment accessibility between virtual and in-person delivery, and little research on treatment appropriateness, efficiency, and safety. Addressing these gaps in future research may help to ensure that quality care is provided to those receiving virtual psychotherapies.

Furthermore, this thesis highlights the importance of a large sample size in research, as indicated by preliminary findings from the RCT investigating virtually delivered EMDR therapy for adults with SI. Recruiting a larger sample for this trial may help to generate results that support the use of virtually delivered EMDR as a safe and effective treatment for adults with SI. This could challenge current clinical norms by addressing clinicians' fears of worsening suicide risk with trauma focused psychotherapy.

While virtual trauma-focused care may serve as a significant aspect of the solution to suicide prevention, this thesis also highlights the existing need to expand the scope of suicide prevention to involve a public health approach. The key to improving suicide prediction and prevention in the long term may require significant focus on the social determinants of health and early life trauma, including targeted care for individuals who have experienced childhood adversity. Future research involving machine-learning based risk algorithms can help to establish a reverse engineering approach to suicide prediction, thus allowing identification of early life factors which lead to increased suicide risk. This combination of technology with a public health approach has the potential to address the issue of suicide in a meaningful way and may lead to reductions in suicide mortality rates across the globe.

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Appendix A

Part 1: Final search strategies for all databases

A.Medline – Ovid Interface
Result: 674 citations, with 36 duplicates, leaving 638 to screen.
1. exp Suicide/
2. suicid*.mp.
3. Borderline Personality Disorder/
4. (borderline personality disorder or emotionally unstable personality disorder).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
5. (Emotion* regulation or emotion* dysregulation).mp.
6. (trauma adj5 (psychotherap* or treatment* or therap* or CBT)).mp.
7. exp Desensitization, Psychologic/
8. somatic experiencing.mp.
9. (cognitive processing therapy or CPT).mp.
10. (prolonged exposure or exposure therapy).mp.
11. sensorimotor psychotherapy.mp.
12. ("Eye movement*" or EMDR).mp.
13. "virtual reality".mp.
14. "accelerated resolution therapy".mp.
15. "imagery rehearsal therapy".mp.
16. or/6-15
17. 1 or 2 or 3 or 4 or 5
18. 17 and 16

PsycINFO (April 4, 2020) – Ovid Interface
Result: 1092 citations, with 331 duplicates, leaving 761 citations to screen
1. exp suicide/
2. suicid*.mp.
3. exp Borderline Personality Disorder/
4. (borderline personality disorder or emotionally unstable personality disorder).mp.
5. (emotion* regulation or emotion* dysregulation).mp.
6. 1 or 2 or 3 or 4 or 5
7. (trauma adj5 (psychotherap* or treatment* or therap* or CBT)).mp.
8. exp eye movement desensitization therapy/
9. somatic experiencing.mp.
10. sensorimotor psychotherapy.mp.
11. exp cognitive processing therapy/
12. exp prolonged exposure therapy/
13. exp exposure therapy/
14. (eye movement* or EMDR).mp.
15. virtual reality.mp.
16. "accelerated resolution therapy".mp.
17. "imagery rehearsal therapy".mp.
18. cognitive processing therapy.mp.
19. (prolonged exposure or exposure therapy).mp.
20. or/7-19
21. 6 and 20

Embase (April 4, 2020) – Ovid Interface
Result: 1048 citations, with 524 duplicates, leaving 524 citations to screen

1. exp suicidal behavior/
2. suicid*.mp.
3. exp borderline state/
4. (borderline personality or emotionally unstable personality disorder).mp.
5. (emotion* regulation or emotion* dysregulation).mp.
6. 1 or 2 or 3 or 4 or 5
7. (trauma adj5 (psychotherap* or treatment* or therap* or CBT)).mp.
8. "eye movement desensitization and reprocessing"/
9. exposure therapy/ or "desensitization (psychology)"/ or systematic desensitization/ or virtual reality exposure therapy/
10. "somatic experiencing".mp.
11. (cognitive processing therapy or CPT).mp.
12. (prolonged exposure or exposure therapy).mp.
13. sensorimotor psychotherapy.mp.
14. (eye movement or EMDR).mp.
15. "virtual reality".mp.
16. "accelerated resolution therapy".mp.
17. "imagery rehearsal therapy".mp.
18. or/7-17
19. 6 and 18

CINAHL Plus with Full Text (EBSCO host platform)
Result: 458 citations, with 242 duplicates, leaving 216 citations to screen.

1. (MH “suicide”) or (MH “Suicidal Ideation”) OR (MH “Suicide, Attempted”)
2. suicid*
3. (MH "Borderline Personality Disorder")
4. borderline personality or bpd or emotionally unstable personality disorder or eupd
5. emotion* regulation or emotion* dysregulation
6. (trauma N5 (psychotherap* or treatment* or therap* or CBT))
7. (MH "Desensitization, Psychologic+")
8. somatic experiencing
9. (cognitive processing therapy or CPT)
10. (prolonged exposure or exposure therapy)
11. sensorimotor psychotherapy
12. ("eye movement" or EMDR)
13. virtual reality
14. accelerated resolution therapy
15. imagery rehearsal therapy
16. (S1 or S2 or S3 or S4 or S5) AND (S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15)

Table A.1: Country or Region of Publication

Country or Region of Publication[1]	Number (N) of studies (out of total of 43 studies)	Percentage of References (out of total 43)
United States	**n=18**: Blain 2020; Brown 2019a; Bryan 2018; Cloitre 2002; Cohen 2007; Cox 2016; Harned 2012; Harned 2014; Horwitz 2019; Menefee 2016; Meyers 2017; Mueser 2008; Najavits 2005; Resick 2015; Resick 2017; Roberge 2021; Smith 2020; Stayton 2019;	41.9%
Germany	**n=9**: Bohus 2013; Bohus 2020; Neuner 2010; Pabst 2012; Pabst 2014; Rosner 2019; Sachsse 2006; Steil 2018; Steuwe 2016;	20.9%
Netherlands	**n=8**: De Jongh 2020; Hendriks 2017; Hendriks 2018; Slotema 2019; van den Berg 2015; Van Toorenburg 2020; Van Woudenberg 2018; Voorendonk 2020	18.6%
Other Europe (UK, Sweden)	**n=3**: Hogberg 2008; Proudlock 2020; Tarrier 1999	7.0%
Middle East (Iran)	**n=2**: Fereidouni 2019; Jamshidi 2020	4.7%
Africa (Uganda)	**n=1**: Ertl 2011	2.3%
Asia (Taiwan)	**n=1**: Tang 2015	2.3%
Australia	**n=1**: Peters 2021	2.3%

[1]Based on first author

Table A.2: Year of Publication

Year of publication	Number (N) of studies (out of total of 43 studies)	Percentage of References (out of total 43)
Up to and including 2000	**n=1**: Tarrier 1999	2.3%
2001-2005	**n=2**: Cloitre 2002; Najavits 2005	4.7%
2006 to 2010	**n=5:** Cohen 2007; Hogberg 2008; Mueser 2008; Neuner 2010; Sachsse 2006;	11.6%
2011 to 2015	**n=9**: Bohus 2013; Ertl 2011; Harned 2012; Harned 2014; Pabst 2012; Pabst 2014; Resick 2015; Tang 2015; van den Berg 2015;	20.9%
2016 to 2021	**n=26**: Blain 2020; Bohus 2020; Brown 2019a; Bryan 2018; Cox 2016; De Jongh 2020; Fereidouni 2019; Hendriks 2017; Hendriks 2018; Horwitz 2019; Jamshidi 2020; Menefee 2016; Meyers 2017; Peters 2021; Proudlock 2020; Resick 2017; Roberge 2021; Rosner 2019; Slotema 2019; Smith 2020; Stayton 2019; Steil 2018; Steuwe 2016; Van Toorenburg 2020; Van Woudenber 2018; Voorendonk 2020	60.5%

Table A.3: Research Study Design

Study design type	Number (N) of studies (out of total of 43 studies)	Percentage of References (out of total 43)
Quantitative randomized	**n=16**: Bohus 2013; Bohus 2020; Brown 2019a; Cloitre 2002; Cohen 2007; Ertl 2011; Fereidouni 2019; Harned 2014; Jamshidi 2020; Mueser 2008; Neuner 2010; Resick 2015; Resick 2017; Rosner 2019; Tarrier 2000; van den Berg 2015;	37.2%
Quantitative nonrandomized	**n=24**: Bryan 2018; Cox 2016; De Jongh 2020; Harned 2012; Hendriks 2017; Hendriks 2018; Menefee 2016; Meyers 2017; Najavits 2005; Pabst 2012; Pabst 2014; Peters 2021; Proudlock 2020; Sachsse 2006; Slotema 2019; Smith 2020; Stayton 2019; Steil 2018; Steuwe 2016; Tang 2015; Van Toorenburg 2020; Van Woudenberg 2018; Voorendonk 2020	55.8%
Quantitative Descriptive	**n=3**: Hogberg 2008; Horwitz 2019; Roberge 2021	7.0%
Mixed methods	**n=0**	0.0%
Qualitative	**n=0**	0.0%

Table A.4: Study Setting

Setting type	Number (N) of studies (out of total of 43 studies)	Percentage of References (out of total 43)
Military	**11** Blain 2020; Bryan 2018; Cox 2016; Horwitz 2019; Menefee 2016; Meyers 2017; Resick 2015; Resick 2017; Roberge 2021; Smith 2020; Stayton 2019	25.6%
Civilian	**32** Bohus 2013; Bohus 2020; Brown 2019a; Cloitre 2002; Cohen 2007; De Jongh 2020; Ertl 2011; Fereidouni 2019; Harned 2012; Harned 2014; Hendriks 2017; Hendriks 2018; Hogberg 2008; Jamshidi 2020; Mueser 2008; Najavits 2005; Neuner 2010; Pabst 2012; Pabst 2014; Peters 2021; Proudlock 2020; Rosner 2019; Sachsse 2006; Slotema 2019; Steil 2018; Steuwe 2016; Tang 2015; Tarrier 1999; van den Berg 2015; Van Toorenburg 2020; Van Woudenberg 2018; Voorendonk 2020	74.4%
Inpatient	**5** Fereidouni 2019; Menefee 2016; Sachsse 2006; Steuwe 2016; Voorendonk 2020	11.6%
Outpatient	**26** Bohus 2020; Brown 2019a; Cloitre 2002; Cox 2016; Ertl 2011; Harned 2012; Harned 2014; Hendriks 2017; Hendriks 2018; Hogberg 2008; Horwitz 2019; Jamshidi 2020; Meyers 2017; Mueser 2008; Najavits 2005; Neuner 2010; Peters 2021; Resick 2015; Resick 2017; Roberge 2021; Rosner 2019; Slotema 2019; Steil 2018; Tang 2015; Tarrier 2000; van den Berg 2015	60.5%
Residential	**7** Blain 2020; Bohus 2013; Bryan 2018; Cohen 2007; De Jongh 2020; Smith 2020; Stayton 2019;	16.3%
Mixed	**5** Pabst 2012; Pabst 2014; Proudlock 2020; Van Toorenburg 2020; Van Woudenberg 2018	11.6%

Table A.5: Sex and Gender

Sex or gender	Number (N) of studies (out of total of 43 studies)	Percentage of References (out of total 43)
Female sex participants (total number)	**2786**	45.1%
Male sex participants (total number)	**3392**	54.9%
Studies reporting on gender (as opposed to sex)	**1** (Menefee 2016; mentioned a "gender based program" for males and females respectively)	2.9%
Studies with only female participants	**Civilian: 12** Bohus 2013; Bohus 2020; Brown 2019a; Cloitre 2002; Cohen 2007; Harned 2012; Harned 2014; Jamshidi 2020; Pabst 2012; Pabst 2014; Sachsse 2006; Steil 2018 **Military: 0**	27.9%
Studies with only male participants	**Civilian: 1** Najavits 2005 **Military: 0**	2.3%
Studies with 70% or more female participants	**Civilian: 23** Bohus 2013; Bohus 2020; Brown 2019a; Cloitre 2002; Cohen 2007; De Jongh 2020; Harned 2012; Harned 2014; Hendriks 2017; Hendriks 2018; Hogberg 2008; Jamshidi 2020; Mueser 2008; Pabst 2012; Pabst 2014; Rosner 2019; Sachsse 2006; Slotema 2019; Steil 2018; Steuwe 2016; Van Toorenburg 2020; Van Woudenberg 2018; Voorendonk 2020 **Military: 0**	53.5%
Studies with 70% or more male participants	**Civilian: 1** Najavits 2005 **Military: 6 (14.0%)** Cox 2016; Horwitz 2019; Resick 2015; Resick 2017; Smith 2020; Stayton 2019	16.3%

