Psychological therapy for children with PTSD: Impact on parents' own post-traumatic stress symptoms and other mental health outcomes.

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Thesis portfolio abstract

Context: Parents of children with Post-traumatic Stress Disorder (PTSD) are recommended to be included in their child's treatment as they are considered integral to the child's recovery. Studies have found an association between child PTSD and parent PTSD and depression, making it likely that parents are experiencing their own mental health difficulties alongside their child's. However, little work has been conducted exploring the impact of child PTSD therapy on parental mental health.

Aim: This research portfolio aimed to investigate whether parents' own mental health improves as a result of their child receiving a psychological intervention for PTSD.

Design: The project is presented in a thesis portfolio format combining two main research papers: a systematic review with meta-analysis and a quantitative empirical paper. The systematic review searched the existing literature for studies measuring parent depression and PTSD and investigated whether these parent mental health outcomes improved as a result of their child receiving Trauma-focused Cognitive Behavioural Therapy (TF-CBT) or Eye Movement Desensitisation and Reprocessing (EMDR) for PTSD. The empirical paper investigated whether parents reported any improvements in PTSD, depression, anxiety or general mental health following the child receiving Cognitive Therapy for PTSD (CT-PTSD) in the early stages following a trauma.

Results: The systematic review identified some tentative, preliminary evidence for the effectiveness of trauma-focused psychological interventions at reducing parent PTSD, emotional reactions and depression. The empirical paper found preliminary evidence for the effectiveness of CT-PTSD delivered to the child at reducing parent PTSD, depression, anxiety and general mental health.

Conclusion: The findings provide preliminary evidence that parents' own mental health outcomes improve following their child receiving a psychological intervention for PTSD. Further research is required to explore which parents are likely to benefit and why.

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Chapter 1. Introduction to the thesis portfolio

This thesis portfolio consists of two main papers, a systematic review and an empirical paper, exploring parent mental health outcomes following trauma-focused psychotherapy delivered to the child. A bridging chapter links the two papers together. Also contained in the portfolio are extended methodology and results chapters to provide additional information of the research process. The portfolio ends with an overall discussion and critical evaluation which considers the relationship between the findings of each paper and their wider implications for research and clinical practice.

A traumatic experience is defined as 'a stressful event or situation…of an exceptionally catastrophic nature, which is likely to cause distress in almost anyone' (World Health Organisation, 1992: p47). Although trauma exposure in childhood and adolescence is common (31 per cent), post-traumatic stress disorder (PTSD) occurs in a minority (16 per cent; McLaughlin, Brent & Hermann, 2019; Alisic et al., 2014). Post-traumatic stress symptoms (PTSS) include intrusive recollections, avoidance of stimuli relating to the trauma, altered cognitions and mood, and hyperarousal. For children, PTSD can have significant detrimental effects on school and academic functioning as well as mental health going into adulthood (Yule et al., 2000).

Research has suggested that not only do children develop symptoms following their traumatic experience, but their parents do also. A meta-analysis found that there is a significant association between child PTSS and both parent PTSS and depression (Morris, Gabert-Quillen & Delahanty, 2012). This means that it is highly likely that parents with traumatised children are also experiencing PTSD (and other mental health) symptoms as well. As research is in its infancy it is not yet know whether these symptoms arise from first-

hand experience of the same trauma or a secondary trauma effect arising from parenting a child with PTSD symptoms.

Research shows that untreated PTSD may increase risk for depression, suicidality, substance misuse, hospital admissions and physical health difficulties in adults (Kessler, Sonnega, Bromet, Hughes & Nelson, 1995; Sareen et al., 2007; Jacobsen, Southwick & Kosten, 2001; Warshaw et al., 1993; Gupta, 2013). Parental PTSD may also affect the relationship with the child and prevent the child from recovering (Weems & Scheeringa, 2013). Therefore, there is a clear need to address parent PTSD and other mental health outcomes.

The National Institute for Health and Care Excellence recommends that children with PTSD are offered either Trauma Focused Cognitive Behavioural Therapy (TF-CBT) or Eye Movement Desensitisation and Reprocessing (EMDR; NICE, 2018).

The first recommended therapy, TF-CBT, belongs to a wider family of CBT interventions. CBT is a collection of techniques based on cognitive and behavioural theories. Cognitive theory postulates that people's emotional responses and behaviours are strongly influenced by their cognitions (beliefs, interpretations and thoughts) relating to the event or situation. Ultimately, it is about the meaning that people associate with specific events in their lives that results in certain emotions (Beck, 1976). Behavioural theory postulates that behaviour is crucial in the maintenance of psychological states (Wolpe. 1958). Taken together, CBT is based on the premise that behaviour can have a strong impact on thought and emotion, and also in their modification (Ellis, 1957).

TF-CBT may start off in the same way as any CBT intervention. It begins with psychoeducation about maintenance cycles, the role of avoidance and thinking errors, the link between thoughts and feelings, and physiological responses. It then progresses on to the

development and practice of skills such as grounding and relaxation. Subsequently, TF-CBT moves onto the trauma specific components. This begins with developing a trauma narrative which has the purpose of: (a) tackling the avoidance linked with trauma memories; (b) identifying cognitive distortions in relation to the traumatic experience; and (c) contextualising the child's trauma. Next, the cognitive distortions hypothesised to be related to negative affective states are explored and challenged (Cohen & Mannarino, 2008).

Parents are included in TF-CBT in various components. Firstly, they might be involved in the psychoeducation aspects to help them also understand trauma and how symptoms are maintained. They may also be involved in the skills development as it is likely that the child may need support in implementing any learnt strategies. Once the trauma narrative is produced, this is often shared with the parents in a way the child feels comfortable with. Some therapies provide a separate parenting component where parenting skills that are known to support the child are explored (Cohen & Mannarino, 1996; Deblinger, Lippman & Steer, 1996).

TF-CBT is used as an umbrella term and many manuals based on the core principles have been developed over the years including: Narrative Exposure Therapy (Schauer, Neuner & Elbert (2011), TF-CBT manual (Cohen & Mannarino, 2008), Cognitive Processing Therapy (Resick, Monson & Chard, 2008), Prolonged Exposure (Foa, Chrestman & Gilboa-Schechtman, 2009), and Cognitive Therapy for PTSD (CT-PTSD; Smith, Perrin, Yule & Clark, 2010).

CT-PTSD will now be described as this is the manual used in the empirical paper in this portfolio. CT-PTSD is based on Ehlers and Clark's (2000) cognitive model of PTSD and treatment programme (Ehlers et al. 2005) and is considered theory-based. Two factors are central to this model. Firstly, the model recognises that there are individual differences in

both the trauma memory representation and the appraisal processes about the traumatic experience. Secondly, CT-PTSD is formulation-driven. This means that the model is used to develop an individualised hypothesis which is used as a guide to understanding the child's difficulties, and discovering useful strategies to implement changes.

The second NICE recommended therapy, EMDR, draws upon Shapiro's model of "Adaptive Information Processing" (AIP; 2017). This model assumes that human beings are physiological processors of information which is stored in networks in the brain containing memories, thoughts, images, emotions and sensations. During normal processing of information, connections are made, and people respond and resolve disturbances. According to the AIP mode, during traumatic events information associated with that event can be processed inadequately and stored in a dysfunctional format. EMDR uses bilateral stimulation (or eye movements) to stimulate adaptive information processing and forge new connections between dysfunctionally held information and adaptive information. There is a three-stage process in EMDR: (1) processing details of the past event; (2) processing current situations that result in distress; and (3) processing for future situations.

It is known that TF-CBT and EMDR are effective for children with PTSD (NICE, 2018) but what is not yet understood is whether these therapies delivered to children are also effective at reducing parent mental health symptoms, and so this is the main question for this portfolio. The systematic review in this portfolio summarised the current literature and evaluated through meta-analysis whether there were any significant changes for parents own mental health outcomes after child psychotherapy as compared to controls. The parent outcomes measured were PTSD (including parent emotional reactions) and depression. The systematic review included studies that evaluated TF-CBT based on any of the manuals outlined above as well as EMDR. The empirical paper focused on TF-CBT being delivered using the CT-PTSD manual described above. It sought to add to the current literature by

investigating the effects on parent outcomes following CT-PTSD delivered to children in the early stages following a trauma as compared to a wait-list control. The parent outcomes were PTSD, depression, anxiety and general mental health. It was not the purpose of this portfolio to compare manuals or therapies but rather understand parent mental health outcomes following the provision of these therapies.

Chapter 2.

Systematic review prepared for submission to: Journal of Traumatic Stress

Psychotherapeutic treatments for children's post-traumatic stress symptoms: outcomes for parents' own PTSD and depression.

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Abstract

Research has shown that there is a correlation between child PTSD and parent PTSD and depression. The NICE recommended interventions for children with PTSD are Trauma-Focused Cognitive Behavioural Therapy (TF-CBT) and Eye Movement Desensitisation and Reprocessing (EMDR). While it is clear that these therapies are effective for children, it is unclear whether these interventions, delivered to the child, have a beneficial impact on parents' own PTSD and depression. This paper presents a systematic review and meta-analysis of the studies that have evaluated TF-CBT or EMDR for traumatised children, and measured parent depression and post-traumatic stress symptoms. Seven RCTs (six CBT based and one EMDR-based) were identified and reviewed. The results provide some preliminary evidence that trauma-focused psychological interventions were superior to control conditions at reducing parents' own emotional responses as measured by the PERQ and depression symptoms. Although not reaching significance ($p=0.09$), there was some promising evidence that parent PTSD symptoms also reduced. Although the results are promising, further research is required before firmer conclusions can be drawn. Current studies offer little information about the types of parents that benefit from their child's therapy and whether parent involvement is related to parent PTSD and depression. Indirect parent-related gains may be useful for any future cost-effectiveness evaluation. Recommendations for future research and clinical implications are presented.

Keywords: post-traumatic stress disorder, parent PTSD, parent depression, parent mental health, child PTSD.

Introduction

Post-traumatic stress disorder (PTSD) can develop when an individual has experienced 'a stressful event or situation…of an exceptionally catastrophic nature, which is likely to cause distress in almost anyone' (World Health Organisation, 1992: p47). Post-Traumatic Stress Symptoms (PTSS) include intrusive recollections, avoidance of stimuli relating to the trauma, negatively altered cognitions and mood, and hyperarousal. A recent prevalence study found that a lifetime prevalence of trauma exposure reported at age 18 was 31.1 per cent and out of this trauma exposed sample, the lifetime prevalence of PTSD by age 18 was 25 per cent (Lewis et al., 2019).

Research suggests that not only do children develop post-traumatic stress symptoms in response to their trauma, but parents do also. In a sample of children with PTSD, it was found that 50 per cent of parents experienced at least moderate levels of post-traumatic stress symptoms and one in three parents reported clinically significant levels of depression (Tutus & Goldbeck, 2016). A meta-analysis found that across 32 studies, there was a significant association between child PTSS and both parent PTSS and depression (Morris, Gabert-Quillen & Delahanty, 2012).

There are two main reasons why parents may develop PTSD in response to their child's trauma. Firstly, the parent may have also experienced the same traumatic event as their child or witnessed it. A meta-analysis found a parent sharing the same interpersonal trauma as their child led to significantly more distress for the child (a term used to include PTSD, anxiety, depression, general psychological distress and behavioural difficulties; Lambert, Holzer & Hasbun, 2014). Secondly, parents may be experiencing secondary traumatic stress symptoms in response to caring for their traumatised child. This has been shown to link to depression, shame, guilt and a sense of hopelessness for their child's situation (Cohen, Mannarino & Deblinger, 2006). While it is unknown how many parents go

on to develop PTSD in response to their child's trauma, it has been estimated that 23 per cent of parents meet PTSD criteria following paediatric traumatic injury (that could include fractures, open wounds, burns, mild traumatic brain injury or internal injuries, caused by road traffic accidents, falls, sports incidents or assaults; Martin-Herz et al., 2012). The paediatric trauma literature has also found that parents are more likely to develop PTSD if their child was younger (de Vries et al., 1999), the parent witnessed the child's trauma (van der Sluis, Stewart, Groothoff, ten Duis & Eisma, 2005), the parent experienced greater peritraumatic distress and dissociation (Allenou et al., 2010), and the child experienced greater levels of pain during their hospital stay (Stoddard et al., 2006).

When a child has been traumatised, parents are thought to develop "relational PTSD" (Scheeringa and Zeanah, 2001). This model suggests that traumatised parents can either become overprotective (arising from their own concerns about their children's safety) or find it difficult to tolerate their children's expression of fear, anxiety and helplessness. Thus, parents may adopt intrusive and insensitive parenting practices reflecting a preoccupied attachment style, or may instead withdraw from interactions with the child, reflecting an avoidant attachment style (Flykt, Kanninen, Sinkkonen, & Punamäki, 2010; Van Ee, Kleber, Jongmans, Mooren, & Out, 2016). A qualitative review confirmed that parental trauma can prevent children from developing a secure base because the child feels overwhelmed and uncontained by the parent (De Haene Grieten, & Verschueren, 2010).

To take this further, the "relational PTSD and recovery" model proposes that parent responsiveness to the child is dependent on their own wellbeing. When a parent is aware of their child's needs and can act upon them, this leads to an improvement in wellbeing for the child (Alisic, Boeije, Jongmans and Kleber, 2012). This is confirmed by studies that found that supportive, secure and wise parenting practices can be a protective factor for children's

mental health, resilience and development (Feldman, Vengrober, Eidelman-Rothman, & Zagoory-Sharon, 2013; Qouta, Punamäki, Miller, & El Sarraj, 2008).

