EFFECTIVENESS OF REMOTE DELIVERY OF THERAPIES FOR POSTTRAUMATIC STRESS DISORDER SYMPTOMS: A META – ANALYSIS

by

Trevor R. Smith

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Thesis Supervisor:

Joe Etherton

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Abstract

Objective: The effectiveness of in-person treatments such as Cognitive Behavioral Therapy (CBT) and Prolonged Exposure (PE) for managing and ameliorating Posttraumatic Stress Disorder (PTSD) symptoms have been well confirmed, however the need for a safe alternate means of therapeutic relief, such as remote-therapy (telehealth) is necessary during the current Coronavirus pandemic. Remote delivery of therapies holds great promise by addressing the issue of being able to acquire mental health treatments when patients are unable to physically seek treatments in-person. The author conducted a meta-analysis of both randomized controlled trials and an uncontrolled study comparing remote-therapies and in-person treatments. The outcome of interest was PTSD symptom severity after treatments. ***Method:*** The meta-analysis included published studies in which remote therapy treatments and in-person treatments were used simultaneously on different groups of participants. The results of each of these studies measured PTSD symptoms in participants before and after treatments to determine if remote therapies are as effective as in-person treatments. Analyses for this study were performed using RevMan Systematic Review software. ***Results:*** Six studies (5 controlled, 1 uncontrolled) with a total sample size of 499 participants met the final inclusion criteria. The primary analysis for the studies indicated that remote-therapies are similarly effective at treating PTSD symptoms as in-person treatments. ***Conclusions:*** Remote therapies appear to be as effective as in-person treatments for treating PTSD symptoms, however additional randomized controlled trials are needed to boost the confidence in these findings.

Effectiveness of Remote Delivery of Therapies for Posttraumatic Stress Disorder Symptoms: A Meta – Analysis

Access to safe, effective and affordable mental healthcare services is a growing concern due to the worldwide Coronavirus (Covid-19) pandemic that has created a myriad of barriers for those seeking treatment (Blumenthal et al., 2020). Before the global pandemic began, barriers for acquiring mental healthcare treatment often consisted of financial barriers (affordability); attitudinal barriers such as social stigma of seeking treatment and misinterpretation of consequences of treatment; and structural barriers such as inability to physically get to treatment locations or obtain appointments when needed (Andrade et al., 2013). Additional barriers for treatment have arisen during the pandemic in the form of health concerns such that patients and practitioners alike are unable to safely meet in person due to contagious airborne diseases, which is why remote therapy options are the most viable option for treatment currently (Ojha & Syed, 2020).

Remote delivery of therapies (also known as telehealth, telemental health, telepsychotherapy or telemedicine) is becoming a more common place practice among the healthcare profession. Frequently remote therapies are delivered via videoconferencing, telephone calls, e-mails, remote monitoring, electronic applications on computer devices and varying wireless communication devices (Telehealth, APA). Positive benefits range from accessibility and convenience to both patient and practitioner (times of crisis or limited mobility patients); potential time and cost effectiveness for both patient and practitioner; and increased physical safety from transmitted airborne diseases (Monaghesh & Hajizadeh, 2020). However, there are barriers to widespread acceptance of remote therapies such as: practitioners lacking

multistate licensure; patient privacy and confidentiality concerns; potential for misdiagnosis and data gathering errors; perceived lack of impersonal interactions between practitioner and patient; refusal by some insurance companies to cover remote treatment; and the treatment may not be appropriate for all types of mental health concerns (Gajarawala & Pelkowski, 2021).

One particular area in which remote therapies have shown promise is in the treatment of Posttraumatic stress disorder (PTSD). PTSD is psychological disorder that is developed after direct exposure to a traumatic event and thereafter, quality of life is diminished by causing clinically marked distress and/or social and occupational disfunction due to negative symptoms such as: intrusion symptoms of the traumatic event; continued avoidance of stimuli correlated with the traumatic event; negative cognition and mood; and altered arousal and response after trauma exposure (American Psychiatric Association, 2013). As stated by the United States' National Comorbidity Survey Replication (NCS-R), PTSD has a lifetime prevalence in adults of 6.8% with an annual prevalence of 3.5% (Kessler et al., 2005). Veterans that serve in the United States' Armed Forces unfortunately possess the highest prevalence rates of PTSD. PTSD prevalence among Vietnam Veterans upon testing in 1986 in the National Vietnam Veterans Readjustment Survey (NVVRS) was 15.2%, however the estimated lifetime prevalence of PTSD in Vietnam Veterans was estimated to be 30.9% (Kulka et al., 1990). From 1995 – 1997, Gulf War Veterans were assessed using the PTSD checklist (PCL), which resulted in a 12.1% prevalence rate for PTSD (Kang et al., 2003). Veterans who served in Operation Iraqi Freedom and Operation Enduring Freedom were assessed using

the PCL and were found to have a PTSD prevalence rate of 13.8% (Tanielian & Jaycox, 2008).