Table A.6: Ages Included in the Studies[1]

Age range	Number (N) of studies that included participants from age range (out of total of 43 studies)	Percentage of References (out of total 43)
Child or adolescents	**8** Brown 2019a; Cohen 2007; Ertl 2011; Hendriks 2017; Hogberg 2008; Peters 2021; Rosner 2009; Tang 2015	18.6%
Adults	**37** Blain 2020; Bohus 2013; Bohus 2020; Bryan 2018; Cloitre 2002; Cox 2016; De Jongh 2020; Ertl 2011; Fereidouni 2019; Harned 2012; Harned 2014; Hendriks 2018; Horwitz 2019; Jamshidi 2020; Menefee 2016; Meyers 2017; Mueser 2008; Najavits 2005; Neuner 2010; Pabst 2012; Pabst 2014; Peters 2021; Proudlock 2020; Resick 2015; Resick 2017; Roberge 2021; Sachsse 2006; Slotema 2019; Smith 2020; Stayton 2019; Steil 2018; Steuwe 2016; Tarrier 1999; van den Berg 2015; Van Toorenburg 2020; Van Woudenberg 2018; Voorendonk 2020	86.0%
Over age 65	**4** Proudlock 2020, Smith 2020, Stayton 2019, Voorendonk 2020	9.3%

[1]Studies were counted if they enrolled even one participant in the noted age category; therefore, studies may be counted more than once in this table.

Table A.7: Trauma Type[1]

Trauma type	Number (N) of studies (out of total of 43 studies)	Percentage of References (out of total 43)
Mixed trauma type	**23** Blain 2020; Byan 2018; Cohen 2007; De Jongh 2020; Ertl 2011; Fereidoini 2019; Harned 2012; Harned 2014; Hendriks 2018; Hogberg 2008; Menefee 2016; Mueser 2008; Najavits 2005; Pabst 2014; Proudlock 2020; Sachsse 2006; Slotema 2019; Steuwe 2016; Tarrier 2000; van den Berg 2015; van Toorenburg 2020; Van Woudenberg 2018; Voorendonk 2020	**53.5%**
Military combat trauma	**5** Cox 2016; Horwitz 2019; Resick 2015; Resick 2017; Smith 2020	**11.6%**
Military sexual trauma specifically	**0**	**0%**
Childhood physical and/or sexual abuse	**7** Bohus 2013; Bohus 2020; Brown 2019a; Cloitre 2002; Hendriks 2017; Jamshidi 2020; Rosner 2019; Steil 2018	**16.3%**
CSA specifically	**3** Bohus 2013; Brown 2019a; Steil 2018	**7.0%**
Interpersonal trauma	**2** Hendriks 2017; Peters 2021	**4.7%**
Other	**2** Neuner 2010 (organized violence); Tang2015 (Typhoon)	**4.7%**
Not reported	**4** Meyers 2017; Pabst 2012; Roberge 2021; Stayton 2019	**9.3%**

[1]Studies may be counted more than once in this table if they specifically enrolled participants with more than one trauma type.

Table A.8: Diagnoses Included in the Study Inclusion Criteria[1]

Inclusion criteria diagnosis	Number (N) of studies (out of total of 43 studies)	Percentage of References (out of 43)
PTSD (full or subthreshold)	**40** Blain 2020; Bohus 2013; Bohus 2020; Brown 2019a; Bryan 2018; Cloitre 2002; Cohen 2007; Cox 2016; De Jongh 2020; Ertl 2011; Harned 2012; Harned 2014; Hendriks 2017; Hendriks 2018; Horwitz 2019; Jamshidi 2020; Menefee 2016; Meyers 2017; Mueser 2008; Najavits 2005; Neuner 2010; Pabst 2012; Pabst 2014; Peters 2021; Resick 2015; Resick 2017; Roberge 2021; Rosner 2019; Sachsse 2006; Slotema 2019; Smith 2020; Stayton 2019; Steil 2018; Steuwe 2016; Tang 2015; Tarrier 1999; van den Berg 2015; Van Toorenburg 2020; Van Woudenberg 2018; Voorendonk 2020	**93.0%**
BPD or BPD traits	**9** Bohus 2013; Bohus 2020; Harned 2012; Harned 2014; Meyers 2017; Pabst 2012; Pabst 2014; Steil 2018; Steuwe 2016	**20.9%**
Comorbid BPD and PTSD (full or subthreshold)	**9** Bohus 2013; Bohus 2020; Harned 2012; Harned 2014; Meyers 2017; Pabst 2012; Pabst 2014; Steil 2018; Steuwe 2016	**20.9%**
MDD	**4** Bohus 2013; Fereidouni 2019; Mueser 2008; Tang 2015	**9.3%**
Serious mental illness (SMI)	**2** Mueser 2008; van den Berg 2015	**4.7%**
Psychosis and PTSD	**1** van den Berg 2015	**2.3%**
Substance use disorder	**1** Najavits 2005	**2.3%**
Non-PTSD population	**3** Fereidouni 2019 (MDD); Hogberg 2008 (youth with SI/NSSI); Proudlock 2020 (acute mental health crisis)	**7.0%**

[1]Note: some studies had more than 1 inclusion diagnosis, so studies may be counted more than once.

Table A.9: Reported Comorbidities for Studies that Primarily Focused on Patients with Full or Subthreshold PTSD

Total number of studies focusing on full or subthreshold PTSD =40		
Number of studies reporting on comorbidities with full or subthreshold PTSD		
	Number (N) of studies (out of total of 40 PTSD or PTSD symptom studies)	Percentage of References (n=40)
Total number of PTSD Studies reporting on presence of ANY comorbidity	23/40 Bohus 2013, Brown 2019a, Cloitre 2002, Cohen 2007, DeJongh 2020, Ertl 2011, Harned 2012, Harned 2014, Hendriks 2017, Hendriks 2018, Menefee 2016, Meyers 2017, Mueser 2008, Peters 2021, Rosner 2019, Sachsse 2006, Slotema 2019, Steil 2018, Tarrier 2000, van den Berg 2015, van Toorenburg 2020, van Woudenberg 2018, Voorendonk 2020	57.5%
Total number of PTSD Studies <u>not</u> reporting on presence of ANY comorbidities	17/40 Blain 2020, Bohus 2020, Bryan 2018, Cox 2016, Horowitz 2019, Jamshidi, Najavits 2005, Neuner 2010, Pabst 2012, Pabst 2014, Resick 2015, Resick 2017, Roberge 2021, Smith 2020, Stayton 2019, Steuwe 2016, Tang 2015	42.5%
Most frequent comorbidities with PTSD reported on:		
Comorbidity with PTSD	Number (N) of studies (out of total of 40 PTSD or PTSD symptom studies)	Percentage of References (out of total of 40)
Mood disorder	**n=20/40** Bohus 2013, Brown 2019a, Cloitre 2002, Cohen 2007, DeJongh 2020, Ertl 2011, Harned 2014, Hendriks 2018, Menefee 2016, Mueser 2008, Peters 2021, Rosner 2019, Sachsse 2006, Slotema 2019, Steil 2018, Tarrier 1999, van den Berg 2015, van Toorenburg 2020, van Woudenberg 2018, Voorendonk 2020	**50.0%**
Anxiety disorders	**n=15/40** Brown 2019a, Cloitre 2002, Cohen 2007, DeJongh 2020, Harned 2014, Hendriks 2018, Meyers 2017, Peters 2021, Rosner 2019, Slotema 2019, Steil 2018, Tarrier 2000, van Toorenburg 2020, van Woudenberg 2018, Voorendonk 2020	**37.5%**
Substance use disorders	**n=6/40** Cohen 2007, DeJongh 2020, Harned 2014, Hendriks 2017, Menefee 2016, Mueser 2008,	**15.0%**
Eating Disorder	**4/40** Cloitre 2002, Cohen 2007, Harned 2014, Slotema 2019,	**10.0%**
Personality disorders	**3/40**	**7.5%**

	Cohen 2007, Harned 2012, Peters 2021	
Dissociative subtype of PTSD	**3/40** DeJongh 2020, van Toorenburg 2020, van Woudenberg 2018,	**7.5%**
Psychosis/psychotic disorder	**2/40** Mueser 2008, van den Berg 2015,	**5.0%**
Dissociative disorders	**1/40** Sachsse 2006	**2.5%**
Other	**3/40** AHDH (Brown 2019a, Slotema 2019); OCD (Brown 2019a);	**7.5%**

Table A.10: Studies reporting Suicidality, Self Harm, or Borderline Personality Disorder Diagnosis at Baseline

	Number (N) of studies and percentage (out of total of 43 studies)	Range of prevalence reported at baseline (%)
Studies reporting number of BPD patients at baseline	**17, 39.5%** Bohus 2013; Bohus 2020; Cloitre 2002; De Jongh 2020; Harned 2012; Harned 2014; Menefee 2016; Meyers 2017; Mueser 2008; Pabst 2012; Pabst 2014; Peters 2021; Rosner 2019; Sachsse 2006; Slotema 2019; Steil 2018; Steuwe 2016	**0%-100%**
Studies Reporting number of patients with SI at baseline	**27, 62.8%** Blain 2020; Bohus 2013; Brown 2019a; Bryan 2018; Cohen 2007; Cox 2016; De Jongh 2020; Ertl 2011; Fereidouni 2019; Hendriks 2017; Hogberg 2008; Horwitz 2019; Jamshidi 2020; Menefee 2016; Najavits 2005; Neuner 2010; Peters 2021; Proudlock 2020; Resick 2015; Resick 2017; Roberge 2021; Smith 2020; Stayton 2019; van den Berg 2015; Van Toorenburg 2020; Van Woudenberg 2018; Voorendonk 2020	**17.5%-100%**
Studies reporting number of Patients with NSSI at baseline	**11, 25.6%** Bohus 2013; Bohus 2020; Harned 2012; Harned 2014; Hendriks 2017; Hogberg 2008; Meyers 2017; Peters 2021; Sachsse 2006; Steil 2018; Steuwe 2016	**0%-100%**

Table A.11: Studies with Inclusion Criteria that Specified Suicidal Ideation or Non-Suicidal Self Injury

	Number (N) of studies (out of total of 43 studies)	Percentage of References (out of total of 43 studies)
Studies that specifically included those with suicidal ideation	**4** Fereidouni 2019; Hogberg 2008; Jamshidi 2020; Proudlock 2020	**9.3%**
Studies that specifically included those with non-suicidal self harm	**1** Harned 2012	**2.3%**