These models suggest that improvements in parents' own PTSD and depression are likely to result in benefits for both the parent and child. For the parent, risk of suicide, substance misuse and physical health difficulties may be significantly reduced (Sareen et al, 2007; Jacobsen, Southwick & Kosten, 2001). Reduced mental health symptoms may then result in a reduction of child PTSD symptoms due the mediating effect of parent PTSD symptoms on child treatment outcomes (Nixon, Sterk & Pearce, 2012).

Clearly, there needs to be effective treatments for parents as well as their children. If one therapy can support both the parent and child, this has potential benefits from a cost-effectiveness perspective. There is some debate as to whether separate programmes or joint programmes are more effective, and some have found that a joint child-parent programme was significantly more effective at reducing child PTSD symptoms compared to a parent only programme, due an improvement in positive parenting (Runyon, Deblinger & Steer, 2010)

The National Institute for Health and Care Excellence (NICE, 2018) recommend two psychological interventions for treating children with PTSD: TF-CBT and Eye Movement Desensitisation and Reprocessing (EMDR). TF-CBT has shared components of any CBT intervention which includes psychoeducation (including the role of thoughts in behaviour and emotion), skills building (relaxation, affect modulation, cognitive coping) and modifying behaviours to challenge thoughts (through graded exposure or behavioural experiments). TF-CBT has additional components that include working through a trauma narrative, in vivo mastery of trauma reminders and cognitive processing. EMDR draws upon Shapiro's model of "Adaptive Information Processing" (AIP; 2017) and uses bilateral stimulation (or eye movements) to stimulate adaptive information processing and forge new connections between dysfunctionally held information and adaptive information. There is a three-stage process in

EMDR: (1) processing details of the past event; (2) processing current situations that result in distress; and (3) processing for future situations.

Aims

This systematic review with meta-analysis aimed to investigate whether providing TF-CBT or EMDR to children improved parents' own PTSD and depression. A previous systematic review found promising preliminary evidence that parent mental health improved as a result of their child receiving trauma-focused CBT (Martin, Everett, Skowron & Zalewski, 2019). This review will add additional knowledge by adding EMDR into the search criteria. A meta-analysis was conducted as no other systematic review has done so at present. Only data from randomised controlled trials were included, and parent PTSD and depression were assessed as two separate outcomes with individual meta-analyses.

Method

Search Procedure

This meta-analysis was conducted in accordance with PRISMA guidelines (Liberati et al., 2009). Studies were identified through searching the databases AMED, BNI, CINAHL, EMBASE, EMCARE, HMIC, Medline, PsycINFO and PubMed. Searches were conducted using all possible search terms in the title and/or abstract. The search terms were as follows:

1. "Post-traumatic Stress Disorder" OR "Post-traumatic Stress" OR PTSD OR "Post Traumatic Stress Disorder" OR "Post Traumatic Stress".
2. Intervention* OR therap* OR CBT OR "Cognitive Behavioural Therapy" OR EMDR.
3. Child* OR youth* OR "young person*" OR "young people*" OR adolescen* OR teen*.

Search terms relating to parent outcomes were not used as this would have limited the search results, excluding studies that investigated parent outcomes as a secondary rather than primary outcome, and therefore containing no related terms in the title or abstract.

Screening of articles

The initial search process yielded 11,870 articles. Duplicates were removed and then each article was screened. The inclusion and exclusion criteria were used to examine eligibility for the meta-analysis. Some articles were excluded based on the title, some based on the abstract and some based on reading the full text. The third author examined eligibility of 10 per cent of the articles at each of the title, abstract and full text stages. Disagreements were resolved through discussion. There was high inter-rater reliability (Cohen's Kappa=0.91). Additionally, manual searches of the systematic reviews that were returned through database searching were also conducted. All papers that were included in each systematic review were screened for eligibility. If the paper had already been assessed, it was not assessed again. If it was a new paper, the full text was assessed. These additional searches yielded a further 660 papers. The total number of articles for screening once duplicates were removed was 5656. For the 471 full text articles that were assessed, a hierarchical process for excluding studies was utilised. This was as follows: the study (1) was not a peer-reviewed, empirical paper, (2) contained an adult sample, (3) did not measure child PTSD, (4) did not measure parent outcomes (5) did not have a control arm, and (6) did not include a CBT or EMDR intervention. The screening process is illustrated in figure 1.

Study selection (Inclusion and exclusion criteria)

Studies were required to include a sample of child participants between the ages of 0 and 18 and at least one parent. A limit of 18 was chosen because this review is focused on the treatment of child PTSD, and this is the generally accepted age across different countries where a child moves into adulthood. Studies where the sample included some individuals over 18 (e.g. some samples might include young people between 14 and 25) were included if the mean age was below 18.

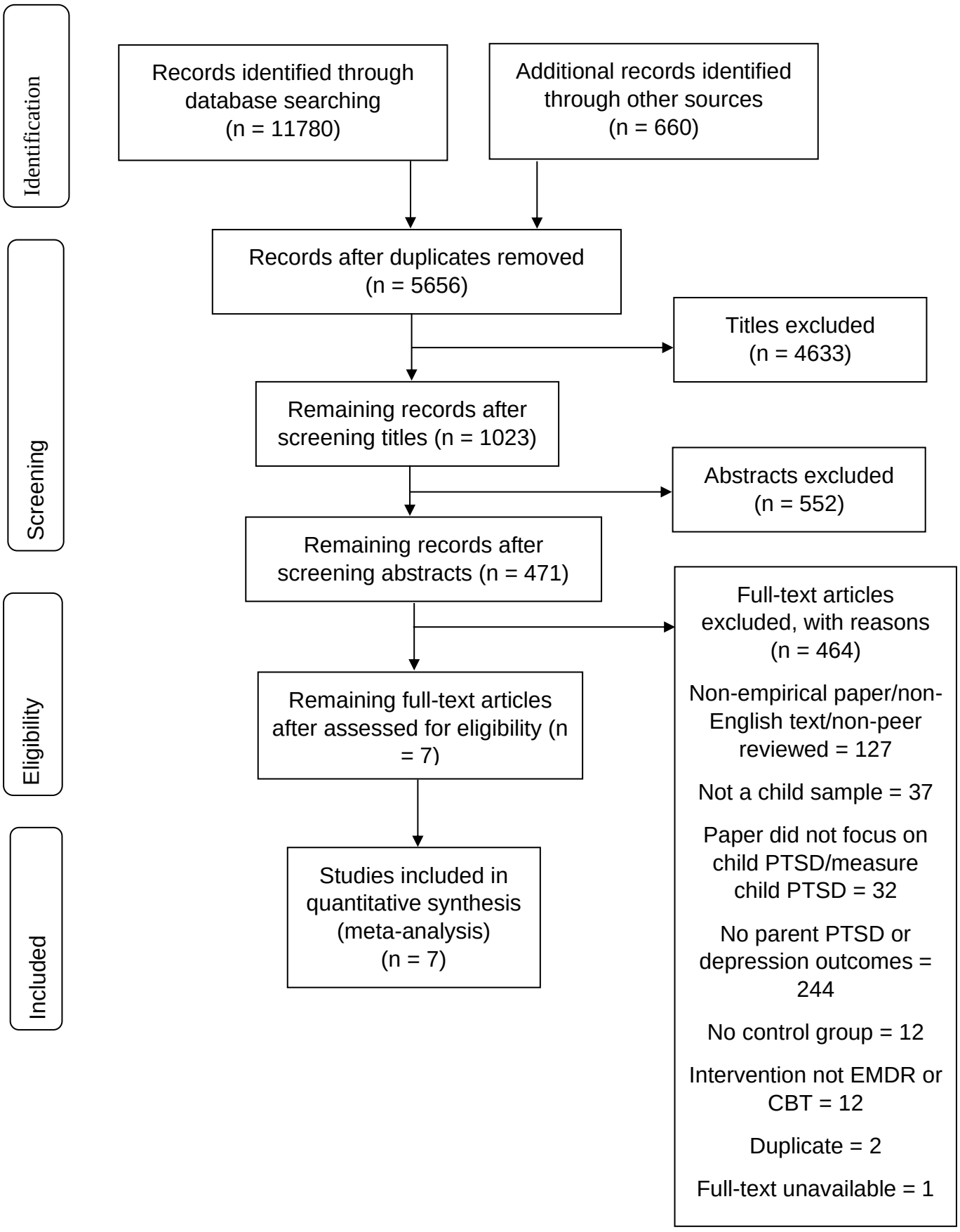

Figure 1. PRISMA diagram to show the process of reviewing studies.

This review focused on child PTSD treatment and therefore studies were required to include a validated measure of child PTSD, and the psychotherapeutic intervention (CBT or EMDR) needed to focus on reducing the child's PTSD symptoms. Any type of parent involvement was accepted ranging from no involvement to end of session summaries to having concurrent or joint sessions.

The purpose of this review was to assess parent outcomes and therefore studies were also required to have at least one validated measure of parent PTSD and/or parent depression. Studies needed to be experimental/quasi-experimental, peer-reviewed and written in English. All studies were required to have a control group, either active (other treatments like supportive counselling, case management, treatment as usual) or inactive (such as wait-list or assessment only). It was important to include active controls because they can show whether CBT or EMDR were more effective than other treatments rather than being better than receiving nothing.

Studies were excluded if they were case studies, did not include a control group, were written in languages other than English and were non-published dissertations or theses. Studies were also excluded if one arm of the study included medications. They were also excluded if they compared two different types of the same therapy e.g. comparing Cognitive Behavioural Therapy with Cognitive Therapy or compared the two different therapies at the centre of this review (EMDR and CBT).

Data extraction and coding

Data were extracted from selected studies and recorded on a data extraction spreadsheet. The first author independently extracted data from all studies and coded all selected studies; the third author conducted reliability coding on 10% of the studies.

The following data were extracted from each paper: (1) Study details (country it was conducted and setting), (2) demographic data pertaining to the child sample (age range, percentage of female participants, and trauma type), (3) demographic data pertaining to the parent sample (age range/mean age, percentage of mothers, ethnicity, education, and income), (3) Intervention data (name of intervention and psychological model, number of sessions, session length, frequency of sessions, and whether it was trauma-focused), (4) control group data (type of control), (5) study statistics (number of participants in the intervention group, number of participants in the control group, measure of parent depression, measure of parent PTSD, and means and SDs pre-post).

Meta-analysis

All analyses were performed using the software MAVIS: meta-analysis via Shiny (Hamilton, Aydin & Mizumoto, 2016). Separate effect sizes for the continuous variables – parent PTSD and parent depression – were calculated. Effect sizes were calculated using Hedges' *g* and the associated 95% confidence interval. The effect size estimates were calculated using a random effects model due to the differences between the studies.

Quality Assessment

The Revised Cochrane Risk of Bias tool for Randomized Trials (ROB 2; Higgins, Savovic, Page & Stern, 2016) was used to assess the risk of bias for each of the included studies. The tool allowed each study to be assessed against criteria in the following domains: (1) randomisation process; (2) deviations from intended interventions (based on an intention to treat effect); (3) missing outcome data; (4) measurement of outcomes; (5) selection of the reported result. Each item under each domain was rated as: yes, probably yes, probably no, no or no information. Using their pre-existing algorithms, each domain was

categorised as either low risk, some concerns or high risk, and then these were collated to produce an overall risk of bias judgement.

Results

Table 1 presents summary data for the seven included studies in this meta-analysis. All studies were randomised controlled trials. Three studies used a wait-list control group, one study used an assessment only control group, two studies used other interventions (supportive counselling and child-centred therapy) and one study used a treatment as usual control group. Those using wait-list controls and assessment only controls were classified as inactive control groups. Those using other interventions and the one study using treatment as usual (Holt, Jensen & Wentzel-Larsen, 2014) were classified as active control groups. The treatment as usual control group had little description other than the theoretical orientation of the clinician and their profession. For theoretical orientation, 45.9 per cent described theirs as psychodynamic, 29.7 per cent as Cognitive-Behavioural, and 24.3 per cent as systemic. With regards to profession, 51.1 per cent were psychologists, 26.7 per cent were social workers, 17.8 per cent were educational therapists, and 4.4 per cent were psychiatrists.

Four studies reported using TF-CBT interventions and two studies reported interventions that were given a different name (i.e. cue-centred treatment and information processing intervention) but contained enough CBT components to be classified in this meta-analysis as being CBT. Only one of the seven studies reported an EMDR treatment, and only included a parent PTSD outcome and not a parent depression outcome.