PTSD originates from exposure to a traumatic event such as directly experiencing; witnessing; learning news of a significant other; or repeated exposure to death (or threatened), serious injury (or threatened), sexual violence or abuse. (American Psychiatric Association, 2013). The symptoms that qualify an individual for a diagnosis of PTSD after exposure to a traumatic event are intrusion symptoms of the traumatic event; extreme avoidance to sources associated to the event; and significant alterations in one's arousal and reactivity associated to the event for at least one month (Yehuda, 2002). An intrusion symptom of the traumatic event is frequently in the form of recurrent, distressing, intrusive memories of the trauma (American Psychiatric Association, 2013). However, additional intrusion symptoms may also include recurrent nightmares; dissociative reactions (aka: flashbacks); intense and/or continued distress to cues symbolizing the traumatic event; and physiological reactions to cues symbolizing the traumatic event. When an intrusion symptom occurs, the person suffering will reexperience feelings and emotions similar to those previously experienced when the traumatic event originally occurred.

Additional PTSD symptoms that are encountered are: continued avoidance of stimuli that serves as a reminder of the traumatic event; negative cognition and mood; and altered arousal and response after trauma exposure. (American Psychiatric Association, 2013). Continued avoidant behaviors come in two forms. First is an internal, mental effort to avoid distressing thoughts, feelings or memories that would serve as reminders of the traumatic event. Second is an external effort to avoid sources from the

outside world that would serve as reminders of the traumatic event, such as locations or individuals. Negative cognition and mood occur when two of these symptoms are experienced: inability to recall specifics of traumatic event; negative viewpoint about self and world; distorted cognitions about the cause and effect of the traumatic event, which may cause the individual to attribute blame to self or others; and diminished interest or involvement in normal everyday activities. Alterations in one's arousal and reactivity associated to the traumatic event occur when two of these symptoms are experienced: Irritability; self-destructive behavior; hypervigilance (heightened state of awareness), sleep disruption; and concentration issues. Due to the culmination of the PTSD symptoms, many who suffer chronic symptoms experience psychosocial and occupational functioning difficulties that diminish their quality of life (Pagotto et al., 2015). Therefore, the need for effective and affordable treatments that can be accessed wherever the patient might be is extremely important.

Method

Approach

A systematic review was implemented and executed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al, 2009).

Eligibility Criteria (Data Inclusion Requirements)

The inclusion requirements for data to be used in the meta-analysis were (a) studies must have been conducted, written and completed within 15 years previous of current study (current and relevant); (b) two treatment styles must be used from comparison (an in-person treatment and a remote treatment); (c) literature must be written

in English language; (d) participants must have a primary diagnosis of PTSD or meet the criteria of a PTSD diagnosis from the Diagnostic and Statistical Manual of Mental Disorders, Clinician Administered PTSD scale (CAPS) or PTSD Checklist (PCL-5); (e) must have a minimum sample size of 10 participants; and (f) pretreatment and posttreatment data of PTSD symptoms.

Search Procedure

A meticulous literature search was conducted using electronic databases provided by Texas State University that included PsycINFO, PsycARTICLES, Scopus and Google Scholar from October 2020 until January 2021. The following search terms were used in the databases: *remote therapy and PTSD or Posttraumatic Stress Disorder*, *Telehealth and PTSD or Posttraumatic Stress Disorder* and *Telemedicine and PTSD or Posttraumatic Stress Disorder*. The search was restricted to peer-reviewed literature, written within 15 years' time and written in English language only. The search produced 113 results to be potentially used in the current study. Further reviewing eliminated 55 of the 113 results due to lack of access because of the agreement between Texas State University and the varying publishers, leaving 58. Upon inspecting the abstracts of the remaining 58 results, 14 were identified as relevant to the current study.

Further examination of the 14 articles during data screening and extraction, produced more exclusions because 3 of articles did not have full pre-treatment and post-treatment data. An additional 2 articles were excluded due to lack of comparison between in-treatment and remote-treatment modalities. Another 3 were excluded due to lack of verification of PTSD diagnosis. A total of 6 studies met criteria for inclusion and were accessible for data extraction.