Appendix B

Part 1: Final search strategies for all databases

Database: Medline via OVID (1946 - Present)
Date of search: July 20 2020

1 psychotherapy/ 54032
2 exp cognitive behavioral therapy/ 28453
3 (psychotherap* or "psycho-therap*").ti,ab,kf. 46645
4 (cognitive adj2 "behavio?r* therap*").ti,ab,kf. 17565
5 or/1-4 106653
6 exp mental disorders/ or exp anxiety disorders/ or exp obsessive-compulsive disorder/ or exp phobic disorders/ or exp "bipolar and related disorders"/ or exp "disruptive, impulse control, and conduct disorders"/ or exp dissociative disorders/ or exp elimination disorders/ or exp enuresis/ or exp "feeding and eating disorders"/ or exp mood disorders/ or exp depressive disorder/ or exp neurocognitive disorders/ or exp neurodevelopmental disorders/ or exp "attention deficit and disruptive behavior disorders"/ or exp tic disorders/ or exp paraphilic disorders/ or exp personality disorders/ or exp "schizophrenia spectrum and other psychotic disorders"/ or exp psychotic disorders/ or exp schizophrenia/ or exp sexual dysfunctions, psychological/ or exp sleep wake disorders/ or exp dyssomnias/ or exp parasomnias/ or exp somatoform disorders/ or exp substance-related disorders/ or exp alcohol-related disorders/ or exp narcotic-related disorders/ or exp substance withdrawal syndrome/ or exp "trauma and stressor related disorders"/ or exp stress disorders, traumatic/ 1294085
7 suicidal ideation/ 7077
8 ((psychological or psychiatric or mental*) adj2 (disorder* or ill or illness* or health or wellness)).ti,ab,kf. 265669
9 (behavio?r adj2 disorder*).ti,ab,kf. 7668
10 (((anxiety or panic or "obsessive-compulsive" or phobi*) adj1 disorder*) or OCD).ti,ab,kf. 50695
11 ((depressi* or bipolar or mood) adj1 disorder*).ti,ab,kf. 77986
12 ("eating disorder*" or anorexi* or bulimi* or "binge eat* disorder*" or pica or "ruminat* disorder*" or "food intake disorder*" or ARFID).ti,ab,kw. 52015
13 "personality disorder*".ti,ab,kf. 20141
14 ("post traumatic stress disorder*" or PTSD).ti,ab,kf. 29420
15 ("psychotic disorder*" or schizophreni*).ti,ab,kf. 131837
16 ((suicid* or selfharm* or "self harm*") adj2 (idea* or thought*)).ti,ab,kf. 13848
17 or/6-16 1506479
18 Telemedicine/ or (telecare or telecollaborat* or teleconference* or telehealth or teleguide*or telediagnos* or telemed* or telemonitor* or telepresence* or "telemental health" or telepsychotherap* or ((skype or facetime or zoom or internet or web or online or web or video or distan* or remote*) adj2 (deliver* or conferenc* or call*)) or ehealth* or tele care or tele collaborat* or tele conference* or tele health or tele guide* or tele diagnos* or tele med* or tele monitor* or tele presence* or "tele mental health" or "tele psychotherap*" or (teletherap* not (x-ray or radiat* or cobalt or gamma* or cesium))).mp. 39528
19 ((distan* or remote* or video* or virtual* or tele or web or internet or online or technology or "text messag*") adj4 (psychotherap* or "mental health" or CBT or (cognitive adj2 "behavio?r* therap*"))).mp. 2897
20 Telephone/ 11763
21 ((telephone* or telephoning or phone* or phoning) adj2 (call* or deliver* or psychotherap*)).ti,ab,kf. 8279
22 or/18-21 58465
23 5 and 17 and 22 2153
24 (note* or comment* or editorial* or news* or opinion or letter).pt. 2069060
25 23 not 24 2101
26 remove duplicates from 252093

Database: EMBASE via OVID (1974 - Present)
Date of search: July 20 2020

1 psychotherapy/ 85537
2 exp cognitive behavioral therapy/ 13012
3 (psychotherap* or "psycho-therap*").ti,ab,kw. 60610
4 (cognitive adj2 "behavio?r* therap*").ti,ab,kw. 25434
5 or/1-4 130186
6 mental disease/ or exp addiction/ or adjustment disorder/ or alexithymia/ or exp anxiety disorder/ or behavior disorder/ or delirium/ or exp dissociative disorder/ or emotional disorder/ or exp mood disorder/ or exp neurosis/ or exp personality disorder/ or exp psychosexual disorder/ or exp psychosis/ or exp psychosomatic disorder/ or exp psychotrauma/ or exp schizophrenia spectrum disorder/ or thought disorder/ or exp depression/ or exp mania/ or exp bipolar disorder/ or exp perinatal depression/ or exp gender dysphoria/ or exp hypersexuality/ or exp paraphilic disorder/ or exp alcohol psychosis/ or exp delusion/ or exp drug induced psychosis/ or exp hallucination/ or exp paranoid psychosis/ or exp schizophrenia/ or exp somatoform disorder/ or exp body dysmorphic disorder/ or exp conversion disorder/ or behavioral addiction/ or drug dependence/ or withdrawal syndrome/ or drug dependence/ or exp alcoholism/ or exp narcotic dependence/ or exp alcohol withdrawal syndrome/ or exp delirium tremens/ or exp obsessive compulsive disorder/ or exp phobia/ or exp hoarding disorder/ or exp obsession/ or exp attention deficit disorder/ or automutilation/ or exp disruptive behavior/ or exp eating disorder/ or pica/ or exp impulse control disorder/ or exp perception disorder/ or exp psychosocial disorder/ 1466653
7 suicidal ideation/ 20932
8 ((psychological or psychiatric or mental*) adj2 (disorder* or ill or illness* or health or wellness)).ti,ab,kw. 330816
9 (behavio?r adj2 disorder*).ti,ab,kw.10471
10 (((anxiety or panic or "obsessive-compulsive" or phobi*) adj1 disorder*) or OCD).ti,ab,kw. 71469
11 ((depressi* or bipolar or mood) adj1 disorder*).ti,ab,kw. 116856
12 ("eating disorder*" or anorexi* or bulimi* or "binge eat* disorder*" or pica or "ruminat* disorder*" or "food intake disorder*" or ARFID).ti,ab,kw. 71265
13 "personality disorder*".ti,ab,kw. 27328
14 ("post traumatic stress disorder*" or PTSD).ti,ab,kw. 38746
15 ("psychotic disorder*" or schizophreni*).ti,ab,kw. 173349
16 ((suicid* or selfharm* or "self harm*") adj2 (idea* or thought*)).ti,ab,kw. 18161
17 or/6-16 1642732
18 telemedicine/ or teleconsultation/ or telehealth/ 38753
19 (telecare or telecollaborat* or teleconference* or telehealth or teleguide*or telediagnos* or telemed* or telemonitor* or telepresence* or "telemental health" or telepsychotherap* or ((skype or facetime or zoom or internet or web or online or web or video or distan* or remote*) adj2 (deliver* or conferenc* or call*)) or ehealth* or tele care or tele collaborat* or tele conference* or tele health or tele guide* or tele diagnos* or tele med* or tele monitor* or tele presence* or "tele mental health" or "tele psychotherap*" or (teletherap* not (x-ray or radiat* or cobalt or gamma* or cesium))).mp. 50049
20 ((distan* or remote* or video* or virtual* or tele or web or internet or online or technology or "text messag*") adj4 (psychotherap* or "mental health" or CBT or (cognitive adj2 "behavio?r* therap*"))).mp. 3592
21 telephone/ 37271
22 ((telephone* or telephoning or phone* or phoning) adj2 (call* or deliver* or psychotherap*)).mp. 14992
23 18 or 19 or 20 or 21 or 22 103671
24 5 and 17 and 23 2940
25 (note* or comment* or editorial* or news* or opinion or letter).pt. 2586608
26 24 not 25 2827
27 remove duplicates from 262768

Database: PsycINFO via OVID (1806 - Present)
Date of search: July 20 2020

1 psychotherapy/ 52941
2 exp cognitive behavior therapy/ 21585
3 (psychotherap* or "psycho-therap*").ti,ab,tw. 122199
4 (cognitive adj2 "behavio?r* therap*").ti,ab,tw. 25814
5 or/1-4 155753

6 mental disorders/ or exp affective disorders/ or exp anxiety disorders/ or exp bipolar disorder/ or borderline states/ or exp chronic mental illness/ or exp dissociative disorders/ or exp eating disorders/ or gender dysphoria/ or exp neurosis/ or exp paraphilias/ or exp personality disorders/ or exp psychosis/ or exp sleep wake disorders/ or exp somatoform disorders/ or exp "stress and trauma related disorders"/ or exp "substance related and addictive disorders"/ or thought disturbances/ or confabulation/ or delusions/ or "fantasies (thought disturbances)"/ or "fragmentation (schizophrenia)"/ or judgment disturbances/ or magical thinking/ or obsessions/ or perseveration/ or exp major depression/ or exp obsessive compulsive disorder/ or exp hoarding disorder/ or exp phobias/ or exp mania/ or exp acute psychosis/ or exp alcoholic psychosis/ or exp alcoholic hallucinosis/ or exp childhood psychosis/ or exp "paranoia (psychosis)"/ or exp schizophrenia/ or exp parasomnias/ or exp conversion disorder/ or exp factitious disorders/ or exp attachment disorders/ or exp posttraumatic stress disorder/ or exp nonsubstance related addictions/ or exp "substance use disorder"/ or exp addiction/ or exp "alcohol use disorder"/ or exp "opioid use disorder"/ or exp alcohol withdrawal/ or exp alcoholic psychosis/ or exp alcohol abuse/ 631442
7 suicidal ideation/ 9169
8 ((psychological or psychiatric or mental*) adj2 (disorder* or ill or illness* or health or wellness)).ti,ab,tw. 318930
9 (behavio?r adj2 disorder*).ti,ab,tw. 10012
10 (((anxiety or panic or "obsessive-compulsive" or phobi*) adj1 disorder*) or OCD).ti,ab,tw. 56780
11 ((depressi* or bipolar or mood) adj1 disorder*).ti,ab,tw. 72528
12 ("eating disorder*" or anorexi* or bulimi* or "binge eat* disorder*" or pica or "ruminat* disorder*" or "food intake disorder*" or ARFID).ti,ab,tw. 39099
13 "personality disorder*".ti,ab,tw. 33739
14 ("post traumatic stress disorder*" or PTSD).ti,ab,tw. 37154
15 ("psychotic disorder*" or schizophreni*).ti,ab,tw. 130243
16 ((suicid* or selfharm* or "self harm*") adj2 (idea* or thought*)).ti,ab,tw. 14810
17 or/6-16 863457
18 exp telemedicine/ or exp teleconferencing/ or computer assisted therapy/ or electronic health services/ or computer mediated communication/ or online therapy/ 15547
19 (telecare or telecollaborat* or teleconference* or telehealth or teleguide*or telediagnos* or telemed* or telemonitor* or telepresence* or "telemental health" or telepsychotherap* or ((skype or facetime or zoom or internet or web or online or web or video or distan* or remote*) adj2 (deliver* or conferenc* or call*)) or ehealth* or tele care or tele collaborat* or tele conference* or tele health or tele guide* or tele diagnos* or tele med* or tele monitor* or tele presence* or "tele mental health" or "tele psychotherap*" or (teletherap* not (x-ray or radiat* or cobalt or gamma* or cesium))).mp. 11489
20 ((distan* or remote* or video* or virtual* or tele or web or internet or online or technology or "text messag*") adj4 (psychotherap* or "mental health" or CBT or (cognitive adj2 "behavio?r* therap*"))).mp. 3949
21 ((telephone* or telephoning or phone* or phoning) adj2 (call* or deliver* or psychotherap*)).mp. 3459
22 18 or 19 or 20 or 21 25951
23 5 and 17 and 22 2322
24 (book or "edited book" or "authored book").pt. 487485
25 23 not 24 2093
26 remove duplicates from 252092