Table 1

Characteristics of included studies

Study	Country	Intervention	Control Group	Child trauma type	% mothers	Mean age of parents	Parent outcome measure(s)	Parent involvement	Number of sessions, length, frequency
Carrion, Kletter, Weems, Berry & Rettger (2013)	USA	"Cue-centred treatment" based on cognitive and behavioural models	Wait list	Interpersonal violence	Not reported	Not reported	BDI	4 out of 15 sessions	15, 50 minutes, weekly
Cohen, Deblinger, Mannarino & Steer (2004)	USA	TF-CBT	Child centred therapy	Sexual abuse	83	37.07	PERQ BDI	Half of each session was for the parent.	12, 90 minutes, weekly
Cox, Kenardy & Hendrikz (2009)	Australia	"Information processing intervention" based on cognitive theory via information booklet and website	Assessment only	Unintentional injury	88.5	40.64	IES-R	Parent information booklet about child reactions and own stress response.	Self-help website, exposed for 4-6 weeks, can access any time

Deblinger, Stauffer & Steer (2001)	USA	CBT	Supportive counselling	Sexual abuse	100	33.1	SCL-90-R	Concurrent sessions plus 15-minute joint parent-child activity	11, 120 minutes
Kemp, Drummond & McDermott (2010)	Australia	EMDR	Wait list	Road traffic accident	Not reported	Not reported	IES	Attended the first session to give details of the trauma and related difficulties. Stayed in the waiting room while the child had their sessions. The child was able to visit parent in waiting room if needed.	4, 60 minutes, every 7 to 10 days over a six-week period
Holt, Jensen, & Wentzel-Larsen (2014)	Norway	TF-CBT	TAU	Mixed (single and multiple trauma)	72.6	Not reported	PERQ; CES-D	Of the 61 completed TF-CBT cases, caregivers participated in 56 cases (91.8%).	12-15 sessions, varied length.
Tutus, Keller, Sachser, Pfeiffer & Goldbeck (2017).	Germany	TF-CBT	Wait list	Interpersonal trauma 70.2% Accidental Trauma 29.8%	81	41.88	BDI	Joint or parallel. Participated in at least half of the sessions.	12, 90 minutes, weekly

Note. BDI = Beck Depression Inventory; PERQ = Parent Emotional Reactions Questionnaire; IES = Impact of Event Scale; IES-R = Impact of Events Scale – Revised; SCL-90-R = Symptoms Checklist 90 – Revised; TF-CBT = Trauma-focused cognitive behavioural therapy; CBT = cognitive behavioural therapy; TAU = treatment as usual; EMDR = Eye Movement Desensitisation and Reprocessing; CES-D = Center for Epidemiological Studies Depression Scale

Sample size and characteristics

Study sample sizes ranged from 27 to 180. The studies recruited a total of 575 participants, of whom 289 were allocated to the intervention groups and 286 to the control conditions. Five studies reported the percentage of mothers in the sample, and this ranged from 72.6 to 100. The mean age of parent participants (reported in *N*=4 studies) was 31.18, and mean ages ranged across studies from 33.1 to 41.88. The mean age of child participants across the seven studies was 10.77 years and ranged from 5.45 to 14.8 years.

Intervention characteristics

The duration of interventions ranged from four weeks to 15 weeks and the length of each session ranged from 50 minutes to 120 minutes. One study did not report how long their sessions lasted and one study was a self-help intervention where the material could be accessed as much or as little as the participants wanted within a four to six-week period. The amount of parent involvement in the intervention varied across studies but most (n=5) reported that parents were actively involved either through concurrent sessions or joint sessions. One study (self-help intervention) reported providing information via a leaflet to parents and another study reported the parents only being involved in the first session.

Outcome measures

All studies used self-report measures of PTSD (n = 5) and depression (n = 4). Depression measures were: Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock & Erbaugh, 1961) and Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). PTSD measures were: Impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979), Impact of Event Scale – Revised (IES-R; Weiss & Marmar, 1997 as cited in Wilson & Keane, 2004), Parent Emotional Reactions Questionnaire (PERQ; Mannarino & Cohen, 1996) and Symptoms Checklist 90 – Revised (SCL-90-R; Derogatis, 1983).

Meta-analysis findings

Post-intervention means and standard deviations were extracted from the final seven papers. Five separate meta-analyses were conducted for (i) all studies that measured PTSD; (ii) all CBT studies that measured PTSD; (iii) all studies that measured PTSD excluding those using the PERQ; and (iv) all studies that measured PTSD using the PERQ; (v) all studies measuring depression (which were all CBT studies). All analyses used a random effects model given the heterogeneity of the study populations. The PERQ was an unexpected measure that arose and after reading its it was deemed as containing sufficient PTSD components, such as difficulties with sleep, intrusions and avoidance. As the PERQ was not intended to be used as a PTSD measure, it was decided to conduct separate meta-analyses for studies with PERQ and ones that included validated PTSD measures.

A total of seven studies were included in this review. For those studies that measured parent PTSD symptoms (k=5), all trauma-focused psychological interventions resulted in no significantly different outcomes compared to controls ($z(4)= 1.69$; $p = 0.09$) with a small effect size (g=0.28, 95% confidence interval -0.05-0.60). The forest plot is presented in figure 2a. CBT interventions that measured parent PTSD symptoms (k=4) resulted in no significantly different outcomes compared to controls ($z(3)= 1.18$; $p = 0.24$) with a small effect size (g=0.22, 95% confidence interval -0.14-0.57). All interventions measuring parent PTSD using measures other than the PERQ (k=3) resulted in no significantly different outcomes compared to controls ($z(2)=0.35$; $p=0.73$) with a small effect size (g=0.35, 95% confidence interval -0.40-0.57). Both interventions (k=2) measuring parent PTSD-related symptoms using the PERQ resulted in significantly greater reductions than controls ($z(1)=3.27$; $p<0.001$) with a small effect size (g=0.47, 95% confidence interval 0.19-0.75). Studies that included a parental depression measure (k=4) resulted in significantly lower

symptom scores than control groups (z(3)=1.98; p<0.05) with a minimal effect size (g=0.19, 95% confidence interval 0-0.38).

Although there is some variability in effect sizes across the meta-analyses, all PTSD-related ones were classified as having small effect sizes and the depression meta-analysis was classified having a minimal effect size. Effect sizes were classified as minimal if below 0.2, small if between 0.2 and 0.5, medium if between 0.5 and 0.7, and large if above 0.7. The forest plot for the PTSD meta-analysis is presented in figure 2a and the forest plot for the depression meta-analysis is presented in figure 2b.

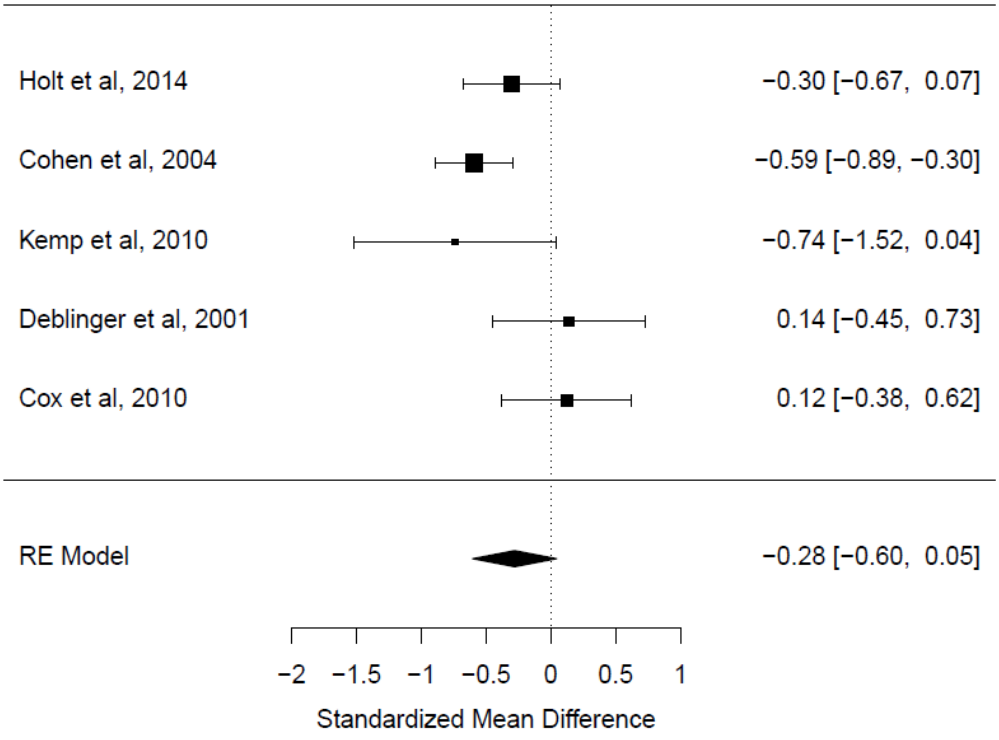

Figure 2a. Forest plot for meta-analysis of studies that included a parent PTSD measure

Quality assessment findings

In total, two papers were classified as high risk for bias (Deblinger, Stauffer & Steer, 2001; Tutus, Keller, Sachser, Pfeiffer & Goldbeck, 2017), three papers were classified as

having some concerns (Kemp, Drummond & McDermott, 2010; Cohen, Deblinger, Mannarino & Steer, 2004; Cox, Kenardy & Hendrikz, 2009; Holt, Jensen & Wentzel-Larsen, 2014), and one paper was classified as having low risk of bias (Carrion, Kletter, Weems, Berry & Rettger, 2013). The findings are presented in table 2. Where a paper includes both a PTSD and depression outcome, the results are presented on separate rows.

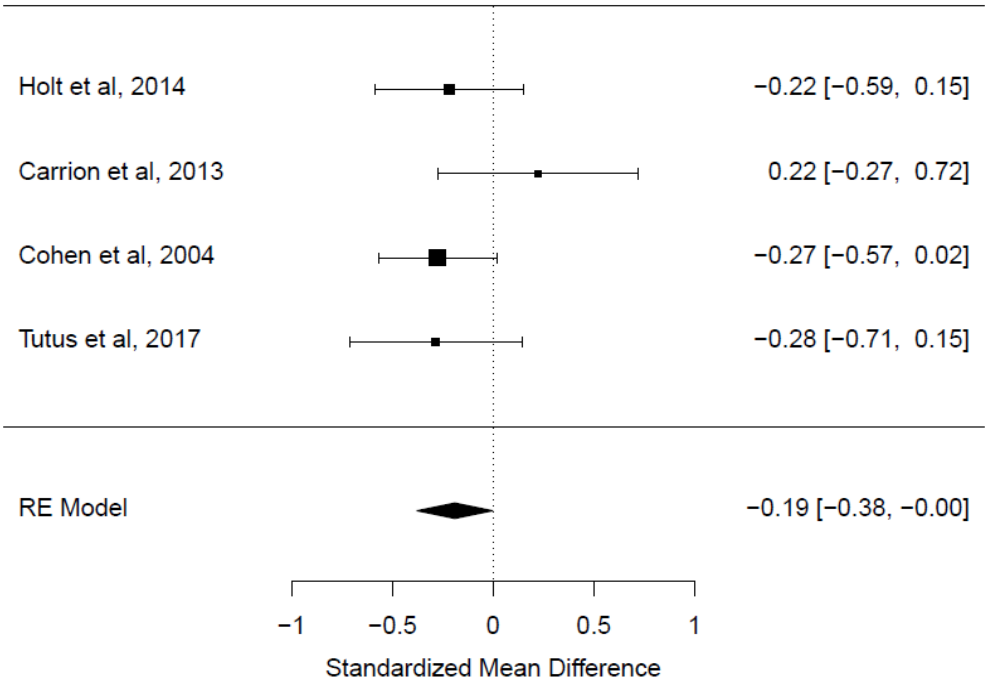

Figure 2b. Forest plot for meta-analysis of studies that included a parent depression measure

For those studies that were classified as having some concerns, there were some concerns in the majority of the five different criteria. One study (Tutus, Keller, Sachser, Pfeiffer & Goldbeck, 2017) was classified as having a high risk of bias because the study appeared not to report data for all participants that were randomised. The other study (Deblinger, Mannarino & Steer, 2001) to be classified as having a high risk of bias used a completer sample which excluded a significant enough proportion of the randomised sample to be considered as having the potential to create bias in the results.

Table 2

Risk of bias for included studies

Study	Outcome	Randomisation Process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall bias
Carrion, Kletter, Weems, Berry & Rettger (2013)	Depression	Low	Low	Low	Low	Low	Low
Cohen, Deblinger, Mannarino & Steer (2004)	Depression	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Cohen, Deblinger, Mannarino & Steer (2004)	PTSD	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Cox, Kenardy & Hendrikz (2009)	PTSD	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Deblinger, Stauffer & Steer (2001)	PTSD	Some concerns	High	Some concerns	Some concerns	Some concerns	High
Kemp, Drummond & McDermott (2010)	PTSD	Low	Low	Low	Some concerns	Some concerns	Some concerns
Holt, Jensen, & Wentzel-Larsen (2014)	PTSD	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Holt, Jensen & Wentzel-Larsen (2014)	Depression	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Tutus, Keller, Sachser, Pfeiffer & Goldbeck (2017).	Depression	Low	Low	High	Some concerns	Some concerns	High

Discussion

This systematic review demonstrated that parent PTSD and depression are under-researched outcomes when it comes to studies investigating the effect of TF-CBT or EMDR for children with PTSD. Studies that do include parent PTSD and depression outcomes are mostly of low quality. Due to the few studies included in the meta-analyses and the low quality of the studies, any conclusions about the meaning of the results must be interpreted with caution.

The meta-analysis showed some preliminary support for the superiority of TF-CBT over WL at reducing parent emotional reactions as measured by the PERQ and depression symptoms. Although not reaching significance ($p=0.07$), the results for parent PTSD were promising given that there were only three studies included in the meta-analysis. These results are encouraging given the small amount of studies included in all the different meta-analyses and the variation of outcome measures.

The aim of this meta-analysis was to test the hypotheses that parent PTSD and depression symptoms reduce as a result of a child PTSD intervention. A previous systematic review concluded that there was evidence to support these hypotheses (Martin, Everett, Skowron & Zalewski, 2019). Although this review included fewer studies and used meta-analysis rather than narrative synthesis, the results were encouraging in providing further support for these previous findings. Still, further research is required so that these systematic reviews can be updated, and firmer conclusions drawn.