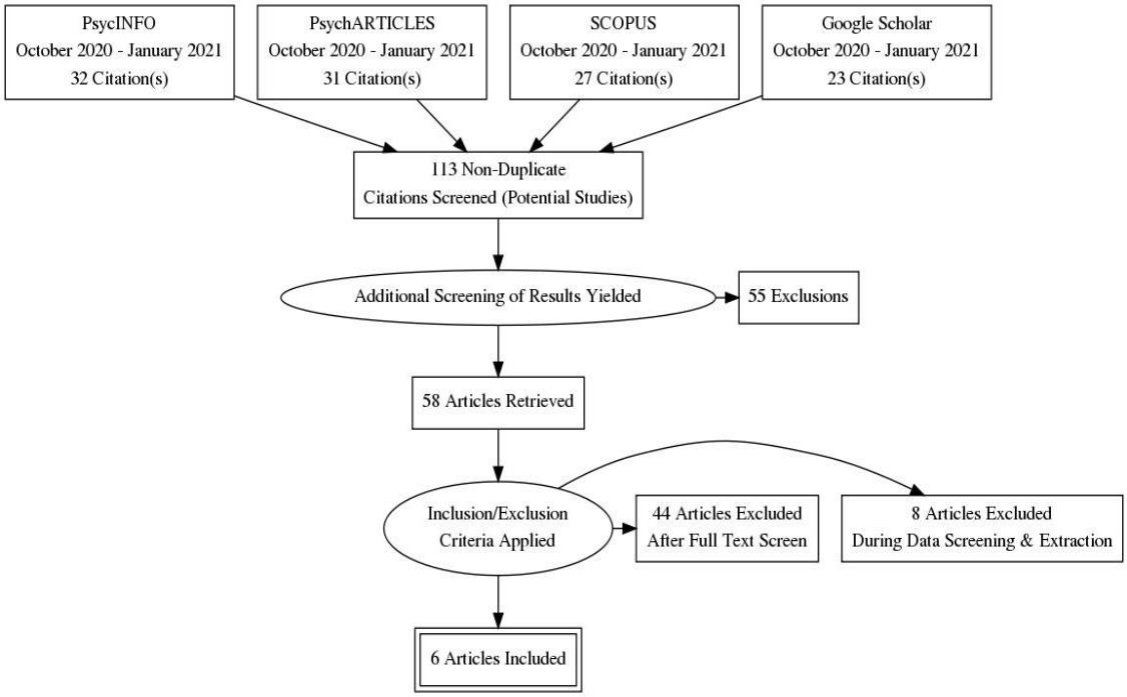


Figure 1. Flowchart of study selection and exclusions during study search and data extraction

Data Extraction and Coding

Data were extracted and transcribed from the six studies by the author on three separate data logs and reviewed afterwards for consistency. Data extracted from these studies included standard deviation (SD), means (M) scores and number of patient (N). Data extracted from the (Weirville et al, 2016) study was inconsistent with data from the other five studies because standard error (SE) was used versus the other five studies were in standard deviation (SD) format. For consistency in data, SE scores were converted to SD using the formula: SE = SD/√(sample size) (Altman & Bland, 2005).

Variables Coded

The following variables were transcribed from the included six studies: treatment types such as Prolonged Exposure (PE) and Cognitive-Behavioral Therapy (CBT), modality of treatment (remote therapy or in-person) and the number of participants/patients that participated in each type of modality per study. Also coded were

PTSD measure PCL-5/PDS pretreatment and posttreatment scores, as well as attrition rates during treatment. The PCL-5/PDS scoring system was chosen for the analysis because two of the studies (Tuerk et al, 2010, and Germain et al, 2009) lacked pretreatment and posttreatment data for the Clinician Administered PTSD scale (CAPS).

Analytic Strategy

Analysis for the five randomized controlled trials were conducted by inputting the standard deviation (SD), means (M) scores and number of participants (N) in each modality type (remote vs in-person) into Review Manager (RevMan) software by Cochran Collaboration for computing Random Effects sizes (Cochran, 2020). This method was conducted to compare both pretreatment samples and posttreatment samples effect size by Standardized Mean Difference formula (SMD; aka: Cohen's d). The standardized mean difference equation (experimental condition measure – control condition measure ÷ pooled SD) takes the SD that has been pooled and adjusts the experimental condition (remote therapy) versus control condition (in-person therapy) for both scale and precision of measurement (PCL-5/PDS scoring system) and sample size expressed as. (Faraone, 2008). SMD effect size for social sciences is viewed as (small = .02; medium = .05; large = .08).