Database: Scopus via Elsevier (1976 - Present)
Date of search: July 10 2020

(TITLE-ABS-KEY ((psychotherap* OR "psycho-therap*" OR (cognitive W/2 ("behavior* therap*" OR "behaviour therap*")) OR cbt))) AND ((TITLE-ABS-KEY ((psychological OR psychiatric OR mental*) W/2 (disorder* OR ill OR illness* OR health OR wellness))) OR (TITLE-ABS-KEY (behavio?r W/2 disorder*)) OR (TITLE-ABS-KEY (((anxiety OR panic OR "obsessive-compulsive" OR phobi*) W/1 disorder*) OR ocd)) OR (TITLE-ABS-KEY ((depressi* OR bipolar OR mood) W/1 disorder*)) OR (TITLE-ABS-KEY ("eating disorder*" OR anorexi* OR bulimi* OR "binge eat* disorder*" OR pica OR "ruminat* disorder*" OR "food intake disorder*" OR arfid)) OR (TITLE-ABS-KEY ("personality disorder*")) OR (TITLE-ABS-KEY ("post traumatic stress disorder*" OR ptsd)) OR (TITLE-ABS-KEY ("psychotic disorder*" OR schizophreni*)) OR (TITLE-ABS-KEY ((suicid* OR selfharm* OR "self harm*") W/2 (idea* OR thought*)))) AND (((TITLE-ABS-KEY (telecare OR telecollaborat* OR teleconferenc* OR telehealth OR teleguide* OR telediagnos* OR telemed* OR telemonitor* OR telepresence* OR "telemental

health" OR telepsychotherap* OR ((skype OR facetime OR zoom OR internet OR web OR online OR web OR video OR distan* OR remote*) W/2 (deliver* OR conferenc* OR call*)) OR ehealth* OR "tele care" OR "tele collaborat*" OR "tele conferenc*" OR "tele health" OR "tele guide*" OR "tele diagnos*" OR "tele med*" OR "tele monitor*" OR "tele presence*" OR "tele mental health" OR "tele psychotherap*" OR (teletherap* AND NOT (x-ray OR radiat* OR cobalt OR gamma* OR cesium)))) OR (TITLE-ABS-KEY ((distan* OR remote* OR video* OR virtual* OR tele OR web OR internet OR online OR technology OR "text messag*") W/2 (psychotherap* OR "mental health" OR "cognitive behavior* therap*" OR "cognitive behaviour* therap*" OR cbt))) OR (TITLE-ABS-KEY ((telephone* OR telephoning OR phone* OR phoning) W/2 (call* OR deliver* OR psychotherap*))))) AND (EXCLUDE (DOCTYPE , "cp") OR EXCLUDE (DOCTYPE , "ed") OR EXCLUDE (DOCTYPE , "ch") OR EXCLUDE (DOCTYPE , "no") OR EXCLUDE (DOCTYPE , "le") OR EXCLUDE (DOCTYPE , "bk") OR EXCLUDE (DOCTYPE , "sh") OR EXCLUDE (DOCTYPE , "er") OR EXCLUDE (DOCTYPE , "Undefined"))

Results: 2146

Database: Web of Science, Core Collection via Clarivate**
Date of search: July 10 2020

Set Number	Number of Resuts	Search Terms
# 1	103,162	TS=(psychotherap* OR "psycho-therap*" OR (cognitive NEAR/2 ("behavior* therap*" OR "behaviour* therap*")))
# 2	357,906	TOPIC: ((psychological OR psychiatric OR mental*) NEAR/2 (disorder* OR ill OR illness* OR health OR wellness))
# 3	2,262	TOPIC: ((behavio?r NEAR/2 disorder*))
# 4	76,557	TOPIC: ((anxiety OR panic OR "obsessive-compulsive" OR phobi*) NEAR/1 disorder*)
# 5	11,893	TOPIC: (ocd)
# 6	118,028	TOPIC: ((depressi* OR bipolar OR mood) NEAR/1 disorder*)
# 7	331,214	TOPIC: ("eating disorder*" OR anorexi* OR bulimi* OR "binge eat* disorder*" OR pica OR "ruminat* disorder*" OR "food intake disorder*" OR arfid OR "personality disorder*" OR "post traumatic stress disorder*" OR ptsd OR "psychotic disorder*" OR schizophreni*)
# 8	16,433	TOPIC: (((suicid* OR selfharm* OR "self harm*") NEAR/2 (idea* OR thought*)))
# 9	113,489	TOPIC: ("diagnostic and statistical manual" OR "international classification of diseases" OR dsm OR icd)
# 10	812,149	#9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2
# 11	63,688	TS=(telecare OR telecollaborat* OR teleconferenc* OR telehealth OR teleguide* OR telediagnos* OR telemed* OR telemonitor* OR telepresence* OR "telemental health" OR telepsychotherap* OR ((skype OR facetime OR zoom OR internet OR web OR online OR web OR video OR distan* OR remote*) NEAR/2 (deliver* OR conferenc* OR call*)) OR ehealth* OR "tele care" OR "tele collaborat*" OR "tele conferenc*" OR "tele health" OR "tele guide*" OR "tele diagnos*" OR "tele med*" OR "tele monitor*" OR "tele presence*" OR "tele mental health" OR "tele psychotherapy*")
# 12	4,228	TS=((distan* or remote* or video* or virtual* or tele or web or internet or online or technology or "text messag*") NEAR/4 (psychotherap* or "mental health" or CBT or "cognitive behavior* therap*" or "cognitive behaviour* therap*"))
# 13	10,443	TS=((telephone* OR telephoning OR phone* OR phoning) NEAR/2 (call* OR deliver* OR psychotherap*))
# 14	76,569	#13 OR #12 OR #11
# 15	2,072	#14 AND #10 AND #1
# 16	1,972	"#14 AND #10 AND #1 Refined by: DOCUMENT TYPES: (ARTICLE OR REVIEW)

Database: Cochrane Library via Wiley (1992 - Present)
Date of search: July 10 2020

#1	(psychotherap* or "psycho-therap*"):ti,ab,kw	13896
#2	(cognitive NEAR/2 behavio?r* therap*):ti,ab,kw	19245
#3	#1 or #2	29430

#4 ((psychological or psychiatric or mental*) NEAR/2 (disorder* or ill or illness* or health or wellness)):ti,ab,kw 36142
#5 (behavio?r NEAR/2 disorder*):ti,ab,kw 3231
#6 (((anxiety or panic or obsessive-compulsive or phobi*) NEAR/1 disorder*) or OCD):ti,ab,kw 15608
#7 ((depressi* or bipolar or mood) NEAR/1 disorder*):ti,ab,kw 24299
#8 ("eating disorder*" or anorexi* or bulimi* or "binge eat* disorder*" or pica or "ruminat* disorder*" or "food intake disorder*" or ARFID):ti,ab,kw 8044
#9 personality disorder*:ti,ab,kw 2226
#10 ("post traumatic stress disorder*" or PTSD):ti,ab,kw 4932
#11 ("psychotic disorder*" or schizophreni*):ti,ab,kw 18103
#12 ((suicid* or selfharm* or "self harm*") NEAR/2 (idea* or thought*)):ti,ab,kw 2771
#13 {OR #4-#12} 93621
#14 (telecare or telecollaborat* or teleconference* or telehealth or teleguide*or telediagnos* or telemed* or telemonitor* or telepresence* or "telemental health" or telepsychotherap* or ((skype or facetime or zoom or internet or web or online or web or video or distan* or remote*) NEAR/2 (deliver* or conferenc* or call*)) or ehealth* or tele care or tele collaborat* or tele conference* or tele health or tele guide* or tele diagnos* or tele med* or tele monitor* or tele presence* or "tele mental health" or "tele psychotherap*" or (teletherap* NOT (x-ray or radiat* or cobalt or gamma* or cesium))):ti,ab,kw 9619
#15 ((distan* or remote* or video* or virtual* or tele or web or internet or online or technology or "text messag*") NEAR/4 (psychotherap* or "mental health" or CBT or (cognitive NEAR/2 "behavio?r* therap*"))):ti,ab,kw 1377
#16 ((telephone* or telephoning or phone* or phoning) NEAR/2 (call* or deliver* or psychotherap*)):ti,ab,kw 7810
#17 #14 or #15 or #1617603
#18 #3 and #13 and #17 1319

Part 2: Additional tables not included in manuscript

Table B.1: Country of Publication

Country of Publication	**N (%) of References (out of total 48)**
USA	**31 (64.6%)** Brenes 2012, 2015, 2017; Celano 2020; Dobkin 2020; Egede 2015; Fann 2015; Frueh 2007; Goetter 2014; Gros 2011; Heffner 2015; Junkins 2020; Kirkness 2017; Liu 2020a; Maieritsch 2016; Mitchell 2008; Mohr 2011, 2012; Morland 2010, 2011, 2014, 2015, 2019; Olden 2017; Stecker 2014; Tuerk 2010; Valentine 2020; Wierwille 2016; Yuen 2013, 2015; Ziemba 2014
Canada	**9 (18.8%)** Bouchard 2000, 2004, 2020; Dennis 2020; Germain 2009, 2010; Marchand 2011; Taylor 2003; Watts 2020
Australia	**4 (8.3%)** Dunstan 2012; Griffiths 2006; Lawn 2019; Stubbings 2013

Japan	**2 (4.2%)** Hamatani 2019; Matsumoto 2018
Spain	**1 (2.1%)** De las Cuevas 2006
Norway	**1 (2.1%)** Vogel 2014

Table B.2: Year of Publication

Year of Publication	**N (%) of References (out of total 48)**
Years (2000-2005)	**3 (6.3%)** Bouchard 2000, 2004; Taylor 2003
Years (2006-2010)	**8 (16.7%)** De las Cuevas 2006; Frueh 2007; Germain 2009, 2010; Griffiths 2006; Mitchell 2008; Morland 2010; Tuerk 2010
Years (2011-2015)	**21 (43.8%)** Brenes 2012, 2015; Dunstan 2012; Egede 2015; Fann 2015; Goetter 2014; Gros 2011; Heffner 2015; Marchand 2011; Mohr 2011, 2012; Morland 2011, 2014, 2015; Stecker 2014; Vogel 2014; Yuen 2013, 2015; Ziemba 2014
Years (2016-2020)	**16 (33.3%)** Bouchard 2020; Brenes 2017; Celano 2020; Dennis 2020; Hamatani 2019; Junkins 2020; Lawn 2019; Liu 2020a; Kirkness 2017; Maieritsch 2016; Matsumoto 2018; Morland 2019; Olden 2017; Valentine 2020; Watts 2020; Wierwille 2016

Table B.3: Research Study Design

Study Design	**N (%) of References (out of total 48)**
RCT	**32 (66.7%)** Bouchard 2000, 2004; Brenes 2012, 2015, 2017; Celano 2020; De las Cuevas 2006; Dennis 2020; Dobkin 2020; Dunstan 2012; Edge 2015; Fann 2015; Frueh 2007; Junkins 2020; Kirkness 2017; Liu 2020a; Maieritsch 2016; Mitchell 2008; Mohr 2011, 2012; Morland 2010, 2011, 2014, 2015, 2019; Olden 2017; Stecker 2014; Stubbings 2013; Vogel 2014; Watts 2020; Yuen 2015; Ziemba 2014
Non-randomized controlled trial	**8 (16.7%)** Bouchard 2020; Germain 2009, 2010; Gros 2011; Heffner 2015; Marchand 2011; Tuerk 2010; Valentine

	2020
Pre/Post-test (No control group)	**6 (12.5%)** Goetter 2014; Griffiths 2006; Hamatani 2019; Lawn 2019; Matsumoto 2018; Yuen 2013
Other	**2 (4.2%)** Taylor 2003; Wierwille 2016
Qualitative	**0 (0%)**
Mixed (quantitative & qualitative)	**2 (4.2%)** Lawn 2019, Junkins 2020

Table B.4: Population Type (Military vs Civilian)

Population Type	**N (%) References (out of total 48)**
Military	**16 (33.3%)** Egede 2015; Frueh 2007; Gros 2011; Liu 2020a; Maieritsch 2016; Mohr 2011; Morland 2010, 2011, 2014, 2019; Stecker 2014; Tuerk 2010; Valentine 2020; Wierwille 2016; Yuen 2015; Ziemba 2014
Civilian	**32 (66.7%)** Bouchard 2000, 2004, 2020; Brenes 2012, 2015, 2017; Celano 2020; De las Cuevas 2006; Dennis 2020; Dobkin 2020; Dunstan 2012; Fan 2015; Germain 2009, 2010; Goetter 2014; Griffiths 2006; Hamatani 2019; Heffner 2015; Junkins 2020; Kirkness 2017; Lawn 2019; Marchand 2011; Matsumoto 2018; Mitchell 2008; Mohr 2012; Morland 2015; Olden 2017; Stubbings 2013; Taylor 2003; Vogel 2014; Watts 2020; Yuen 2013;