Although the results for reducing parent PTSD are promising, some considerations are noteworthy. At baseline, there appeared to be variation in the levels of parent PTSD across the studies. In one study (Kemp, Drummond & McDermott, 2009), there were significant differences in the baselines scores between the intervention and control groups. Each of the

PTSD measures have cut off scores that determine whether symptoms are of clinically significant concern and the control group did report clinically significant levels of PTSD in contrast to parents in the intervention group. Although the study was randomised, not controlling for this difference may conceal the true treatment effects (EMEA, 2003). In another study (Cox, Kenardy & Hendrikz, 2009) the reported parent PTSD symptoms (as determined by clinical cut off scores) were not clinically significant in both groups at baseline. On closer inspection, the children's PTSD symptoms were not clinically significant either. The limited presence of PTSD in the children results in fewer PTSD symptoms in their parents (Scheeringa and Zeanah, 2001), thereby decreasing the likelihood of improvement and the chances of showing an effect for that intervention.

The interventions provided to children where parent PTSD was measured were not always effective at reducing child PTSD either. In fact, two of the three interventions (Deblinger, Stauffer & Steer, 2001; Cox, Kenardy & Hendrikz, 2009) did not show improvements for child compared to controls indicating that changes in PTSD for the child are associated with changes in parent PTSD. The link between parent and child PTSD outcomes provides additional support for relational models of PTSD. Specifically, relational modeals suggest that the outcome for the parent and child may be influenced by attachment (Scheeringa and Zeanah, 2001; Alisic, Boeije, Jongmans and Kleber, 2012). Insecure attachments and negative relationships within the family impacts negatively on the child's mental health and wellbeing as well as the processing of traumatic experiences (Punamäki, Qouta & Peltonen, 2017). Some family studies have shown that members of the family express pain in different ways and at different times in order to maintain homeostasis (Punakai, Qouta, Sarrai & Montgomery, 2006). However, the studies in this review only measured symptoms of one parent which limits any wider understanding of symptom expression and their links to one another.

Understanding parents' own PTSD was difficult to ascertain in this review as the three studies measuring this outcome reported little information about the demographics and experiences of the parent. The most likely reason for this is that parent outcomes were not the primary focus of any of the papers. A notable gap is the trauma experiences of the parent and whether their trauma symptoms relate to their own trauma (either a separate experience or the same trauma experienced by the child) or their child's trauma. It may be hypothesised that some parents in the sample have experienced their own trauma, and the disclosure and treatment of the child may lead to reliving this and a re-experiencing of their own PTSD symptoms (Green, Coupe, Fernandez & Stevens, 1999). However, other parents in the sample may be experiencing "relational PTSD" (Scheeringa & Zeanah, 2001; Alisic, Boeije, Jongmans and Kleber, 2012). As there was a significant reduction in the PERQ used in other studies, a measure connected more with the trauma of the child rather than the parents own trauma, it could be argued that the child intervention reduced the secondary or "relational" trauma symptoms but not primary PTSD symptoms in parents. It was deemed necessary to include the PERQ measure in this review as it is the closest measure currently available to measuring trauma symptoms related to parenting a child who has experienced trauma, with items covering sleep, intrusions, physiological responses, safety and emotional experience (Holt, Cohen & Mannarino, 2015). These hypotheses are only tentative given the small number of studies included in the meta-analyses.

This meta-analysis also sought to investigate whether parent depression symptoms reduced. Consistent with a previous meta-analysis (Martin, Everett, Skowron & Zalewski, 2019), it was found that depression symptoms were significantly reduced compared to controls. As parent depression is significantly associated with child PTSD (Morris, Gabert-Quillen & Delahanty), reducing child PTSD has likely resulted in reducing parent depression. This finding is consistent with other intervention studies that found that maternal depression

is reduced following an intervention that targets child internalising and externalising symptoms, possibly by changing a parents' perspective on their child symptoms and behaviours (Shaw, Connell, Dishion, Wilson & Gardner, 2009). Many of the interventions had a large parent component which may have supported an increase in parent-child interactions which are thought to play a role in the association between parent depression and child PTSD (Koenan, Amstadter & Nugent, 2009). Furthermore, trauma-focused interventions address the avoidance aspect of trauma symptoms which can lead to a decrease in avoidant patterns being modelled by the parents (Fisak & Grills-Taqueche, 2007).

It is possible that parents own PTSD and depression symptoms reduced dependent on the level of involvement they had in the intervention. Due to the minimal studies contained in the review, any sensitivity analyses to investigate this statistically would have been scientifically inappropriate. Parent involvement was also reported in different ways across the studies. Therefore, this review coded involvement into studies that reported minimal, medium and heavy involvement. There appeared to be no link between the amount of involvement and the effect size reported for each intervention. This may support the idea that parents do not require a high level of involvement in their child's PTSD intervention in order to experience benefits for their own mental health. This requires further exploration in future research.

Clinical and research implications

If these preliminary findings are supported by further research, they may guide child and family services in thinking about how parents are both included in their child's treatment and monitored throughout. This might involve asking the parent to complete their own PTSD outcome measure prior to treatment to determine whether PTSD symptoms are present. It may also be useful to collect information from the parent regarding their own experience of

trauma and whether symptoms relate to the child's trauma or a trauma that happened to them separately.

The results from this meta-analysis emphasise the need for more high quality RCTs which have an equal focus on parent outcomes as well as child outcomes. Due to the correlation of parent PTSD and depression symptoms with child PTSD symptoms, interventions that reduce these for both would improve the broader benefits and cost-effectiveness of delivering trauma-focused interventions to youth with PTSD. From a research perspective, further analysis could be conducted into the characteristics of parents and how these relate to mental health outcomes following their child's treatment. This may help to identify parents who might benefit from their child's treatment and parents who might need their own support. Papers would also be more easily accessed and therefore any meta-analysis conducted in the future would be more confident about having included all of the current research in this area.

Limitations

To increase the chance of retrieving as many relevant studies as possible, the search terms and inclusion criteria were broad. The consequence of this was that the sample was heterogeneous – differing in PTSD outcome measures, interventions, intervention length and control groups. A conservative approach was therefore taken to run the meta-analyses, using random effects modelling and Hedge's g for effect sizes.

Secondly, only one study included in this meta-analysis investigated EMDR and this intervention appeared to have the fewest parent contact hours as compared to some of the CBT interventions. Therefore, conclusions regarding the effectiveness of this approach for reducing parent PTSD are even more tentative. Additionally, three of the studies used a wait-

list control group which can limit the conclusions that can be drawn about the specificity of the intervention effects.

Lastly, the study quality was difficult to assess in this review. The Revised Cochrane Risk of Bias tool for Randomised Trials (ROB 2; Higgins, Savovic, Page & Stern, 2016) describes the key criteria required to rate the amount of potential bias in each study. However, many of the studies did not consistently report appropriate methods for randomisation or blinding. For most studies there was very little information that could accurately determine whether the study deviated from intended interventions or contained bias in the reporting of the results. This lack of reporting by the studies resulted in many criteria being rated as inconclusive, increasing the likelihood of level of bias being misrepresented. Future RCTs would benefit from providing clearer information so that level of bias can be ascertained with greater certainty.

Conclusions

Few studies have measured parent mental health outcomes before and after the provision of TF-CBT or EMDR to children with PTSD. The limited available studies showed some tentative, preliminary evidence that trauma-focused psychological interventions may be superior to control groups in reducing parent PTSD, parent emotional reactions and parent depression symptoms. However, as most studies only included parent mental health variables as secondary outcomes, there is little information about the types of parents that benefit from their child's therapy and whether the amount of parent involvement required is related to their PTSD and depression symptoms. Further research is needed to replicate these findings through well-powered and high-quality RCTs. The indirect gains of child PTSD treatment – probable improvements in parent mental health – may be relevant for future health economic evaluations.

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Chapter 3. Systematic Review: Extended Methodology

Chapter overview

This chapter provides additional information about the identification of search terms and how they were combined to search the relevant databases.

Identifying search terms

An initial search of the literature suggested that parent PTSD and depression data would be incorporated into studies investigating the effectiveness of psychological interventions for children with PTSD. Even if parent data was the focus of the paper, child-related terms would be included within the title. Therefore, it was decided that the search terms for this review would be related to the child.

To begin the process of identifying search terms, PICO (participant, intervention, comparator and outcome) was firstly determined based on PRISMA guidelines (Moher et al., 2015). Participant was set as “child”, intervention was set as CBT or EMDR, comparator was set as WL, TAU or other therapy, and outcome was set as PTSD.

Search terms were then built around these key areas. Any variant of the term “child” was included at the first level. For the intervention level, it was decided that search terms would be kept broad. This is because some studies that included a CBT intervention may name their intervention something different despite being based on CBT principles. Search terms were therefore any variants of the term intervention or treatment as well as CBT and EMDR. A decision was then made during the process whether the intervention contained enough CBT components to be included as a CBT study. For the third level, variations of the term PTSD were included. It was decided not to include “trauma” on its own due to the review focusing on PTSD symptoms rather than other symptoms that could be related to experiences of trauma.

The search terms identified within each level were combined with “AND” to form groups of terms. Each level/group of terms were then combined with OR as per Cochrane guidelines (Higgins, Churchill, Chandler & Cumpston, 2017).

Efforts to keep the search terms broad and therefore increase the chances of retrieving all relevant studies carried the risk of returning an unmanageable amount of papers. However, this was deemed a necessary process. All returned papers were exported onto an Excel spreadsheet whereby duplicates were searched for and coded as red. The same process was also used for screening titles, abstracts and full texts.

Chapter 4. Bridging Chapter

Chapter overview

This chapter aims to summarise the findings from the systematic review and outline how the empirical paper addresses any identified limitations and add to the evidence base.

Systematic review summary

The meta-analysis showed some preliminary support for the superiority of TF-CBT over WL at reducing parent emotional reactions as measured by the PERQ and depression symptoms. Although not quite reaching significance (p=0.07), the results for parent PTSD were promising given that there were only three studies included in the meta-analysis. These results are encouraging given the small amount of studies included in the meta-analyses and variation of outcome measures.

Despite these findings, this systematic review demonstrated that parent PTSD and depression are under-researched outcomes when it comes to studies investigating TF-CBT or EMDR for children with PTSD. Studies that do include parent PTSD and depression outcomes are mostly of low quality. Due to the few studies included in the meta-analyses and their low quality, any conclusions about the meaning of the results must be interpreted with caution. This means that replication of findings is required from high quality, well-powered RCTs.

Empirical study purpose

Firstly, the findings from the systematic review revealed that more studies of parent outcomes were needed. The data in the empirical paper was already pre-collected and the aim was to analyse the parent outcome data to add to the literature in this area. Not only did it include parent PTSD and depression outcomes (the most common outcomes currently identified in the literature), it also included parent anxiety. To our knowledge, only one study

so far has measured parent anxiety, which showed that TF-CBT was superior to WL control at reducing parent anxiety (Carrion, Kletter, Weems, Berry & Rettger, 2013). This is to be expected given the well-known link between depression and anxiety (Brown, Campbell, Lehman, Grisham, & Mancill, 2001). The empirical study in this portfolio was adequately powered to find an effect.

Secondly, the systematic review identified that studies that included parent outcomes often did so as secondary outcomes of the main trial paper that focused on child outcomes. This meant that often parent characteristics and descriptions were lost. The empirical paper here, therefore, analysed the parent data in a separate paper leaving room for descriptions of parent characteristics and involvement in the child intervention. This allowed for a discussion focused on contextualising and evaluating the parent findings.

Thirdly, the studies already published with parent data provided little information regarding the timing of the child PTSD intervention. The studies that did report this information provided the intervention either in the acute phase (Cox, Kenardy & Hendrikz, 2009) or many months post-trauma (one year reported by Cohen, Deblinger, Mannarino & Steer, 2004 and 8 months reported by Kemp, Drummond & McDermott, 2009). Two other studies reported that the intervention was delivered at least four weeks post-trauma (Holt, Jensen & Wentzel-Larsen, 2014) or at least three months post-trauma (Tutus, Keller, Sachser, Pfeiffer & Goldbeck, 2017) but did not report the average time that had elapsed since the trauma. The empirical paper in this portfolio reported results from a trial that delivered the intervention specifically in the early phase of two to six months, and therefore is considered a novel contribution to the literature.

Chapter 5.

Empirical paper prepared for submission to: Journal of Traumatic Stress.

Cognitive therapy as an early treatment for children with PTSD: the outcomes for parents' own PTSD, depression, anxiety and general mental health.

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Abstract

Post-traumatic stress disorder (PTSD) experienced by children can have a large impact on the wider family. The National Institute for Health and Care Excellence (NICE, 2018) recommend that parents are involved in their child's PTSD treatment. Studies have found that parents themselves also report high levels of PTSD and other mental health symptoms but few have explored whether these symptoms reduce following their child receiving trauma-focused CBT. In this study, parents (N=29) whose children (ages 8-17 years) were randomly assigned to either 10 sessions of Cognitive Therapy for PTSD (CT-PTSD) or a wait-list control condition (WL) completed the Post Traumatic Stress Diagnostic Scale (PDS), the Patient Health Questionnaire (PHQ-9; to measure depression), the Generalised Anxiety Disorder Questionnaire (GAD-7; to measure anxiety), and the General Health Questionnaire (GHQ-28; to measure general mental health) for pre-post comparison. Parents whose children were allocated to CT-PTSD reported greater improvements on self-report PTSD, depression, anxiety and general mental health, relative to the WL condition. This trial provides preliminary support for the efficacy of CT-PTSD delivered to children for reducing parent PTSD, depression, anxiety and general mental health symptoms. Replication is needed as well as further exploration of parent factors and frequency of parental involvement required to predict improvements.

Keywords: cognitive therapy, trauma treatment, parent PTSD, parent depression, parent anxiety, parent outcomes after child psychotherapy.