The same measure was also conducted separately by adding the one uncontrolled study to the 5 controlled studies (6 total) to discern if there was any difference in effect size. The statistical analysis on Review Manager software used continuous data (SD & M) comparing between groups (N) though inverse variance calculations using random effects (due to sample size) with effects measured by standard mean difference with a confidence interval of 95% (Cochran, 2020).

Heterogeneity

The I^2 statistic was used on Review Manager to compute and evaluate the heterogeneity in this meta-analysis. The I^2 statistic is frequently interpreted by Cochran Collaboration as the higher the I^2 (25-75%), the higher the heterogeneity (diversity within the sample) (Cochran, 2020).

Publication Bias

This study was checked for publication biases through several means. The primary means of testing for publication biases were on Cochran Collaboration's software by running multiple tests on the data entered to check for biases in study data involving study selection, performance, attrition and reporting. All tests yielded inconclusive results. Two other common tests for checking for publication bias include a visual inspection of funnel plots of data collected and running Egger's test for asymmetry within the funnel plot (Egger et al, 1997). However, the two tests were quickly dismissed due to Cochran Collaborations guidelines stating that funnel plot tests should not be executed with a meta-analysis featuring fewer than ten studies due to insufficient test power (Higgins & Green, 2011). Due to the absence of suitable tests for meta-analyses featuring fewer than ten studies, no formal tests for publication bias were conducted.

Results

Study Characteristics

Five studies (5 controlled) comprising two treatment conditions (CBT & PE), with a total number of participants (n = 499), in two different modalities (remote, n = 201) and (in-person, n = 298), revealing posttreatment data were included in the primary

analysis (See Table 1). A secondary analysis was executed using all six studies combined (5 controlled, 1 uncontrolled) for comparison to see if the effectiveness of treatment modalities differed between controlled/randomized and uncontrolled/nonrandomized conditions (See Table 2).

Table 1. *(RANDOMIZED CONTROLLED TRIALS) Random effects forest plot of five randomized controlled trials studies comparing Posttreatment PCL 5/PDS results between both modalities* CI = confidence interval

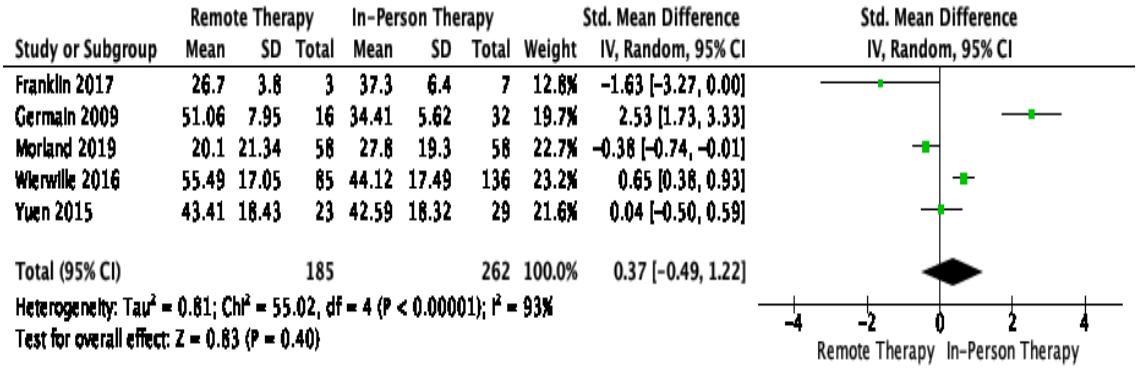
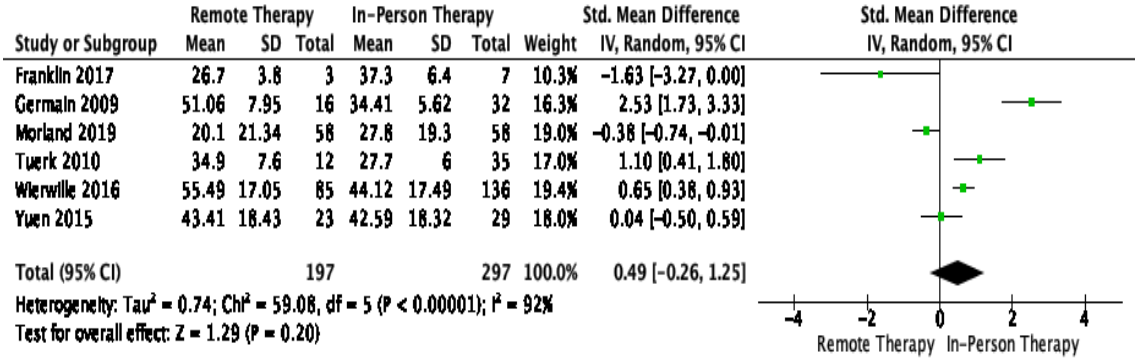