Table B.5: DSM/ICD Diagnosis

DSM/ICD Diagnosis	**N (%) of References (out of total 48)**
Posttraumatic stress disorder (PTSD)	**19 (40.0%)** Frueh 2007; Germain 2009, 2010; Gros 2011; Liu 2020a; Maieritsch 2016; Marchand 2011; Morland 2010, 2011, 2014, 2015, 2019; Olden 2017; Stecker 2014; Tuerk 2010; Valentine 2020; Wierwille 2016; Yuen 2015; Ziemba 2014
Panic disorder (PD)	**2 (4.2%)** Benes 2012; Matsumoto 2018

Panic disorder with agoraphobia (PDA)	**4 (6.3%)** Bouchard 2000, 2004, 2020; Griffiths 2006;
Anxiety disorder	**10 (20.8%)** Brenes 2012, 2015, 2017; Dunstan 2012; Griffiths 2006; Lawn 2019; Matsumoto 2018;Stubbings 2013; Watts 2020; Yuen 2013
Depressive disorder	**11 (22.9%)** Dennis 2020; Dobkin 2020; Egede 2015; Fann 2015; Griffiths 2006; Junkins 2020; Kirkness 2017; Lawn 2019; Mohr 2011, 2012; Olden 2017; Stubbings 2013
Mixed anxiety-depressive disorder	**2 (4.2%)** Dunstan 2012; Griffiths 2006
Obsessive-compulsive disorder (OCD)	**4 (8.3%)** Goetter 2014; Matsumoto 2018; Taylor 2003; Vogel 2014
Eating disorder	**2 (4.2%)** Hamatani 2019; Mitchell 2008;
Bipolar disorder	**2 (4.2%)** Celano 2020; Heffner 2015
Neurotic, stress-related and somatoform disorders	**1 (2.1%)** De Las Cuevas 2006

Table B.6: Intervention Characteristics

Intervention Characteristic	**N (%) of References (out of total 48)**
Mode of Delivery	
Video	**31 (64.6%)** Bouchard 2000, 2004, 2020; De las Cuevas 2006; Dunstan 2012; Egede 2015; Frueh 2007; Germain 2009, 2010; Goetter 2014; Griffiths 2006; Gros 2011; Hamatani 2019; Junkins 2020; Liu 2020a; Maieritsch 2016; Marchand 2011; Matsumoto 2018; Morland 2010, 2011, 2014, 2015; Olden 2017; Stubbings 2013; Tuerk 2010; Valentine 2020; Vogel 2014; Watts 2020; Wierwille 2016; Yuen 2013, 2015
Phone	**15 (31.3%)** Brenes 2012, 2015, 2017; Celano 2020; Dennis 2020; Dobkin 2020; Fann 2015; Heffner 2015; Kirkness 2017; Lawn 2019; Mohr 2011, 2012; Stecker 2014; Taylor 2003; Vogel 2014
Both (Video & Phone)	**1 (2.1%)** Vogel 2014

Unspecified (Ex. “telemedicine”)	**3 (6.3%)** Mitchell 2008; Morland 2019; Ziemba 2014
Group or 1-1	
Group	**4 (8.3%)** Frueh 2007; Morland 2010, 2011; 2014
1-1	**44 (91.7%)** Bouchard 2000, 2004, 2020; Brenes 2012, 2015, 2017; Celano 2020; De las Cuevas 2006; Dennis 2020; Dobkin 2020; Dunstan 2012; Egede 2015; Fann 2015; Germain 2009, 2010; Goetter 2014; Griffiths 2006; Gros 2011; Hamatani 2019; Heffner 2015; Junkins 2020; Kirkness 2017; Lawn 2019; Liu 2020a; Maieritsch 2016; Marchand 2011; Matsumoto 2018; Mitchell 2008; Mohr 2011, 2012; Morland 2015, 2019; Olden 2017; Stecker 2014; Stubbings 2013; Taylor 2003; Tuerk 2010; Valentine 2020; Vogel 2014; Watts 2020; Wierwille 2016; Yuen 2013, 2015; Ziemba 2014
Type of Therapy	
Cognitive behavioural therapy (CBT)	**27 (56.3%)** Bouchard 2000, 2004, 2020; Brenes 2012, 2015, 2017; De las Cuevas 2006; Dobkin 2020; Dunstan 2012; Fann 2015; Frueh 2007; Germain 2009, 2010; Hamatani 2019; Junkins 2020; Lawn 2019; Marchand 2011; Matsumoto 2018; Mitchell 2008; Mohr 2011, 2012; Stecker 2014; Stubbings 2013; Taylor 2003; Watts 2020; Wierwille 2016; Ziemba 2014
Cognitive processing therapy (CPT)	**6 (12.5%)** Liu 2020a; Maieritsch 2016; Morland 2011, 2014, 2015; Valentine 2020
Exposure therapy or Prolonged Exposure (PE)	**7 (14.6%)** Gros 2011; Morland 2019; Olden 2017; Tuerk 2010; Valentine 2020; Wierwille 2016; Yuen 2015
Exposure and ritual prevention (ERP)	**4 (8.3%)** Goetter 2014; Griffiths 2006; Taylor 2003; Vogel 2014
Acceptance and commitment therapy	**1 (2.1%)** Heffner 2015
Positive psychology (PP)	**1 (2.1%)** Celano 2020
Interpersonal therapy	**2 (4.2%)** Dennis 2020; Dunstan 2012
Behavioral activation	**1 (2.1%)** Egede 2015
Anger management therapy	**1 (2.1%)**

	Morland 2010
Brief psychosocial behavioral intervention	**1 (2.1%)** Kirkness 2017
Acceptance Based Behavior Therapy for Social Anxiety Disorder (ABBT for SAD)	**1 (2.1%)** Yuen 2013

Table B.7: Study Outcomes

Outcome	**N (%) of References (out of total 48)**
Remote delivery at least as good as in person	**32 (66.7%)** Bouchard 2000, 2004, 2020; De las Cuevas 2006; Dennis 2020; Dunstan 2012; Egede 2015; Fann 2015; Frueh 2007; Germain 2009, 2010; Hamatani 2019; Heffner 2015; Kirkness 2017; Lawn 2019; Liu 2020a; Maieritsch 2016; Marchand 2011; Mitchell 2008; Mohr 2012; Morland 2010, 2011, 2014, 2015, 2019; Stubbings 2013; Tuerk 2010; Vogel 2014; Watts 2020; Yuen 2013, 2015; Ziemba 2014
Remote delivery not compared to an in person comparator	1**2 (25.0%)** Brenes 2012, 2015, 2017; Celano 2020; Dobkin 2020; Goetter 2014; Griffiths 2006; Junkins 2020; Matsumoto 2018; Olden 2017; Stecker 2014; Taylor 2003
Remote delivery not as effective/efficacious as in person	**4 (8.3%)** Gros 2011; Mohr 2011; Valentine 2020; Wierwille 2016

Table B.8: Online Psychotherapy Scoping Review Study Characteristics Table

Study type	Study population	Sample size	Mean age (SD)	N (%) male	Mode of Delivery (Phone or Video)	Group or 1-1	Author, year (Country)
Cognitive Behavioral Therapy (n=27)							
RCT	Adults with PDA	8	30	37.5%	Video	1-1	Bouchard et al., 2000 (Canada)
RCT	Adults with PDA	21 Local site: N = 10 Remote site: N = 11	37.9 Local site: 37.1 Remote site: 38.8	28.6	Video	1-1	Bouchard et al., 2004 (Canada)
RCT	Adults aged 60 years and older with GAD, PD, or ADNOS	60 CBT-T group n = 30 Information-only group n = 30	69.2 (7.1) CBT-T group: 68.8 (7.3) Information-only group: 69.5 (6.9)	CBT-T group: 16.7% Information-only group: 16.7%	Phone	1-1	Brenes et al., 2012 (USA)
RCT	Rural adults aged 60 years and older with GAD	141 CBT-T group n = 70 NST-T group n = 71	Age groups: 60–64: 46.8% 65–69: 27.0% 70–74: 13.5% ≥75: 12.8%	18.4%	Phone	1-1	Brenes et al., 2015 (USA)
RCT	Rural adults aged 60 years and older with GAD	141 CBT N=70 NST N=71	66.8 (6.2)	18.4%	Phone	1-1	Brenes et al., 2017(USA)
RCT	Adult outpatients with mental and behavioral disorders due to psychoactive substance abuse; schizophrenia, schizotypal, and	140 total: VC N=70; FTF N=70	NR	33.6% total VC: 31.4%; FTF: 35.7%	Video	1-1	De las Cuevas et al., 2006 (Spain)

	delusional disorders; mood disorders; neurotic, stress-related and somatoform disorders; or disorders of the adult personality and behavior						
RCT	Adults aged 35–85 years with PD and depressive disorder	N=72; CBT N=37; TAU N=35	65.22 (9.63)	48.61%	Phone	1-1	Dobkin, 2020 (USA)
RCT	Adults with a mood or anxiety disorder	N = 6 ; VC n = 3; FTF n = 3	34.33 (16.11)	2 (33.3%)	Video	1-1	Dunstan, 2012 (Australia)
RCT	Adults with MDD who were hospitalized within the past 10 years for a complicated mild to severe TBI	Telephone CBT = 40; In-person CBT = 18; UC = 42	All: 45.8 (13.3) CBT: 45.4 (14.1) UC: 46.3 (12.4)	Male: CBT= 34 (59%) UC: 29 (69%)	Phone	1-1	Fann et al., 2015 (USA)
RCT	Male veterans with PTSD	Total n = 38 Same-room group n = 21 Telepsychiatry group n = 17	Same-room group: 56 (5) Telepsychiatry group: 55 (5)	100%	Video	Group	Frueh, 2007(USA)
RCT	African American HIV+ females aged 19 years and older with depression	Total N = 22; CBT group N = 11; ISP group N = 11	Overall 45.8 (11.8); CBT-AD intervention 48 (11.3); ISP intervention 43 (12)	0%	Video	1-1	Junkins et al., 2020 (USA)
RCT	Adults with BN (purging or non-purging subtype) or eating disorder not otherwise specified	n=128; FTF n=66; telemedicine n=62	FTF group = 29.6 (10.9); Telemedicine group: 28.4 (10.4)	FTF group: male 3%; Telemedicine group: male 0%	telemedicine system (TV-CBT)	1-1	Mitchell et al., 2008 (USA)
RCT	Veterans with MDD	85 enrolled; 41 assigned to T-CBT; 44 assigned to TAU	55.9 (10.59)	90.6%	Phone	1-1	Mohr et al., 2011 (USA)

RCT	Adults with MDD	Total n=325; FTF group n=162; telephone group n=163	FTF group: 47.5 (13.5); Telephone group: 47.8 (12.6)	FTF group: male= 21.6% Telephone group: male= 23.4%	Phone	1-1	Mohr et al., 2012 (USA)
RCT	Veterans with PTSD	Total n=274; Intervention n=123; control n=151	Mean age total = 29; Intervention Group = 28.3 (5.3); Control Group = 30.2 (6.9)	Total: 87.2%;Intervention Group: male 84.3%; Control Group: 90.1%	Phone	1-1	Stecker, 2014 (USA)
RCT	Adults with a DSM-IV axis one disorder living in Perth, Western Australia	n= 26 participants; VC = 14; In-Person= 12	30 (11)	Total 42% (11) VC: 42.9%; In-Person: 41.7%	Video	1-1	Stubbings et al., 2013 (Australia)
RCT	Adults aged between 18 and 75 with GAD	Total n=115; VC group n= 50; conventional psychotherapy group n=65	Telepsychotherapy via VTC: 43 (15.00) Conventional psychotherapy: 40 (16.00)	NR	Video	1-1	Watts et al., 2020 (Canada)
RCT	Veterans with PTSD	n=18 enrolled; n=13 completed; n=6 FTF; n=7 telemedicine	NR	NR	telemedicine (could be over the phone, but not specified)	1-1	Ziemba, 2014 (USA)
Non-randomized controlled trial	Adults with PDA	71 Video= 40 FTF = 31	Video: 34.9 (10.45) FTF: 36.90 (11.60)	Video: 15% FTF: 19%	Video	1-1	Bouchard et al., 2020 (Canada)
Non-randomized controlled trial	Adults between 18 and 65 years with PTSD	VC (n=16) FTF (n=32)	VC = 43 (11) FTF = 42 (12)	VC = 6 (37.5%) FTF = M:13 (41%)	Video	1-1	Germain, 2009 (Canada)
Nonrandomized	Adults with PTSD	46 total. 29 FTF; 17 VC	42	Overall: 41.3%. VC group:	Video	1-1	Germain et al., 2010 (Canada)