Introduction

A traumatic event is defined as exposure to actual or threatened death, serious injury, or sexual violence either through direct or first-hand experience, witnessing the event, learning that the event happened to a close family member or friend, or experiencing repeated or extreme exposure to aversive details of the traumatic event (APA, 2013). A recent prevalence study found that a lifetime prevalence of trauma exposure reported at age 18 was 31.1 per cent and out of this trauma exposed sample, the lifetime prevalence of PTSD by age 18 was 25 per cent (Lewis et al., 2019). PTSD can have significant detrimental effects on school and academic functioning as well as mental health going into adulthood (Yule et al., 2000).

Research has suggested that Trauma-focused Cognitive Behavioural Therapy (TF-CBT) is the most effective treatment for young people exposed to trauma and is therefore one of the recommended therapies for children (National Institute for Health and Care Excellence [NICE], 2018). TF-CBT has shared components of any CBT intervention which includes psychoeducation (including the role of thoughts in behaviour and emotion), skills building (relaxation, affect modulation, cognitive coping) and modifying behaviours to challenge thoughts (through graded exposure or behaviour experiments). TF-CBT has additional components that include working through a trauma narrative, in vivo mastery of trauma reminders and cognitive processing.

Parents are recommended to be included in the treatment of children and adolescents with PTSD as they are thought to be integral agents of change in the recovery process (Cohen et al., 2010). Parent involvement can vary between TF-CBT interventions but may include: receiving summaries of session content, psychoeducation, parenting skills training, advice on supporting the child's work out of session, and managing own trauma symptoms. Previous work hypothesises that TF-CBT improves parents' hope about their child's recovery,

reinforces helpful parenting skills, develops feelings of competence, and teaches skills that parents can use to manage their own stress, maladaptive thoughts and emotional reactions (Cohen, Mannarino and Deblinger, 2016). Additionally, participation may lead to the encouragement of their children to practise new skills, more helpful parent-child communication, and stronger familial attachments (Cohen, Mannarino and Deblinger, 2006).

Research has shown that parents of children with PTSD also experience PTSD symptoms themselves. Parental past trauma has been found to have an association with children's PTSD and depression symptoms (Montgomery & Foldspang, 2005; Yehuda & Bierer, 2008), and a meta-analysis of 32 studies has found a significant association between parent PTSS and child PTSS (Morris, Gabert-Quillen & Delahanty, 2012).

Traumatised parents can either become overprotective (arising from their own concerns about their children's safety) or find it difficult to tolerate their children's expression of fear, anxiety and helplessness (Scheeringa & Zeanah, 2001). Thus, parents may adopt intrusive and insensitive parenting practices, reflecting a preoccupied attachment style, or may instead withdraw from interactions with the child, reflecting an avoidant attachment style (Flykt, Kanninen, Sinkkonen, & Punamäki, 2010; Van Ee, Kleber, Jongmans, Mooren, & Out, 2016). A qualitative review found that parental trauma can prevent children from developing a secure base because the child feels overwhelmed and uncontained by the parent (De Haene Grieten, & Verschueren, 2010).

As such, the "relational PTSD and recovery" model proposes that parent responsiveness to the child is dependent on their own wellbeing. When a parent is aware of their child's needs and can act upon them, this leads to an improvement in wellbeing for the child (Alisic, Boeije, Jongmans and Kleber, 2012). This is confirmed by studies that found that supportive, secure and wise parenting practices can be a protective factor for children's

mental health, resilience and development (Feldman, Vengrober, Eidelman-Rothman, & Zagoory-Sharon, 2013; Qouta, Punamäki, Miller, & El Sarraj, 2008).

Most studies that have measured parent PTSD and depression symptoms have found that both mediate treatment outcomes for the child (Weems & Scheeringa, 2013). However, only a few studies have investigated whether parent symptoms significantly change over the course of their child's therapy. One study demonstrated that parents who participated in group TF-CBT with their children have shown significant improvements in the parents' self-reported PTSD (Deblinger, Stauffer & Steer, 2001). Two studies have found that parents in the TF-CBT group do make improvements in their depression symptoms but this effect is not significantly different to parents in the WL or TAU control conditions (Holt, Jensen & Wentzel-Larsen, 2014; Tutus, Keller, Sachser, Pfeiffer & Goldbeck, 2017). One study has found that TF-CBT was superior to WL control at reducing parent anxiety (Carrion, Kletter, Weems, Berry & Rettger, 2013).

Cognitive Therapy for PTSD (CT-PTSD) developed by Smith, Perrin, Yule and Clark (2010) is considered a form of TF-CBT. CT-PTSD is based on Ehlers and Clark's (2000) cognitive model of PTSD and treatment programme (Ehlers et al. 2005). CT-PTSD is considered theory-based and two factors are central to this model. Firstly, there are individual differences in both the trauma memory representation and the appraisal processes in relation to the trauma. Secondly, CT-PTSD is formulation-driven which means that the model is used to develop an individualised understanding of the child's difficulties. This is then used as a guide to challenging unhelpful cognitions and developing useful strategies that promote change.

A recent systematic review (Martin, Everett, Skowron & Zalewski, 2019) concluded that there were some preliminary findings to suggest that TF-CBT can lead to a decrease in parent mental health symptoms (which included depression, anxiety, PTSD, trauma

cognitions and parent emotional responses) but more research is required to investigate this further. The purpose of this study was to investigate the effects of individual child CT-PTSD on parent PTSD, depression, anxiety and general wellbeing. This intervention was delivered two to six months post-trauma. It was hypothesised that CT-PTSD would be superior to WL in reducing parental symptoms of PTSD, depression, anxiety and general mental health difficulties. Those allocated to wait list received CT-PTSD at the end of the wait period if clinically appropriate.

Method

Study design

This current study is a secondary analysis of data collected in a single-blind, stratified (by gender, symptom severity on Child PTSD Symptoms Scale [CPSS; Foa, Johnson, Feeny & Treadwell, 2001] and pre-treatment diagnosis) randomised controlled trial. The RCT (Meiser-Stedman et al., 2017) demonstrated superiority of CT-PTSD over wait-list control in reducing PTSD, depression and anxiety symptoms in children which were maintained at 6 month and 12 month follow up. All study participants and their legal guardians gave their informed written consent. The design was between groups (CT-PTSD versus WL) and within-subjects (baseline versus post-treatment).

Participants

The child and parent participants were recruited through multiple sources including mental health clinics, family doctors, schools, adverts in health clinics, and emergency departments. Children were eligible to take part in the original trial if PTSD was their main presenting problem, they were between 8 and 17 years old, and were fluent in English. To be eligible, children had to meet ICD-10 PTSD criteria. A total of 69 children were screened, and of those 26 did not meet inclusion criteria, 12 declined to take part and two could not be

contacted. For every child that took part one of their parents was also invited into the study. The parents are the participants that made up the sample in this present study. Only one parent completed the assessments but provided demographic information about both parents, if known.

Procedure

Randomisation and assessments

Child participants with their parents were randomised to CT-PTSD or WL. Participants were assessed prior to randomisation (pre-treatment) and at 11 weeks (post-treatment). Post-treatment interviews were conducted by blinded researchers. Assessors did not contribute to any of the intervention delivery or work in any of the areas the intervention was being delivered.

An abbreviated version of the original flowchart showing participant progress throughout the study is presented in figure 1.

Cognitive Therapy for PTSD (CT-PTSD)

CT-PTSD is a treatment approach (Ehlers et al., 2003) based on the cognitive model of PTSD (Ehlers & Clark, 2000), and adapted for young people as outlined in the treatment manual developed by Smith et al. (2010). In this study, up to ten, 90-minute sessions were delivered individually to the child. Therapy sessions were discontinued when, in discussion with the family, it was deemed that there were no further PTSD symptoms to address. CT-PTSD combines cognitive restructuring with reliving, and the following treatment components were included: psycho-education, activity scheduling/reclaiming life, imaginal reliving, cognitive restructuring, revisiting the site of the trauma, stimulus discrimination with respect to traumatic reminders, direct work with nightmares, image transformation techniques and behavioural experiments. Relaxation or other arousal reducing

techniques were not included in this treatment approach. For each session, parents were either: not involved in the session, involved in joint work with the child or were offered a parent only session. Data was collected on how much time was spent in the joint or parent only session per child session.

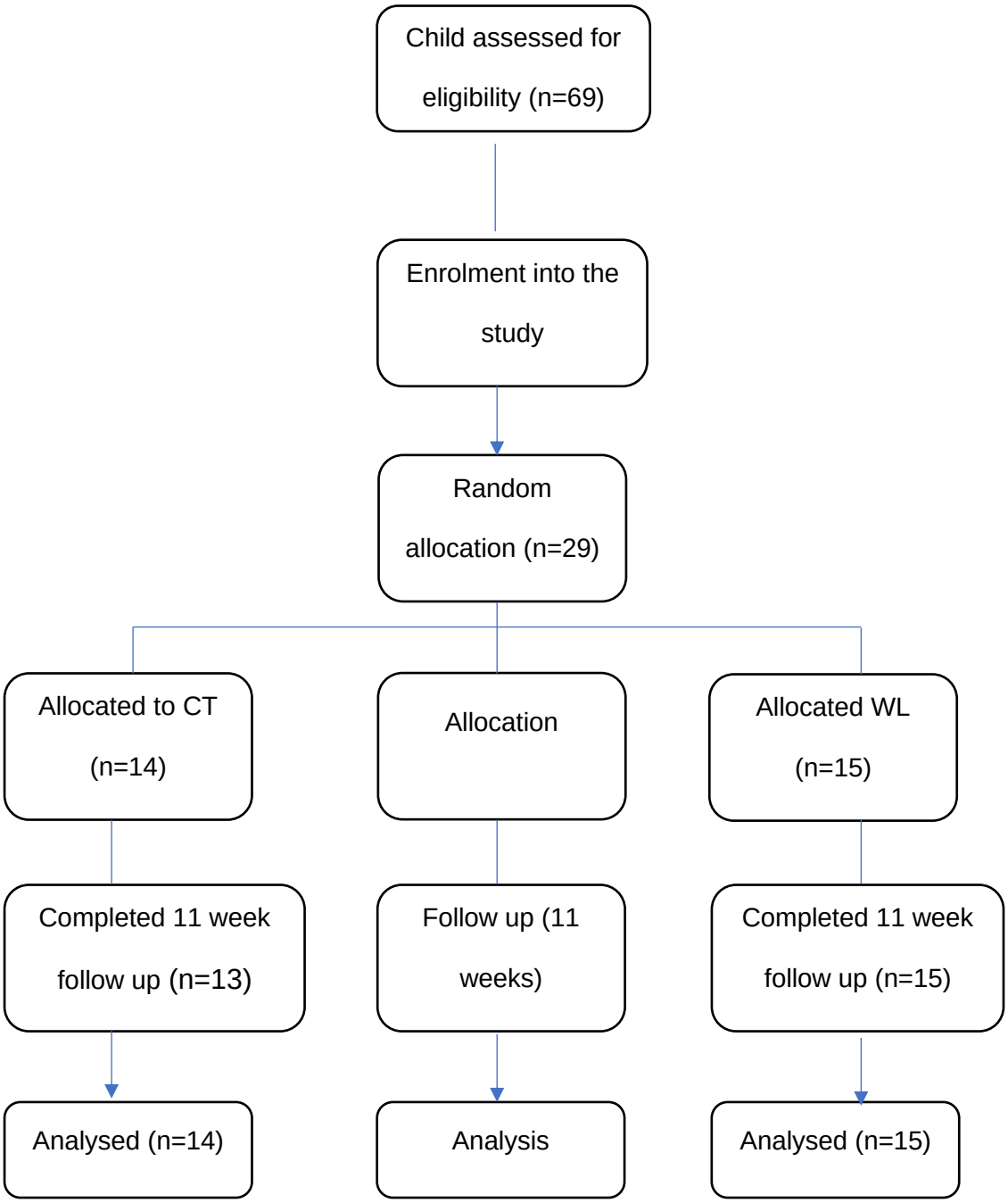

Figure 1. Abbreviated participant progress (CONSORT) diagram.

Measures

The Post-traumatic Stress Diagnostic Scale (PDS), a self-report measure, assessed the severity of PTSD symptoms experienced by parents at pre-treatment and post-treatment. The PDS has high internal consistency and test-retest reliability, high diagnostic agreement with SCID, and good sensitivity and specificity (Foa, Cashman, Jaycox, & Perry, 1997).

The Patient Health Questionnaire – 9 items (PHQ-9), a self-report measure, assessed the symptoms of depression experienced by parents at pre-treatment and post-treatment. It has excellent internal consistency ($\alpha = 0.89$), good test-retest reliability, good construct validity as demonstrated by a strong association of increasing severity scores and worsening functioning on 6 SF-20 scales. A score of 10 or above had a sensitivity and specificity of 88% (Kroenke, Spitzer & Williams, 2001).

The Generalised Anxiety Disorder – 7 items (GAD-7), a self-report measure, assessed the symptoms of anxiety experienced by parents at pre-treatment and post-treatment. It has excellent internal consistency ($\alpha = 0.92$), good test-retest reliability (intraclass correlation = 0.83), and good construct, convergent and factorial validity (Spitzer, Kroenke, Williams & Lowe, 2006).

The General Health Questionnaire – 28 items (GHQ-28), a self-report measure, assessed emotional distress experienced by parents. It has high test-retest reliability (Robinson & Price, 1982) and excellent interrater reliability ($\alpha = 0.9$-0.95) and high internal consistency (Failde, Ramos & Fernandez-Palacin, 2000).