Table 2. *(COMBINED STUDIES) Random effects forest plot of all six studies (5 controlled & 1 uncontrolled) comparing Posttreatment PCL 5/PDS results between modalities* CI = confidence interval



Analyses

Pretreatment

Analysis of pretreatment scores comparing remote vs in-person treatments yielded no significant differences, indicating equivalence prior to treatment.

Randomized Controlled Trials

Posttreatment PCL-5/PDS scores were measured for each condition (remote & in-person) (see Table 1). Heterogeneity between groups was high at (I^2 = 93%), the effect size was small (SMD = 0.37)

Posttreatment Scores (5 controlled & 1 uncontrolled)

Posttreatment PCL-5/PDS scores were measured for each condition (remote & in-person) (see Table 2). Heterogeneity between groups was high at (I^2 = 92%) and the effect size was small (SMD = 0.49).

Comparison

Comparison of Posttreatment Effect Sizes (Controlled vs Combined Studies)

Treatment data for posttreatment scores between modalities (remote vs in-person) and (controlled vs combined studies) (see Table 1 & 2) were not statistically significant by showing randomized controlled studies posttreatment scores (I^2 = 93%; SMD = 0.37; CI = [-0.49, 1.22]) and combined studies post treatment scores (I^2 = 92%; SMD = 0.49; CI = [-0.26, 1.25]). This study's results suggest that remote treatments are similar in effectiveness at treating PTSD symptoms as in-person treatments.

Discussion

This meta-analysis was conducted to examine if remote therapy treatments are as effective in treating PTSD symptoms as in-person treatments. Due to the extremely small quantity of studies that feature remote therapy vs in-person therapy treatments with corresponding data for pretreatment and posttreatment measures of PTSD symptoms, both controlled and one uncontrolled study were used in this meta-analysis. Analysis indicated no difference between modalities posttreatment, whether controlled (SMD =

0.37) or uncontrolled (SMD = 0.49). These findings are important to illustrate that remote treatments are similarly effective to in-person treatments at treating PTSD symptoms. Remote therapies have the capabilities of providing mental healthcare for those in need who may otherwise be physically, mentally of fiscally unable to seek treatments, allowing for treatments nearly anywhere accessible by phone or internet (Kuhn & Owen, 2020). Remote treatments also potentially offer interventions at lower costs to patients, provide faster response times to patient in times of crisis and can keep patient and practitioner alike safe during times public health crisis such as the current global Coronavirus pandemic.

Few studies were encountered that featured a comparison between remote and in-person modalities, however this study suggests that remote therapy is noninferior to in-person therapy. Recent research has also demonstrated promising results for the usage of remote delivery of therapies for cognitive-behavioral therapy (CBT) in adolescents suffering from obsessive-compulsive disorder (Turner et al, 2014), CBT for adults suffering from depression and anxiety (Khatari et al, 2014) and therapeutic interventions for college-age students suffering from alcohol addiction (King et al, 2019). This meta-analysis contributes to existing research by showing that remote therapies are noninferior to traditional in-person therapeutic treatments.

Limitations of this meta-analysis are the small number of studies that met the inclusion criteria, the small number of participants in several of the studies, and the lack of studies featuring multiple treatment styles other than cognitive-behavioral therapy and prolonged exposure. Due to the small number of studies that feature a comparison between both modalities of remote therapy and in-person therapy, additional research is

needed. Studies that are needed are: randomized controlled trials featuring one of several therapy techniques such as cognitive-behavioral therapy, prolonged exposure or behavioral activation; a comparison between modalities such as remote therapy or in-person; studies with large enough sample sizes for sufficient analysis power; and pretreatment and posttreatments scores from participants/patients on the PCL-5/PDS and CAPS scoring system. Due to the current physical heath crisis of the global Coronavirus pandemic, remote therapies would greatly benefit a significant number of persons suffering from PTSD symptoms with no current means of seeking treatment.

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Studies included in the meta-analysis are indicated by an asterisk (*).

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