controlled trial				35.3%; FTF group: 44.8%.			
Non-randomized controlled trial	Adults with PTSD	n=68 (n=44 VC; n=22 FTF)	42.1 (12.1)	36%	Video	1-1	Marchand, 2011 (Canada)
Non-randomized controlled trial	Veterans with PTSD	Telehealth n =85; outpatient n=136	Telehealth 47.13 (15.39); outpatient 46.35 (38.01)	NR	Video	1-1	Wierwille et al., 2016 (USA)
Pre/Post-test (No control group)	Females aged 18 to 65 years with BN or binge-eating disorder	N = 7	31.9 (7.9)	0, 0%	Video	1-1	Hamatani, 2019 (Japan)
Pre/Post-test (No control group)	Adults with MDD or anxiety disorder	Total N = 680; Completers N = 427; Non-completers N = 253	Completers: 55.5 (15.6) Non-completers: 52.1 (16.3)	Completers: 59.5% Non-completers: 40.5%	Phone	1-1	Lawn et al., 2019 (Australia)
Pre/Post-test (No control group)	Adults aged 19 to 65 years with OCD, PD, or SAD	N=30, 1 drop out	35.4 (9.2)	20%	Video	1-1	Matsumoto, 2018 (Japan)
Cohort design, used pre/post test	Adults with OCD	N = 33, completed; N = 26 Delayed treatment n = 15 (completed); Immediate treatment n = 11 (completed)	38 (12)	24%	Phone, use FTF for screening	1-1	Taylor et al., 2003 (Canada)
Exposure Therapy or Prolonged Exposure (n=7)							

RCT	Veterans with PTSD	Total N = 175 IHIP n = 58 HBT n = 58 OBT n = 59	46.5 (14.11)	74.9%	Unspecified	1-1	Morland et al., 2019 (USA)
RCT	Adults aged 18–70 years who were survivors of trauma resulting from working in an occupation at risk for PTSD (e.g. disaster workers, firefighters, police officers, military service workers, reservists, and veterans) with PTSD	11	42.82 (13.53)	81.8%	Video	1-1	Olden et al., 2017 (USA)
RCT	Veterans and military personnel with PTSD	52	43.98 (15.18)	98.1%	Video	1-1	Yuen, 2015 (USA)
Non-randomized controlled trial	Veterans with PTSD	N = 89; Telehealth n=62; In person n = 27	Telehealth group: 45.1 (15.0), In-person group: 45.2 (16.0)	Telehealth group: 93.5%; In-person group: 88.9%	Video	1-1	Gros, 2011 (USA)
Non-randomized controlled trial	Veterans with combat-related PTSD	PE Live n = 35 PE via telehealth n = 12	39 (16)	94%	Video, use FTF for screening	1-1	Tuerk et al., 2010 (USA)
Non-randomized controlled trial	Veterans with PTSD	n = 171 (18.1% CVT-enrolled) CVT n = 32 FTF n = 140	44.4 (11.6)	26.5%	Video	1-1	Valentine et al., 2020 (USA)
Non-randomized controlled	Veterans with PTSD	Telehealth n =85; outpatient n=136	Telehealth 47.13 (15.39); outpatient 46.35 (38.01)	NR	Video	1-1	Wierwille et al., 2016 (USA)

trial							
Cognitive Processing Therapy (n=6)							
RCT	Veterans with PTSD	Total n = 207, in person group = 104, VC group = 103	48.4 (14.1)	77.4%	Video	1-1	Liu L. et al., 2020a (USA)
RCT	Veterans with PTSD	90 (divided 45 in each group)	30.93 (6.05)	93%	Video	1-1	Maieritsch et al., 2016 (USA)
RCT	Veterans with combat-related PTSD	13 enrolled, 7 assigned to NP group, 6 assigned to VTC group	The mean age was 48.6 years (14.2; range = 29–61) for the NP and 53.0 years (19.6; range = 28–77) for the VTC conditions.	100%	Video	Group	Morland et al., 2011 (USA)
RCT	Veterans with PTSD	N = 125, In person group = 64, VTC group = 61	55.3 (12.5)	100%	Video	Group	Morland, 2014 (USA)
RCT	Veterans with PTSD	Total sample (N = 126) In-Person group n = 63; VTC group n = 63	46.4 (11.9)	0%	Video	1-1	Morland, 2015 (USA)
Non-randomized controlled trial	Veterans with PTSD	n = 171 (18.1% CVT-enrolled) CVT n = 32 FTF n = 140	44.4 (11.6)	26.5%	Video	1-1	Valentine et al., 2020 (USA)
Exposure and Ritual Prevention (n=4)							

RCT	Adults with OCD	n = 10 in VCT group, n = 10 in self-help group; n = 10 in waitlist group	VCT group: 28.8 (9.2); Self-help group: 29.8 (10.3); Waitlist group: 40.7 (11.1)	40% VCT; 50% self-help; 30% waitlist	Video, Phone	1-1	Vogel, 2014 (Norway)
Pre/Post-test (No control group)	Adults with OCD	N=15	32.2 (11.41)	13.3%	Video	1-1	Goetter, 2014 (USA)
Pre/Post-test (No control group)	Adults with GAD, PDA, MDD or mixed anxiety and depressive disorder	N=15	NR	20%	Video	1-1	Griffiths, 2006 (Australia)
Cohort design, used pre/post test	Adults with OCD	N = 33, completed n = 26 Delayed treatment n = 15 (completed) Immediate treatment n = 11 (completed)	38 (12)	24%	Phone, use FTF for screening	1-1	Taylor et al., 2003 (Canada)
Interpersonal Therapy (n=2)							
RCT	Adult women with depression between 2 and 24 weeks postpartum	241 Control Group = 121 Intervention = 120	NR	0%	Phone	1-1	Dennis et al., 2020 (Canada)
RCT	Adults with a mood or anxiety disorder	N = 6 ; VC n = 3; FTF n = 3	34.33 (16.11)	2 (33.3%)	Video	1-1	Dunstan, 2012 (Australia)
Acceptance and Commitment Therapy (n=1)							
Non-	Adults with bipolar disorder	In-person n=10	In-person: 42.1 (16.1);	In-person: 20%;	Phone	1-1	Heffner et al.,

randomized controlled trial	who were daily smokers and motivated to quit in the next 30 days	Telephone n=6	Telephone: 51.0 (15.4)	Telephone: 17%			2015 (USA)
Acceptance Based Behavior Therapy for Social Anxiety Disorder (n=1)							
Pre/Post-test (No control group)	Adults with SAD	n = 24	35.0 (10.8)	75%	Video	1-1	Yuen et al., 2013 (USA)
Anger Management Therapy (n=1)							
RCT	Veterans with PTSD	N = 125, n=64 in-person group, n=61 VTC group (112 participants finished treatment: 57 in-person; 55 VTC)	In-person group mean age: 54.7 (9.7); VTC group mean age: 54.8 (9.3)	100%	Video	Group	Morland et al., 2010 (USA)
Behavioral Activation (n=1)							
RCT	Veterans aged 58 years or older with MDD	N= 241 Telemedicine N=120 Same-room N= 121	63.9 (5.1)	98%	Video	1-1	Egede, 2015 (USA)
Brief Psychosocial Behavioral Intervention (n=1)							
RCT	People with depression within 4 months of an ischemic or hemorrhagic stroke	Total= 100 Telephone=37 In-person=35 Control=28	60	50%	Phone	1-1	Kirkness et al., 2017 (USA)
Positive Psychology (n=1)							
RCT	Adults with bipolar depression	PP = 14 Control = 11	PP: 42.6 (12.8) Control: 42.6 (12.8)	32%	Phone	1-1	Celano et al., 2020 (USA)

Abbreviations:

PDA: Panic Disorder with Agoraphobia
GAD: Generalized Anxiety Disorder (GAD)
PD: Panic Disorder (PD)
ADNOS: Anxiety Disorder Not Otherwise Specified
PD: Parkinson's Disease
SAD: Social Anxiety Disorder
MDD: Major Depressive Disorder
BN: Bulimia Nervosa
PTSD: Posttraumatic Stress Disorder
HIV: Human Immunodeficiency virus
OCD: Obsessive Compulsive Disorder
CBT-T: Cognitive Behavioral Therapy Delivered by Telephone
CVT: Clinical Video Technology
NST-T: Telephone-delivered Nondirective Supportive Therapy
PE: Prolonged Exposure Therapy
PP: Positive Psychology
VCT: Videoconference-assisted Exposure and Response Prevention
VTC: Video Teleconference
RCT: Randomized Control Trial
NR: Not Reported
TAU: Treatment as Usual
TBI: Traumatic Brain Injury
UC: Usual Care
DSM: Diagnostic and Statistical Manual of Mental Disorders
NP: In-person
HBT: Home-based Telehealth
OBT: Office-based Telehealth
IHIP: In-person-in-home
FTF: Face-to-face
VC: Videoconference

Table B.9: Online Psychotherapy Scoping Review Results Table

Acceptability	Accessibility	Appropriateness	Effectiveness	Efficiency	Safety	Author, year

						(Country)
Cognitive Behavioral Therapy (n=27)						
Yes (High WAI scores; high rating of perception toward telepsychotherapy on 5-point scale)	No	No	Yes (significant improvement on all outcome measures - PAS, SE-CPAQ, STAI, DISS)	No	No	Bouchard et al., 2000 (Canada)
Yes (High WAI scores)	No	No	Yes (Significant improvement in outcome measures - ACQ, BSQ, MI, SE-CPAQ, STAI, BDI, DISS)	No	No	Bouchard et al., 2004 (Canada)
Yes (High WAI scores; high CALPAS scores)	No	No	Yes (non-inferiority on outcome measures - PAS, MI, BSQ, BDI, ACQ)	No	No	Bouchard et al., 2020 (Canada)
Yes (high satisfaction scores on CSQ-8; high WAI-S scores)	No	No	Yes (improvement in anxiety symptoms - PSWQ, STAI)	No	No	Brenes et al., 2012 (USA)
Yes (high satisfaction scores on CSQ-8)	No	No	Yes (improvement in anxiety symptoms - PSWQ, GAD-7, BDI)	No	No	Brenes et al., 2015 (USA)
No	No	No	Yes (improvement in anxiety symptoms - HAM-A, PSWQ, GAD-7, BDI)	No	No	Brenes et al., 2017 (USA)
No	No	No	Yes (improvement in symptoms - CGI, GSI, PSDI, PST)	No	No	De las Cuevas et al., 2006 (Spain)
No	No	No	Yes	No	No	Dobkin et al.,

			(significant improvements in outcome measures - HAM-D, CGI, BDI, HAM-A, SF-36, MCS)			2020 (USA)
No	No	No	Yes (significant improvement in DASS-42 scores)	No	No	Dustan, et al., 2012 (Australia)
Yes (high WAI-S scores)	No	No	Yes (no difference in effectiveness between digital and in-person therapy - HAM-D, SCL-20, PGI)	No	No	Fann et al., 2015 (USA)
Yes (high satisfaction ratings - CPOSS-VA; high scores on SDP)	No	No	Yes (clinical outcomes similar between groups - LEC, PCL-M, SCL-90-R, GSI, BDI)	No	No	Frueh, 2007 (USA)
Yes (high scores on DCSS; high scores on VT-Q)	No	No	Yes (primary mental health outcomes similar between groups - MPSS, BDI, BAI, ACF)	No	No	Germain, 2009 (Canada)
Yes (high WAI scores; high DCSS scores; high scores on VT-Q)	No	No	Yes (significant decline in the severity and frequency of PTSD symptoms on MPSS)	No	No	Germain, 2010 (Canada)
Yes (high WAI-SF scores)	No	No	Yes (ICBT via videoconference effective for treating bulimia nervosa and binge-eating disorder - reduction in some binge/purge episodes)	No	No	Hamatani, 2019 (Japan)
Yes	No	No	Yes	No	No	Junkins et al.,