Data Analysis

An intention-to-treat approach was adopted for the analysis of all outcome variables. All outcome variables were continuous, and a multiple imputation procedure was used to account for data lost through drop out. Where there was missing data on specific items within questionnaires person mean imputation (van Ginkel et al., 2010) was used. When whole

questionnaires were missing, multiple imputation via SPSS was conducted. Both baseline and post-treatment data for all outcome measures were entered into the model as dependent variables and predictors. Treatment condition (either CT-PTSD or WL) was entered as a predictor but not dependent variable. In total five datasets were generated and their pooled estimates when possible.

Linear regression models were used for all outcome variables. Post-intervention scores were considered the dependent variables, and baseline scores (in order to control for any baseline differences) and condition were considered independent variables. All analyses were conducted on a split file multiple imputation dataset. Pooled statistics were unavailable for the reporting of the ANOVA therefore, the range of each statistic for the five different datasets were reported. Between-groups (CT-PTSD vs. WL) and within-subjects (pre– post) effect sizes were calculated (Cohen's d) for all outcome measures.

Results

Parent characteristics

The study sample comprised of N=29 parents of children who took part in a study that investigated the effectiveness of CT-PTSD delivered within two to six months of the initial traumatic event (Meiser-Stedman et al., 2017). A post-hoc power calculation was conducted using G*Power software (Faul, Erdfelder, Lang & Buchner, 2007; Faul, Erdfelder, Buchner & Lang, 2009). The calculation revealed a power of 0.88 to detect an effect size of 0.3 (small effect based on previous research) at a significance level of 0.05.

The majority of parents involved in completing the measures were mothers (86.2 per cent). Although only 6.9 per cent of parent participants were fathers, demographic information about the fathers (provided by either the fathers themselves, or the other parent that completed the interview) was provided in 72 per cent of cases. The highest proportion of

parents were married (48.3 per cent). More fathers (24.1 per cent) did not hold a GCSE qualification compared to mothers (17.2 per cent), more mothers (44.8%) than fathers (17.2 per cent) achieved GCSEs, and more mothers (34.4 per cent) achieved qualifications higher than GCSE compared to fathers (27.5 per cent). Household income was almost evenly split between earning below 20,000 (41.4 per cent) and above 20,000 (48.3 per cent). A summary of the sample characteristics is presented in Table 1.

Parent Involvement in Child CT-PTSD Sessions

The number of CT-PTSD sessions ranged from 4 to10 sessions (*M*=8.67, *SD*=2.15). Parents participated in an average of 3.08 (*SD*=1.73) joint sessions and 1.17 (*SD*=1.03) parent only sessions. Parent participation in joint sessions ranged from 0 to 80 minutes. Parent participation in parent only sessions ranged from 0 to 45 minutes. The mean amount of time spent in joint sessions and parent only sessions was 55.33 minutes (*SD*=47.29*)* and 20.42 minutes (*SD*=19.48), respectively. Parents participated in an average of 33.42% (*SD*=19.17) joint sessions and 14.33% (*SD*=11.12) parent only sessions.

Linear regressions

Table 2 presents the means and standard deviations for all outcome measures for both conditions (CT-PTSD and WL) at baseline and post-treatment. Corresponding *F* statistics are provided with associated *p* values.

Table 1.

Sample characteristics

	Total Sample (*n*=29)		CT-PTSD (n=14)		WL (n=15)	
	N	%	*N*	%	*N*	%
Parent interviewed						
Fathers	2	6.90	2	14.3	0	0
Mothers	25	86.2	11	78.6	14	93.3
Other	2	6.90	1	7.1	1	6.7
Marital status						
Single	5	17.2	2	14.3	3	20
Living together	4	13.8	1	7.1	3	20
Married	14	48.3	9	64.3	5	33.3
Separated/divorced	6	20.7	2	14.3	4	26.7
Mothers' education level						
Did not achieve GCSEs	5	17.2	0	0	5	33.3
Achieved GCSEs	13	44.8	7	50	6	40

Technical college	2	6.9	1	7.1	1	6.7
University undergrad.	7	24.1	4	28.6	3	20
University postgrad.	1	3.4	1	7.1	0	0
Missing data	1	3.4	1	7.1	0	0
Fathers' education level						
Did not achieve GCSEs	7	24.1	2	14.3	5	33.3
Achieved GCSEs	5	17.2	3	21.4	2	13.3
Technical college	3	10.3	3	21.4	0	0
Sixth form	3	10.3	1	7.1	2	13.3
University undergrad.	2	6.9	1	7.1	1	6.7
University postgrad.	1	3.4	0	0	1	6.7
Missing data	8	27.6	4	28.6	4	26.7
Household income						
<20,000k	12	41.4	3	21.4	9	60
>20,000k	14	48.3	8	57.1	6	40
Missing	3	10.3	3	21.4	0	0

Parent Post-traumatic Stress

A linear regression was undertaken to predict post-treatment PTSD symptoms as measured by the PDS based on both pre-treatment PTSD symptoms and condition (WL or CT-PTSD). A significant model was achieved ($F(2, 26) = 9.55\text{-}26.71$; $p<0.001$), with an R^2 of 0.56. Baseline scores were not shown to contribute to the model (*B=0.22, SE=0.16, p=0.18, CI -0.10 - 0.55)* but condition did account for the variance in the expected direction (*B=-20.02, SE=4.03, p=0.001, CI -27.98 - -12.05).* This indicated that condition was the only significant predictor of post-treatment parent PTSD scores in this model. This means that parents whose children received CT-PTSD reported significantly fewer PTSD symptoms at post-treatment compared to parents whose children were allocated to the wait list control condition.

Parent depression

A linear regression was undertaken to predict post-treatment depression symptoms as measured by the PHQ-9 based on both pre-treatment depression symptoms and condition (WL or CT-PTSD). A significant model was achieved ($F(2, 26) = 35.27\text{-}47.92$; $p<0.001$), with an R^2 of 0.75. Although baseline scores did contribute to the model (*B=0.54, SE=0.10, p<0.001, CI 0.35 – 0.72)* condition also accounted for the additional variance in the expected direction (*B=-7.18, SE=1.66, p<0.001, CI -10.49 - -3.86).* This indicated that despite baseline parent depression being a significant predictor, condition was still a significant predictor of post-treatment parent depression scores in this model. This means that parents whose children received CT-PTSD reported significantly fewer depression symptoms at post-treatment compared to parents whose children were allocated to the wait list control condition.

Table 2

Outcome measures on an intention-to-treat basis

	WL (*n*=15)		CT-PTSD (*n*=14)		
	M	SD	*M*	SD	Effect
PTSD symptoms (PDS)					
Pre	16.43	15.44	15.76	12.77	
Post	23.09	14.05	2.93	5.50	$F(2, 26) = 9.55\text{-}26.71$; $p<0.001$
Depression symptoms (PHQ-9)					
Pre	10.40	8.67	6.30	6.37	
Post	11.95	7.31	2.57	3.57	$F(2, 26) = 35.27\text{-}47.92$; $p<0.001$
Anxiety symptoms (GAD-7)					
Pre	10.60	8.40	5.66	5.03	
Post	12.13	6.44	2.53	3.98	$F(2, 26) = 12.66\text{-}25.39$; $p<0.001$
GHQ					
Pre	36.11	18.88	23.82	12.27	
Post	30.77	11.30	15.95	6.96	$F(2, 26) = 27.20\text{-}46.22$; $p<0.001$

Parent anxiety

A linear regression was undertaken to predict post-treatment anxiety symptoms as measured by the GAD-7 based on both pre-treatment anxiety symptoms and condition (WL or CT-PTSD). A significant model was achieved ($F(2, 26) = 12.66\text{-}25.39$; $p<0.001$), with an R^2 of 0.58. Although baseline scores did contribute to the model (*B=0.32, SE=0.14, p<0.05, CI 0.04-0.59)* condition also accounted for the additional variance in the expected direction (*B=-8.04, SE=1.98, p<0.001, CI -11.93 - -4.14).* This indicated that despite baseline parent anxiety being a significant predictor, condition was still a significant predictor of post-treatment parent anxiety scores in this model. This means that parents whose children received CT-PTSD reported significantly fewer anxiety symptoms at post-treatment compared to parents whose children were allocated to the wait list control condition.

Parent general mental health

A linear regression was undertaken to predict post-treatment general mental health symptoms as measured by the GHQ based on both pre-treatment general mental health symptoms and condition (WL or CT-PTSD). A significant model was achieved ($F(2, 26) = 27.20\text{-}46.22$; $p<0.001$), with an R^2 of 0.73. Although baseline scores did contribute to the model (*B=0.42, SE=0.10, p<0.001, CI 0.22-0.63)* condition also accounted for the additional variance in the expected direction (*B=-9.65, SE=3.04, p<0.01, CI -15.78 - -3.52).* This indicated that despite baseline parent general mental health being a significant predictor, condition was still a significant predictor of post-treatment parent general mental health scores in this model. This means that parents whose children received CT-PTSD resulted in significantly fewer general mental health symptoms at post-treatment compared to parents whose children were allocated to the wait list control condition.

Effect sizes

Between groups (CT-PTSD versus WL at post-treatment) and within subjects (pre-post) effect sizes were calculated for all outcome measures and are presented in table 3. CT-PTSD consistently showed large effect sizes for improvements compared to the WL control group at post-treatment for all outcomes measured. CT-PTSD showed a large effect size for improvements in PTSD, medium effect sizes for improvements in depression and general wellbeing, and a small effect size for improvements in anxiety, relative to pre-treatment scores. In the WL condition, negative effect sizes were found for PTSD, depression and anxiety meaning that parents reported more symptoms at post-treatment. This effect was small for PTSD and depression, and classified as little or no effect for anxiety. A small positive effect size was found for general mental health in the WL condition.

Table 3

Effect sizes for outcome measures for intent to treat analyses

	WL (pre-post)[a]	CT-PTSD (pre-post)[a]	CT-PTSD vs. WL (post)[b]
PTSD symptoms (PDS)	-0.4	0.97	1.86
Depression symptoms (PHQ-9)	-0.32	0.69	1.61
Anxiety symptoms (GAD-7)	-0.19	0.42	1.78
GHQ	0.46	0.74	1.57

[a]Within-group; negative scores indicated worsening symptomatology/functioning.

[b]Between-group; positive scores indicated superiority of CT-PTSD.

Discussion

The aim of this study was to investigate whether CT-PTSD delivered to children would be superior to WL regarding change in parental PTSD, depression, anxiety and general wellbeing. Similar to the source study (Meiser-Stedman et al., 2017) and consistent with our hypotheses, this RCT provided preliminary support for the efficacy of CT-PTSD for children as a treatment for parent PTSD. Compared to WL, at post-treatment CT-PTSD led to significantly reduced PTSD symptoms as well as significant improvements in depression, anxiety and general mental health in parents.

Compared to a previous evaluation of TF-CBT (Deblinger, Stauffer & Steer, 2001), this study found large effect sizes rather than medium for parent PTSD in the treatment group. Effect sizes for depression were reported to be medium for the treatment group and small negative effect size for the WL group, and these differed from a previous study (Tutus, Keller, Sachser, Pfeiffer & Goldbeck, 2017) that reported a small effect size for the treatment group and no effect for the WL group. Effect sizes for anxiety were comparable to a previous study (both reporting no effect for the WL group and small effect for the treatment group; Carrion, Kletter, Weems, Berry & Rettger, 2013). This data suggests that CT-PTSD is an effective intervention for children with PTSD and receiving it results in improvements in their parents' own mental health as well. Being in the wait-list control condition may lead to worsening of PTSD, depression and anxiety symptoms.

On average, the parents in this study reported moderate levels of PTSD symptoms supporting the idea that there is a link between parents' PTSD symptoms and the child's (Morris, Gabert-Quillen & Delahanty, 2012). Parent PTSD symptoms significantly improved following the CT-PTSD intervention which is partly consistent with a previous study that found that parent PTSD intrusions reduced even though their avoidance symptoms did not

(Deblinger, Stauffer & Steer, 2001). Findings between the studies may have differed due to the differing content of the interventions. Unlike the Deblinger, Stauffer and Steer (2001) study, this study incorporated a reliving component for the children which is thought to be integral for addressing the avoidance that is developed following the trauma (Smith, Perrin, Yule & Clark, 2010). It is hypothesised that this component is likely to have resulted in the reduction in PTSD symptoms of the child and in turn reduce the symptoms of the parents. A correlation between parent and child recovery is likely to exist due to the child learning that it is acceptable to think and talk about the trauma, thus reducing avoidance for both themselves and their parents. Parents may have learnt that they no longer need to be overprotective of their child and the narrative developed during therapy is shared and safe, reducing the likelihood of the parent re-traumatising the child. Such strategies are thought to be important for reducing parents' "relational PTSD" (Scheeringa and Zeanah, 2001) by increasing their responsiveness (Alisic, Boeije, Jongmans and Kleber, 2012) and therefore fostering a secure base for the child (De Haene Grieten, & Verschueren, 2010).

Another important difference between this present study and that from Deblinger, Stauffer and Steer (2001) is the level of parental involvement in the intervention. Parents in this study were involved in only a proportion of sessions (33.4 per cent of joint sessions and 14.3 per cent parent only sessions) compared to participating in separate, concurrent sessions (Deblinger, Stauffer and Steer, 2001). This could suggest that parents benefit more from being a part of some of their child's sessions rather than having the same amount of sessions running concurrently. Research shows that parent involvement is associated with an improvement in child PTSD, and this relationship is mediated by a reduction in parent PTSD symptoms **(**Graham-Bermann, Howell, Lilly & DeVoe, 2011). It could be that being open to hearing the child's trauma narrative results in a reduction in PTSD for the child and supports the cognitive-emotional processing of their child's trauma which in turn may reduce parent's

own PTSD symptoms (Yasinski et al, 2016). Connected sessions may also mean that the parent is able to regain hope that their child is getting better, improve any parenting strategies that can support the child's PTSD and challenge any cognitions or feelings that may be a barrier to supporting their child helpfully (Cohen, Mannarino and Deblinger, 2016).