(high CSQ-8 scores)			(decrease in CES-D scores over treatment period)			2020 (USA)
No	No	No	Yes (improvement in PHQ-9 and GAD-7 scores)	No	No	Lawn et al., 2019 (Australia)
No	No	No	Yes (non-inferiority in clinical outcome scores for virtual CBT for PTSD - MPSS, BDI-II, BAI, SF-12)	No	No	Marchand, 2011 (Canada)
Yes (high satisfaction ratings on 7-point Likert scale; high WAI-SF scores)	No	No	Yes (reductions in symptoms of OCD, panic, and social anxiety; reductions in PHQ-9 and GAD-7 scores)	No	No	Matsumoto, 2018 (Japan)
Yes (WAI scores indicate the intervention was acceptable to patients)	No	No	Yes (reduction in binge purge episodes and BDI scores)	No	No	Mitchell et al., 2008 (USA)
No	No	No	Yes (no differences in HAM-D or PHQ-9 scores or episodes of MD between T-CBT and treatment as usual)	No	No	Mohr et al., 2011 (USA)
No	No	No	Yes (significant improvement in depression symptoms - HAM-D, PHQ-9)	No	Yes (no suicidal ideation or suicide attempts for either treatment condition)	Mohr et al., 2012 (USA)
No	No	No	Yes (both groups reported reductions in symptoms of both PTSD and depression during course of trial) Measures: PASS, PCL-M, PHQ-9	No	No	Stecker, 2014 (USA)

Yes (high WAI-S scores; high CSQ-8 scores; high TSQ scores)	No	No	Yes (CBT was effective in significantly reducing symptoms of depression, anxiety, and stress - DASS, Q-LES-Q, BDI-II, OCI, HAQ, PSWQ, ASI)	No	No	Stubbings et al., 2013 (Australia)
No	No	No	Yes (scores for interview-administered Dimensional YBOCS, self-report YBOCS and PI declined significantly over the course of treatment)	No	No	Taylor et al., 2003 (Canada)
Yes (high WAI scores)	No	No	Yes (clinical and statistical improvement of the participants on ADIS-IV between the beginning and end of the therapy)	No	No	Watts et al., 2020 (Canada)
No	No	No	Yes (Veterans who received CPT and PE treatment in traditional outpatient setting experienced greater PTSD symptom reduction than those who received same treatments in telehealth setting - PCL-S, BDI-2)	No	No	Wierwille et al., 2016 (USA)
Yes (survey results indicate greater satisfaction for telemedicine subjects as opposed to those receiving traditional face-to-face treatment)	No	No	Yes (reductions in CAPS, HAM-A, and MADRS scores signify improvement of symptoms)	No	No	Ziemba, 2014 (USA)
Exposure Therapy or Prolonged Exposure (n=7)						

No	No	No	Yes (significant reductions across all measures of symptomatology in telehealth and in-person groups - PCL-M, DASS, BDI-II, IIRS)	No	No	Gros, 2011 (USA)
No	No	No	Yes (On average, all participants experienced improvements across primary and secondary clinical outcomes, independent of treatment modality. Improvements were maintained over time. Measures: BAI, BDI-II, B-IPF, CAPS-5, PCL-5)	No	Yes (Neither participants nor providers reported safety issues, regardless of modality)	Morland et al., 2019 (USA)
Yes (high CSQ-8 scores; high WAI-SF scores; high TSAS scores)	No	No	Yes (post-treatment: all study completers demonstrated significant reductions across clinical measures - CAPS, PCL, BDI)	No	Yes (No safety issues arose during any of the assessments or treatment sessions)	Olden et al., 2017 (USA)
No	No	No	Yes (Prolonged exposure treatment via telehealth associated with large reductions in symptoms of PTSD and depression for veterans diagnosed with combat-related PTSD - measured via PCL and BDI)	No	Yes (no instances in the PE telehealth condition where an event representing a threat to patient safety occurred)	Tuerk et al., 2010 (USA)
No	No	No	Yes (trend of fewer participants fully completing and attriting quicker in CVT; similar trend when considering “minimally adequate care”)	No	No	Valentine et al., 2020 (USA)
No	No	No	Yes (Veterans who received CPT and PE treatment in traditional outpatient	No	No	Wierwille et al., 2016 (USA)

			setting experienced greater PTSD symptom reduction than those who received same treatments in telehealth setting - PCL-S, BDI-2)			
Yes (high scores on SDP)	No	No	Yes (Symptoms of PTSD, depression, and anxiety declined in both treatment modalities. Noninferiority supported for CAPS and anxiety (BAI); results inconclusive for self-reported PTSD symptoms (PCL) and depression (BDI-II))	No	No	Yuen, 2015 (USA)
Cognitive Processing Therapy (n=6)						
No	No	No	Yes (self-reported PTSD, clinician-rated PTSD, and self-reported depression instrument scores showed symptom severity decreases - CAPS, PCL-S, PHQ-9)	No	No	Liu L. et al., 2020a (USA)
No	No	No	Yes (decreased BDI, CAPS, PCL scores in telemental health group)	No	No	Maieritsch et al., 2016 (USA)
Yes (high TSAS scores; no difference in GTAS scores between treatment conditions)	No	No	Yes (differences between CAPS scores at pre-treatment compared to posttreatment, and 6-month follow-up)	No	No	Morland et al., 2011 (USA)
Yes (high CPOSS-VA scores; high scores	No	No	Yes (reductions in CAPS scores, no significant effect for treatment	No	No	Morland, 2014 (USA)

on TSAS; high GTAS scores)			condition at any time point)			
Yes (High WAI-SF scores; high CPOSS-VA scores; high TSAS scores)	No	No	Yes (civilians demonstrated reductions at all time points; veterans demonstrated no reductions in CAPS at any time point)	No	No	Morland, 2015 (USA)
No	No	No	Yes (trend of fewer participants fully completing and attriting quicker in CVT; similar trend when considering "minimally adequate care")	No	No	Valentine et al., 2020 (USA)
Exposure and Ritual Prevention (n=4)						
Yes (high WAI-S scores; high satisfaction scores on CSS; high scores on RTQ)	No	No	Yes (YBOCS scores changed significantly over time)	No	No	Goetter, 2014 (USA)
Yes (high acceptability rating on Likert-type scale)	No	No	Yes (significant improvement in MHI scores)	No	No	Griffiths, 2006 (Australia)
No	No	No	Yes (scores for interview-administered Dimensional YBOCS, self-report YBOCS and PI declined significantly over the course of treatment)	No	No	Taylor et al., 2003 (Canada)
Yes (high WAI scores)	No	No	Yes (CVT group had greatest change in	No	No	Vogel, 2014 (Norway)

			primary outcome (Y-BOCS) score; secondary outcome measures (VOCI and BDI) did not show significant differences among groups)			
Interpersonal Therapy (n=2)						
Yes (high scores on satisfaction questionnaire)	No	No	Yes (improvement in depressive symptoms: EPDS24, STAI, DAS, ECR)	No	No	Dennis et al., 2020 (Canada)
No	No	No	Yes (significant improvement in DASS-42 scores)	No	No	Dustan, et al., 2012 (Australia)
Acceptance and Commitment Therapy (n=1)						
Yes (high satisfaction ratings on two forced-choice response items)	No	No	Yes (67% of telephone participants reduced cigarette smoking)	No	Yes (no suicidal ideation or suicide attempts in telephone-deliered counseling)	Heffner et al., 2015 (USA)
Acceptance Based Behavior Therapy for Social Anxiety Disorder (n=1)						
Yes (high satisfaction scores on PSS; high WAI-SF scores)	No	No	Yes (significant reductions in psychopathology and improvements in functioning at post-treatment and 3-month follow-up - SPAI-SP, LSAS, Brief-FNE)	No	No	Yuen et al., 2013 (USA)
Anger Management Therapy (n=1)						
Yes (high scores on	No	No	Yes (improvement in STAXI-2	No	No	Morland et al., 2010 (USA)

CPOSS-VA; high scores on GTAS)			anger expression and trait anger subscale scores & on NAS-T)			
Behavioral Activation (n=1)						
No	No	No	Yes (similar outcomes between telemedicine and same room group: GDS, BDI, SCID)	No	No	Egede, 2015 (USA)
Brief Psychosocial Behavioral Intervention (n=1)						
No	No	No	Yes (non-significant increase in % decrease in HRSD scores and % participants in remission in combined intervention groups)	No	No	Kirkness, et al., 2017 (USA)
Positive Psychology (n=1)						
Yes (high acceptability rating)	No	No	Yes (significant improvement in positive affect and optimism - LOT-R, PANAS)	No	No	Celano et al., 2020 (USA)

Note: "Yes" indicates that the HQM dimension was measured in some way; "No" indicates that the HQM dimension was not measured.

Abbreviations:

ACF: Assessment of Current Functioning

ACQ: Agoraphobic Cognition Questionnaire

ADIS-4: Anxiety Disorders Interview Schedule for DSM-4

ASI: Anxiety Sensitivity Index

BAI: Beck Anxiety Inventory

BDI: Beck Depression Inventory

B-FNE: Brief Version of the Fear of Negative Evaluation Scale

B-IPF: Brief Inventory of Psychosocial Functioning

BSQ: Body Sensation Questionnaire

CALPAS: California Psychotherapy Alliance Scale

CAPS: Clinician Administered PTSD Scale

CBT: Cognitive Behavioral Therapy

CES-D: Center of Epidemiologic Studies Depression Scale

CGI: Clinical Global Impressions

CPOSS-VA: Charleston Psychiatric Outpatient Satisfaction Scale—VA PTSD Version

CPT: Cognitive Processing Therapy

CSQ-8: Client Satisfaction Questionnaire-8

CSS: Client Satisfaction Survey

CVT: Clinical Video Technology

DAS: Dyadic Adjustment Scale

DASS: Depression Anxiety and Stress Scale

DCCS: Distance Communication Comfort Scale

DISS: Sheehan Disability Scale

ECR: Experiences in Close Relationships Scale

EPDS24: Edinburgh Postnatal Depression Scale

GAD-7: General Anxiety Disorder-7

GDS: Geriatric Depression Scale

GSI: Global Severity Index

GTAS: Group Therapy Alliance Scale

HAI: Health Anxiety Inventory

HAM-A: Hamilton Anxiety Rating Scale

HAM-D: Hamilton Depression Rating Scale

HRSD: Hamilton Rating Scale for Depression

ICBT: Internet-based Cognitive Behavioral Therapy

IIRS: Illness Intrusiveness Rating Scale

LOT-R: Life Orientation Test-Revised

LSAS: Liebowitz Social Anxiety Scale

LEC: Life Events Checklist

MADRS: Montgomery-Asberg Depression Rating Scale

MCS: Mental Health Composite Score

MHI: Mental Health Inventory

MI: Mobility Inventory

MPSS: Modified PTSD Symptom Scale

NAS-T: Novaco Anger Scale-total score

OCD: Obsessive-Compulsive Disorder

OCI: Obsessive-Compulsive Inventory

P&A: Panic and Agoraphobia Scale

PANAS: Positive and Negative Affect Schedule

PASS: Perceptions About Service Scale

PCL: PTSD Checklist

PE: Prolonged Exposure

PGI: Patient Global Impression

PHQ-9: Patient/Physician Health Questionnaire-9

PI: self-report revised Padua Inventory

PSDI: Positive Symptom Distress Index

PSS: Patient Satisfaction Survey

PST: Positive Symptom Total

PTSD: Post Traumatic Stress Disorder

PSWQ: Penn State Worry Questionnaire

QLES: Quality of Life Enjoyment and Satisfaction scale

RTQ: Reaction to Treatment Questionnaire

SCID: Structured Clinical Interview for DSM-4, clinician version

SCL-20: Patient-Reported Symptom Checklist-20

SCL-90-R: Symptoms Checklist-90 Revised

SDP: Service Delivery Perceptions measure

SE-CPAQ: Self-Efficacy to Control a Panic Attack Questionnaire

SF: Medical Outcomes Study Short Form–36

SF-12: SF-12 Version 2.0 Health Survey

SPAI-SP: Social Phobia and Anxiety Inventory-Social Phobia subscale

STAI: State-Trait Anxiety Inventory

STAXI-2: State-Trait Anger Expression Inventory-2

TSAS: Telemedicine Satisfaction and Acceptance Scale

VT-Q: Videoconference Therapy Questionnaires

VOCI: Vancouver Obsessional Compulsive Inventory

WAI: Working Alliance Inventory

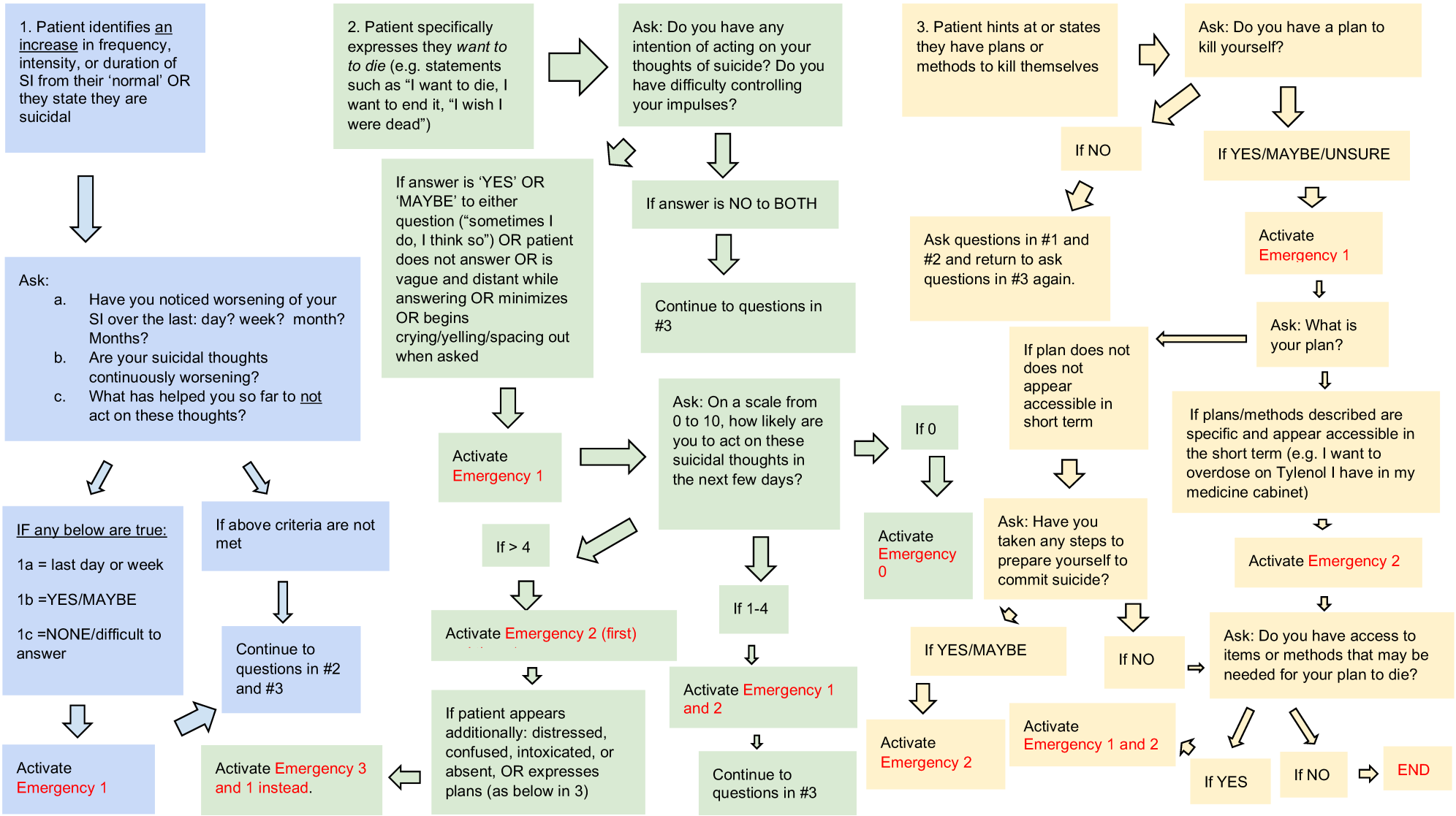
WAI-SF: Working Alliance Inventory-Short Form

Y-BOCS: Yale-Brown Obsessive-Compulsive Scale

Appendix C

Safety Protocol for Research Assistant

Note: RA will refer to safety protocol at any point in workflow in case of patient emergency. This protocol can be entered at any of the points 1, 2, or 3. If any of points 1, 2, or 3 are entered, activate Emergency 0 (see next page).



Emergency 0:

If the participant is already enrolled in the study: Contact Drs. Burback or Winkler to discuss the case and arrange for non-urgent assessment time.

If patient is **not yet enrolled** in the study, encourage them to contact their psychiatrist/MHT for assessment.

For all: Ask the patient if they have an emergency/crisis plan and ask them to activate the plan.

Document the encounter, send copy of the chart note to treatment team (and if enrolled, study therapist). Debrief with study psychiatrists as soon as feasible.

Emergency 1: Contact Drs. Burback or Winkler to join the Zoom session urgently. Send both a text to their cell phones with the word "emergency." Email Drs to their AHS email with subject "emergency" and include ZOOM meeting ID and password of the patient in the email body.

Emergency 2:

"I am worried about your safety. **Can you go to the emergency room for an assessment?**

If NO/uncertain/wavering: activate Emergency 3 and 1

If YES, you may conclude the call, and activate Emergency 0

Emergency 3:

STEP1:"**Can you please confirm your name, address, and phone number with me?** (confirm if possible. If patient not cooperating, move to STEP2 below)

STEP 2:"**I am worried about your safety. Please stay online with me and keep your camera and microphone on as I call 911 to help you**"

Step 3: Call 911 and activate Emergency 1 as you keep the patient on the line.

If a patient hangs up suddenly, activate Emergency 1 and call 911 and provide the following information:

-state you are concerned about patient acting on SI and that they hung up on you as you were assessing them for it

-describe change in SI that patient provided

-describe plans if any

-describe intent if any

-provide patient's address,phone, emergency contact

IF patient does not want to wait and asks to hang up, return to Emergency 2 questions.

If patient asks to talk with them while they wait, specify that it must be unrelated to present SI or stressful situation. You may then choose to talk about

- weather

- last vacation they took

- a happy occurrence

-someone they are friends/family with NOT A COMPLICATED relationship

END: "**Thank you for answering my questions**" and:

If activating Emergency 1: **I will ask one of our doctors to join us right away to speak with us. Please wait with me as I do that.**

If activating Emergency 2: **I will let one of our therapists know about your difficulties and we'll arrange for a follow up appointment either with them or your usual treatment team. I will call you with the date/time of this appointment as soon as I know. (you may then end)**

Questions related to Adverse Events and Dropouts for Virtual Eye Movement Desensitization and Reprocessing for Adults with Suicidal Ideation

Questions related to Adverse events (queried at the beginning of each session):

1) Describe the Adverse Event (AE)

_____

_____

2) Start date of AE _____

3) End date of AE _____

4) Severity

o Mild

o Moderate

o Severe

5) Relationship to study treatment

o Definitely related

o Possibly related

o Not related

o Unknown

6) Action taken regarding study intervention

o None

o Discontinued permanently by therapist

o Discontinued temporarily by therapist

o Patient discontinued therapy

o Protocol modified

o Frequency of sessions changed

o Hospital admission

o Crisis management/safety planning

7) Outcome of AE

o Resolved, no sequel

o AE still present – no treatment

o AE still present – being treated

o Residual effects present – not treated

o Residual effects present – treated

o Death

o Unknown

8) Expected

o Yes

o No

9) Serious Adverse Event?

o Yes

o No

o Unknown

10) Date of final study visit _____

11) Date of last known study intervention _____

12) Primary reason for terminating participation in the study

o Completed study

o Participant was determined after enrollment to be ineligible (Provide comments)

o Participant withdrew consent

o In the Investigator's opinion it was not in the participant's best interest to continue (Provide comments)

o Adverse event (If checked, complete the AE form)

o Death

o Lost to follow-up

o Other (Provide comments)

o Unknown

Questions related to dropouts:

13) Did the participant revoke consent or is not able to proceed with the study for any reason?

o Yes o No

14) What day did they stop participating in the study? _____

15) Why did they stop participating?

_____

_____

16) Additional notes (did the client agree to complete any final measures, can we still use their previous data, was any follow-up/additional information requested, etc.)

_____

_____

Appendix D

Table D.1 C-SSRS (Past Week) Scores

	Baseline	Mid (2 Months)	End (4 Months)
EMDR 1	3	0	0
EMDR 2	3	3	3
EMDR 3	2	3	2
EMDR 4	0	1	1
EMDR 5	5	5	0
EMDR 6	5	3	3
EMDR 7	3	3	3
TAU 1	4	5	5
TAU 2	3	3	3
TAU 3	1	2	1
TAU 4	5	0	0

Table D.2 BSS Scores

	Baseline	Mid (2 Months)	End (4 Months)
EMDR 1	23	0	0
EMDR 2	17	20	17
EMDR 3	0	0	0
EMDR 4	1	8	1
EMDR 5	25	22	13
EMDR 6	16	22	18
EMDR 7	18	21	15
TAU 1	24	35	32
TAU 2	23	16	13
TAU 3	3	12	3
TAU 4	27	0	1

Table D.3 DERS Scores

	Baseline	Mid (2 Months)	End (4 Months)
EMDR 1	106	73	85
EMDR 2	122	107	116
EMDR 3	89	92	89
EMDR 4	65	62	66
EMDR 5	126	91	77
EMDR 6	110	98	122
EMDR 7	105	106	100
TAU 1	140	168	135
TAU 2	124	118	91
TAU 3	112	14	141
TAU 4	122	50	81

Table 5.4 BDI Scores

	Baseline	Mid (2 Months)	End (4 Months)
EMDR 1	36	15	15
EMDR 2	43	41	44
EMDR 3	8	10	2
EMDR 4	11	12	11
EMDR 5	45	25	13
EMDR 6	34	32	25
EMDR 7	27	30	23
TAU 1	50	53	57
TAU 2	45	36	33
TAU 3	41	51	47
TAU 4	42	3	7

Table D.5 PHQ-9 Scores

	Baseline	Mid (2	End (4

		Months)	Months)
EMDR 1	13	4	5
EMDR 2	23	18	14
EMDR 3	5	4	4
EMDR 4	5	6	5
EMDR 5	26	18	12
EMDR 6	22	19	22
EMDR 7	14	16	11
TAU 1	24	24	27
TAU 2	23	15	15
TAU 3	23	26	26
TAU 4	23	1	6

Table D.6 GAD-7 Scores

	Baseline	Mid (2 Months)	End (4 Months)
EMDR 1	7	2	8
EMDR 2	20	13	12
EMDR 3	9	3	1
EMDR 4	7	7	8
EMDR 5	19	8	5
EMDR 6	10	6	11
EMDR 7	14	12	6
TAU 1	18	18	18
TAU 2	15	10	6
TAU 3	14	20	19
TAU 4	14	1	5

Table D.7 IES-R Scores

	Baseline	Mid (2 Months)	End (4 Months)
EMDR 1	22	7	4

EMDR 2	48	35	29
EMDR 3	34	13	8
EMDR 4	10	25	14
EMDR 5	24	33	32
EMDR 6	24	19	13
EMDR 7	33	25	16
TAU 1	73	82	75
TAU 2	25	14	14
TAU 3	51	45	47
TAU 4	35	4	13

Table D.8 DES-II Scores

	Prestudy	End (4 Months)
EMDR 1	11.43	17.14
EMDR 2	17.14	4.64
EMDR 3	15	2.86
EMDR 4	1.07	3.57
EMDR 5	23.21	11.07
EMDR 6	17.5	17.14
EMDR 7	3.57	2.14
TAU 1	23.57	22.5
TAU 2	7.86	5
TAU 3	20.71	23.93
TAU 4	13.93	2.5