With respect to depression, parents in this study reported significantly fewer symptoms post-treatment following CT-PTSD, which contrasts to previous studies that found no superiority of TF-CBT over controls (Tutus, Keller, Sachser, Pfeiffer & Goldbeck, 2017; Holt, Jensen, & Wentzel-Larsen, 2014). Previous studies suggested that waiting for the intervention was just as effective as receiving the intervention, hence no difference found between the groups. However, they also noted that depression symptoms were not elevated in parents to begin with; whereas in this study parents reported mild to moderate depression symptoms. It is likely, then, that once symptoms exceed a certain threshold, intervention is required and more effective than waiting. Anxiety severity levels were the same as depression severity levels which is expected given the well-known link between the two (Brown, Campbell, Lehman, Grisham, & Mancill, 2001). The significant reduction in anxiety scores is consistent with a previous study which incorporated cognitive and behavioural models in their intervention (Carrion, Kletter, Weems, Berry & Rettger, 2013). With the reductions in PTSD, anxiety and depression symptoms, it is not surprising that parents in this study also reported improvements in their general mental health as screened by the General Health Questionnaire.

Some additional limitations to those already reported in the original trial paper are of note here. Although the sample size was large enough to adequately power this trial, there was considerable missing data for parent outcomes. Although this was appropriately dealt with using imputation methods, there is still a possibility that bias could exist. Mothers represented the majority of the sample and the types of trauma experienced by the children

were mostly single event traumas (motor vehicle accidents made up the majority of the sample) which could limit the generalisability of the findings, given that parents may respond to different types of trauma differently.

Future studies of parent outcomes would benefit from conducting further analysis into the amount of parent involvement that is required to predict positive parent outcomes. This would further add to any cost-effectiveness argument that arises from treating both child and parent through one trauma intervention. It would be beneficial to explore which parents are likely to improve on their outcomes and whether there is a difference in parent outcomes between those whose children experienced single event trauma and those who experienced complex trauma. Investigating the correlation between parent outcomes and child outcomes would test the hypothesis presented in this discussion that parents may improve in their own symptoms when their child has improved.

If these preliminary findings are supported by further research, they may guide child and family services in thinking about how parents are both included in in their child's treatment and monitored throughout. This might involve asking the parent to complete their own PTSD outcome measure prior to treatment to determine whether PTSD symptoms are present. It may also be useful to collect information from the parent regarding their own experience of trauma and whether symptoms relate to the child's trauma or a trauma that happened to them separately.

To conclude, this study provided preliminary support for CT-PTSD reducing parent PTSD, depression, anxiety and general mental health symptoms. Further research would benefit from conducting further exploration into the parent factors that are associated with improvements in parents' own mental health symptoms as well as the frequency of parent involvement that is required to predict improvement. A cost-effectiveness evaluation is

required in order to understand the financial impact of potentially treating parent symptoms at the same time as child symptoms.

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Chapter 6. Empirical Paper: Extended Methodology

Chapter overview

This chapter will outline extended methodology in relation to data analysis. Firstly, the method for quantifying parent involvement will be outlined. Secondly, the rationale for conducting multiple imputation as well as its procedure will be explained. Thirdly, the rationale for selecting regression analysis will be commented on. Lastly, the method and formulas used to calculate effect sizes will be presented.

Quantifying parent involvement

The types of parent involvement were divided up into two categories: (a) joint parent-child session, and (b) parent only session. A joint session involved the parent joining the child's sessions for a period of time. The content of the joint session was dependent on what the clinician thought was required at that time e.g. to share a formulation, to inform the parent of strategies covered, to share the trauma narrative or to plan homework tasks. Parent only sessions were offered at the same time as the child sessions. The amount of time (in minutes) parents spent in joint or separate session was recorded.

Missing data

Missing data was handled using the multiple imputation function on SPSS. According to Rubin (1987) multiple imputation follows a five-step process: (1) missing values are imputed by using an appropriate random variation model; (2) the first step is repeated five times; (3) the required analysis is computed for each dataset; (4) the values of parameter estimates are averaged across the five datasets to obtain a single point estimate; and (5) standard errors are calculated by averaging the squared standard errors across the five datasets.

Selection of tests

Firstly, ANCOVAs were considered for all outcome variables. However, after multiple imputation was conducted, SPSS would not generate pooled estimates for the ANCOVA statistics. T-tests were then considered because pooled estimates would be generated by SPSS. However, there were some concerns about the normality of the data that would make post-treatment t-tests subject to bias. They would also not take into consideration differences in baseline scores. In the end, linear regressions were selected due to their robustness in handling non-normality. Both baseline scores and condition (CT-PTSD or WL) were entered as predictor variables.

Before regression analyses were performed, the following assumptions were tested: normality of residuals, homoscedasticity, and multicollinearity. Normality of residuals were tested by reviewing the P-P plots. Residuals were deemed normal if the data circles followed the normality line with no drastic deviations. Homoscedasticity was assessed by reviewing the generated scatterplots of residuals. The data was deemed homoscedastic if it had no obvious pattern, points were equally distributed above and below zero on the X axis, and to the left or right of zero on the Y axis. Multicollinearity was assessed using the VIF values – if the value was below 10 then the data were deemed to be multicollinear.

Effect sizes

Effect sizes are the measure of the magnitude of difference between two variables. Paired samples effect sizes were calculated (Cohen's d) for pre-post differences for each group (CT-PTSD or WL) and each outcome variable (PTSD, depression, anxiety and general mental health) using the following formula:

$$d = \frac{|m_1 - m_2|}{\sqrt{s_1^2 + s_2^2 - (2rs_1s_2)}}$$

To compute this formula, other calculations needed to be made. Firstly, Pearson's r needed to be calculated. This was achieved by splitting the file by both multiple imputation and condition (CT-PTSD or WL) in order to generate a separate pre-post correlation output for each of the two conditions. Secondly, standard deviations needed to be calculated due to SPSS not providing a pooled SD. This was calculated from pooled means and standard errors using the following formula:

SD = SE x √N

Independent samples effect sizes (Cohens d) were calculated for CT-PTSD versus WL at post-treatment using the following formula:

$$d = \frac{|m_1 - m_2|}{\sqrt{\frac{(n_1-1)s_1^2+(n_2-1)s_2^2}{n_1+n_2-2}}}$$

For all Cohens d effect sizes, <0.2 showed little or no effect, 0.2 showed a small effect, 0.5 showed a medium effect and >0.8 showed a large effect.

Ethics

The relevant sections of the original ethical management plan from the trial were adhered to. The secondary supervisor for this project had access to the original data due to being one of the researchers on the original RCT. Therefore, the data (which could include confidential information) was only accessed by this supervisor and was converted into an

anonymised dataset. This meant that no identifiable data was viewed by the author of this thesis.

The anonymised dataset was stored on an encrypted memory stick. When used for the purposes of analysing or writing up the study, this was conducted on a laptop computer which had suitable encryption and could only be accessed via a password. The data was saved to the encrypted memory stick after each use.

Chapter 7. Empirical Paper: Extended results

Chapter overview

This chapter provides additional information about the procedure underlying multiple imputation and makes reference to its SPSS outputs and the data therein. Also provided in this chapter is an outline of the assumptions underlying linear regression with detailed information about the data that lead to them been considered met.

Multiple imputation

One missing value was identified for each of the baseline variables and three missing values were identified for each of the post-treatment variables. As this was calculated to be under 10 per cent of missing values, generating five imputations was deemed sufficient. The Multiple Imputation function on SPSS Statistics version 25 was used, and the output can be found in appendix B.

For baseline PTSD as measured by the PDS, the mean ranged from 15.83 to 16.62 across the five imputations, and a pooled estimate is calculated as 16.11 which compares to the original mean of 16.36. The standard deviation ranged from 13.67 to 13.96 across the five imputations, and a pooled estimate is calculated as 13.83 which compares to the original standard deviation of 13.92. For post-treatment PTSD, the mean ranged from 13.06 to 13.63 across five imputations, and a pooled estimate is calculated as 13.36 which compares to the original mean of 13.50. The standard deviation ranged from 14.10 to 14.81, and a pooled estimate is calculated as 14.37 which compares to the original standard deviation of 14.87.

For baseline depression as measured by the PHQ-9, the mean ranged from 8.22 to 8.56 across the five imputations, and a pooled estimate is calculated as 8.42 which compares to the original mean of 8.48. The standard deviation ranged from 7.71 to 7.84 across the five imputations, and a pooled estimate is calculated as 7.75 which compares to the original

standard deviation of 7.85. For post-treatment depression, the mean ranged from 7.10 to 7.86 across the five imputations, and a pooled estimate is calculated as 7.42 which compares to the original mean of 7.54. The standard deviation ranged from 7.00 to 7.63 across the five imputations, and a pooled estimate is calculated as 7.18 which compares to the original standard deviation of 7.35.

For baseline anxiety as measured by the GAD-7, the mean ranged from 8.10 to 8.34 across the five imputations, and a pooled estimate is calculated as 8.21 which compares to the original mean of 8.39. The standard deviation ranged from 7.21 to 7.37 across the five imputations, and a pooled estimate is calculated as 7.28 which compares to the original standard deviation of 7.34. For post-treatment anxiety, the mean ranged from 7.39 to 7.77 across the five imputations, and a pooled estimate is calculated as 7.49 which compares to the original mean of 7.63. The standard deviation ranged from 6.93 to 7.28 across the five imputations, and a pooled estimate is calculated as 7.04 which compares to the original standard deviation of 7.30.

For baseline general mental health as measured by the GHQ-28, the mean ranged from 29.77 to 30.59 across the five imputations, and a pooled estimate is calculated as 30.17 which compares to the original mean of 29.97. The standard deviation ranged from 16.76 to 17.09 across the five imputations, and a pooled estimate is calculated as 16.86 which compares to the original standard deviation of 17.07. For post-treatment general mental health, the mean ranged from 23.22 to 24.18 across the five imputations, and a pooled estimate is calculated as 23.62 which compares to the original mean of 23.85. The standard deviation ranged from 11.31 to 12.19 across the five imputations, and a pooled estimate is calculated as 11.73 which compares to the original standard deviation of 11.76.

Assumptions underlying linear regression

Normality of the data.

One of the assumptions of a linear regression is that the residuals are normally distributed. This was assessed for each dependent variable by reviewing the P-P plots (five imputations were calculated for each variable and therefore five imputations of P-P plots were produced) which are shown in appendix C. In the main, the observed cumulative probability values were in line with the expected cumulative probability values and therefore this assumption was deemed met.

Homoscedasticity

Another assumption of a linear regression is that the residuals are homoscedastic. This means that the residuals are equally distributed. This was assessed for each dependent variable by reviewing residuals on a scatterplot against the predicted values. These scatterplots are presented in appendix D. In the main, the residuals appeared evenly distributed and therefore this assumption was deemed met.

Multicollinearity

A third assumption of linear regression is that predictors are not multicollinear. Multicollinearity refers to the issue of when predictor variables are highly correlated with one another. If this is the case, it can be difficult to accurately associate the correct predictor variable with the variance in the outcome variable. This was assessed be reviewing the variance inflation factor (VIF) values. Multicollinearity is indicated in values over 10. No pooled VIF values were calculated in SPSS. Across the five imputations, the PTSD variable VIF ranged from 1.000 to 1.011, the depression variable VIF ranged from 1.067 to 1.094, the anxiety variable VIF ranged from 1.122 to 1.146, and the general mental health variable VIF

ranged from 1.131 to 1.188. As all VIF values were under 10, the multicollinearity assumption was deemed met.

Linear regressions

Due to all the assumptions being met, a linear regression was performed for all four outcome variables: parent PTSD, parent depression, parent anxiety, and parent general mental health. SPSS outputs for all regressions are presented in appendix E.

Chapter 8. Overall discussion and critical evaluation

Chapter overview

This chapter will summarise the findings of both the systematic review and empirical paper and offer a critical evaluation of how they relate to each other and how they may differ from one another. Implications for theory, further research and clinical practice will also be considered.

Summary of findings

The aim of the research presented in this portfolio was to investigate whether parents of children with PTSD benefit from trauma-focused psychological interventions (CBT or EMDR) that their children participate in. More specifically, it explores whether parents own mental health outcomes (i.e. PTSD, depression, anxiety and general mental health) change as a result of an intervention aimed at treating the child. The systematic review aimed to investigate existing literature that was available for parent outcomes (PTSD and depression) and through a meta-analysis discover whether there were any significant changes for the parents' outcomes following the child's PTSD intervention compared to a control group (either active or inactive). The empirical paper aimed to extend this research by investigating parent outcomes of a specific type of Cognitive Behavioural Therapy called Cognitive Therapy for PTSD (CT-PTSD) delivered to the child in the early stages following a trauma. It measured both parent PTSD and depression, but also included two other measures: anxiety and general mental health, both of which have been less widely measured in previous literature.

The systematic review with meta-analysis provided some preliminary support for the superiority of trauma-focused psychological interventions over controls at reducing parent PTSD, emotional reactions and depression. The empirical paper found preliminary evidence

for the effectiveness of CT-PTSD delivered to the child at reducing parent PTSD, depression, anxiety and general mental health.

Both papers showed preliminary evidence that parent PTSD improves but the meta-analysis did not reach significance ($p=0.07$) and the empirical paper did ($p<0.001$). It is difficult to make strong conclusions about the meaning of this given the few studies included in the meta-analysis but some considerations are noteworthy.

The first consideration relates to the effects of the intervention on the child. It was identified in two of the three papers included in the parent PTSD meta-analysis (Cox, Kenardy & Hendrikz, 2009; Deblinger, Stauffer & Steer, 2001) that the children in the studies did not significantly improve on PTSD outcomes either. This contradicts the finding from the empirical paper that found that children did improve in their PTSD following CT-PTSD (Meiser-Stedman et al., 2017). Given that child and parent PTSD are positively correlated (Morris, Gabert-Quillen & Delahanty, 2012), it can be hypothesised that parent PTSD improves if their child's PTSD improves. For parent depression, all studies in the meta-analysis found a significant improvement in child PTSD which was supported by the findings in the empirical paper. Again, this is likely to be because there is a link between parent depression and child PTSD (Morris, Gabert-Quillen & Delahanty, 2012). Of course, it is difficult to ascertain the direction of these potential correlations i.e. whether children did not improve because the parents did not or the parents did not improve because the children did not.

A second consideration relates to the timing of the child psychotherapy. In the empirical study, the CT-PTSD intervention was delivered to children within two to six months of the trauma and was considered an early but not acute intervention. This compares to the differing time frames of the studies included in the meta-analysis whereby one study

did not report the time frame between the trauma and intervention (Deblinger, Stauffer & Steer, 2001), one study reported the mean time as being eight months (Kemp, Drummond, MrDermott, 2009) and one study was reported to deliver the intervention within two to four weeks of the trauma (Cox, Kenardy & Hendrikz, 2009) which is considered the acute period rather than the early period investigated in the empirical study. Intervening in the early stages of trauma may lead the reduction in PTSD symptoms in parents for a number of possible reasons. Firstly, early psychoeducation on the role of avoidance and early strategies to reduce this avoidance may reduce the likelihood of avoidance patterns being normalised as helpful everyday coping behaviours. Secondly, intervening early may mean that beliefs about the trauma and its lasting impact on the parent and their lives may be less fixed compared to parents who are receiving support much later on following the trauma.

A third consideration relates to the quality of studies. Many of the studies included in the systematic review were poor quality and under-powered. Furthermore, different measures of PTSD were used across the studies in the meta-analysis and empirical paper (two used IES, one used SCL-90-R and one used PDS) as well different treatment modalities (one group CBT intervention, one individual EMDR intervention, one internet-delivered CBT intervention and one individual CT-PTSD intervention).

Taken together, the findings suggest a two-way, circular relationship between parent PTSD and child PTSD. This is corroborated by a meta-analysis that concluded that parent's own mental health moderates child outcomes and a reduction in mental health symptoms contributes to the child's recovery (Martin, Everett, Skowron & Zalewski, 2019). Research suggests that reducing parent avoidance and blame of the child as well as supporting parents' own cognitive-emotional processing predicts a reduction in child PTSD symptoms (Yasinksi, 2016). A reduction in child PTSD following a TF-CBT treatment appears to result in

improvements in parents own PTSD as demonstrated by the findings of this portfolio. This element of the relationship requires further research.

Critical evaluation of the systematic review

The systematic review presented in this portfolio contributes to the existing literature regarding parent outcomes following a child PTSD intervention. This is the first meta-analysis conducted in this area therefore it provides a novel contribution to the literature. Due to this being an under-researched area, few studies were returned and therefore conclusion are only tentative and require further research.

The review was structured and conducted in line with PRISMA guidelines (Mohar et al., 2015). The initial search yielded a large number of papers, many of which were not relevant to the review. This meant that the process of assessing papers took longer than planned. If this review was to be repeated, further specification of the search terms would be carried out in order to conduct a more targeted search.

Papers were selected for review based on the inclusion criteria. The main parent inclusion criterion was that studies were required to include either a parent depression or parent PTSD measure. However, measures across the studies varied. The PERQ was an unexpected measure that came up and required a decision on whether to include it as a PTSD measure. After reading the items on the questionnaire, it was deemed that it contained enough PTSD components such as difficulties with sleep, intrusions and avoidance. As the PERQ was not intended to be used as a PTSD measure, it felt important to conduct separate meta-analyses for studies with PERQ and ones that included validated PTSD measures. Not only did the studies vary in terms of their measures, the interventions varied in terms of their number of sessions, session length, duration of the intervention and the degree of parent involvement. The limited studies eligible for this review were assessed using the Cochrane

Risk of bias tool and were found to contain bias. Unclear reporting of methodological procedures made rating the quality of studies difficult. This resulted in many criteria being rated as “not enough information”, making the quality of studies unclear. If there was more time, authors could have been contacted to clarify outstanding questions in relation to risk of bias but unfortunately this was not possible under the time constraints of this thesis.

Critical evaluation of the empirical paper

The empirical paper presented in this portfolio addressed the need for further studies regarding parent outcomes, as identified by the systematic review. One notable limitation from the systematic review was that most studies included parent outcomes as a secondary focus. In some ways, the empirical paper did this also due to the design being a secondary analysis from an already published trial. However, what the empirical study did do was to focus on providing descriptions of parent characteristics as well as parent involvement which was often lacking in other studies. Reference to parent data is also made in the title of the study, increasing the likelihood of it being returned in searches of future systematic reviews.

Another limitation of conducting a secondary analysis was that the research process had already been carried out leaving no room to influence the process. If I was part of the research process I would have liked to have included additional questions for the parents. Some would have been about demographics such as age, and others would have been about the parents’ own trauma experiences. It would have been useful to know the parents’ trauma history and whether PTSD symptoms were present before their child’s trauma. Questions around whether they also experienced the same trauma as their child would also have been useful. These questions would have enriched the findings and may have begun to answer some questions around the difference between parent primary and secondary PTSD.

Theoretical implications

It is too early to say with clarity how the results from this portfolio impacts theory due to the further research with larger sample sizes required in order to make firmer conclusions. However, if further studies do find the same encouraging results and provide clarity on the mechanisms that are correlated with improvements in parent outcomes then this supports a more relational theoretical understanding of child PTSD.

The results from this portfolio lead to considering how attachment theory may be incorporated into our understanding of the relationship between child and parent PTSD. Bowlby (1988) asserted that children can develop a secure attachment when they have confidence in their caregiver to provide a safe haven when they feel distressed and provide a secure base from where they can explore the world from. Sensitive caregiving responses are linked to the development of a secure attachment (Leerkes, Gedaly, & Su, 2016 as cited in Balter & Tamis-LeMonda, 2016).

When a child has been traumatised, parents are thought to develop "relational PTSD" (Scheeringa and Zeanah, 2001). This model suggests that traumatised parents can either become overprotective (arising from their own concerns about their children's safety) or find it difficult to tolerate their children's expression of fear, anxiety and helplessness. Thus, parents may adopt intrusive and insensitive parenting practices reflecting a preoccupied attachment style, or may instead withdraw from interactions with the child, reflecting an avoidant attachment style (Flykt, Kanninen, Sinkkonen, & Punamäki, 2010; Van Ee, Kleber, Jongmans, Mooren, & Out, 2016). A qualitative review confirmed that parental trauma can prevent children from developing a secure base because the child feels overwhelmed and uncontained by the parent (De Haene Grieten, & Verschueren, 2010). Therefore, parent PTSD may be directly related to a child's insecure attachment (van Ee, Kleber, Jongmans, Mooren & Out, 2016).

To take this further, the "relational PTSD and recovery" model proposes that parent responsiveness to the child is dependent on their own wellbeing. When a parent is aware of their child's needs and can act upon them, this leads to an improvement in wellbeing for the child (Alisic, Boeije, Jongmans and Kleber, 2012). This is confirmed by studies that found that supportive, secure and wise parenting practices can be a protective factor for children's mental health, resilience and development (Feldman, Vengrober, Eidelman-Rothman, & Zagoory-Sharon, 2013; Qouta, Punamäki, Miller, & El Sarraj, 2008). This means therefore, that a reduction in parent PTSD may increase their ability to provide a safe haven and secure base. A secure attachment is then in itself associated with a decrease in PTSD symptoms for the child (Petersen & Elklit, 2013).

Relational models such as those outlined above may be considered for understanding child PTSD but also current child PTSD models may incorporate parental and relational factors into them. For example, the cognitive model developed by Ehlers and Clark (2000) has three main components: nature of trauma memories, negative appraisals of trauma/beliefs, and avoidance/strategies to control threats. Parents can be incorporated into this model in the following ways. In terms of the nature of trauma memories, parents are likely to have their own memory of the trauma based on either being part of or witnessing the same trauma as their child, or from hearing the details of the trauma memory from the perspective of the child. In terms of the appraisals of trauma and subsequent beliefs, parents may misinterpret new situations as being more dangerous than they are for the child or hold mistaken beliefs around the causes of the trauma leading to inflated responsibility and guilt. Parents may negatively evaluate how they responded to their child's trauma leading to feelings of incompetence and shame. Parents may also misinterpret their own and their child's PTSD symptoms. With both behavioural and cognitive avoidance, parents are likely

to accommodate their child's avoidance but also engage in avoidance themselves to protect their child or themselves.

Clearly the above are tentative, speculative comments on the impact of the results on theory. Future studies would benefit from testing such hypotheses.

Clinical implications

The results from this portfolio, if replicated by future research, may support child and family services to think about how parents are both included in treatment but also monitored during the course of treatment for children with PTSD. This would potentially involve asking the parent to complete their own PTSD outcome measure prior to treatment to determine whether PTSD symptoms are present. Depression, anxiety and other general mental health outcome measures may also be beneficial. It may also be useful to collect information from the parent regarding their own experience of trauma and whether symptoms relate to the child's trauma or a trauma that happened to them separately.

If symptoms reach clinical cut-offs then it may be beneficial to monitor these throughout the child's treatment. They may help clinicians to identify whether parents' symptoms are improving. If they are not, clinicians may decide whether the parent requires further support, perhaps their own sessions or own mental health support through an appropriate adult provider. Of course, if the parents' symptoms can improve as a result of their child's intervention with some involvement as suggested by the findings from this research, then this could have more immediate benefits for both the parent and child, considering the commonly long waiting times for community adult mental health treatment. Although a cost-effectiveness analysis has yet to be conducted, it appears likely that improvements in parent mental health as a result of a child intervention would involve less services and therefore cost less money.

Research implications

The results found within this portfolio support conducting further research into parent outcomes following the delivery of PTSD interventions to traumatised children. One hypothesis to test is whether changes in parent outcomes are correlated with changes in child outcomes. One possibility is to conduct a longitudinal or long-term follow-up study measuring the symptomologies of both child and parent to find out how the trajectories relate to one another. Another possibility is to test whether significant changes in parent outcomes mediate treatment outcomes for the child. A second hypothesis to be tested is whether there is a difference between primary and secondary PTSD in parents, and if there is, whether child psychotherapy impacts this differently. A third hypothesis to be tested relates to how much the parent needs to be involved in the child intervention in order to reduce mental health symptoms. Lastly, further exploration of parent characteristics in relation to changes in PTSD and other mental health symptoms is required.

These future research areas can all be addressed using quantitative research designs and this is required, especially RCTs that are adequately powered and of high quality. However, another layer that is missing from the literature is a qualitative understanding of parents' experiences of PTSD following their child's trauma and how this might change over the course of their child's therapy. This might provide a rich understanding of the parent experience and complement any findings from quantitative research.

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Appendix A – Author guidelines for Journal of Traumatic Stress

Author Guidelines

1. **Online Submissions:** The *Journal of Traumatic Stress* accepts submission of manuscripts online at: http://mc.manuscriptcentral.com/jots Information about how to create an account or submit a manuscript may be found online on the Manuscript Central homepage in the "User Tutorials" section or, on the Author Dashboard, via the "Help" menu in the upper right corner of the screen. Personal assistance also is available by calling 434-964-4100.
2. **Article Formats:** Three article formats are accepted for consideration by JTS. All page counts should include references, tables, and figures. *Regular articles* (30 pages maximum, inclusive of all text, abstract, references, tables, and figures) include research studies, quantitative systematic reviews, and theoretical articles. Purely descriptive articles or narrative-based literature reviews are rarely accepted. In extraordinary circumstances, the editors may consider longer manuscripts that describe highly complex designs or statistical procedures but authors should seek approval prior to submitting manuscripts longer than 30 pages. *Brief reports* (18 pages maximum) are appropriate for pilot studies or uncontrolled trials of an intervention, preliminary data on a new problem or population, condensed findings from a study that does not merit a full article, or methodologically oriented papers that replicate findings in new populations or report preliminary data on new instruments. *Commentaries* (1,000 words or less) involve responses to previously published articles or, occasionally, invited essays on a professional or scientific topic of general interest. Response commentaries, submitted no later than 8 weeks after the original article is published (12 weeks if outside the U.S.), must be content-directed and use tactful language. The original author is given the opportunity to respond to accepted commentaries.
3. **Double-Blind Review:** As of January 1, 2017, the Journal of Traumatic Stress utilizes a double-blind review process in which reviewers receive manuscripts with no authors' names or affiliations listed in order to ensure unbiased review. To facilitate blinded review, the title page should be uploaded as a separate document from the body of the manuscript, identified as "Title Page," and should include the title of the article, the running head (maximum 50 characters) in uppercase flush left, author(s) byline and institutional affiliation, and author note (see pp. 23-25 of the APA 6th ed. manual). Within the main body of the manuscript, tables, and figures, authors should ensure that any identifying information (i.e., author names, affiliations, institutions where the work was performed, university whose ethics committee approved the project) is blinded; a simple way to accomplish this is by replacing the identifying text with the phrase "[edited out for blind review]". In addition, language should be used that avoids revealing the identity of the authors; e.g., rather than stating, "In other research by our lab (Bennett & Kerig, 2014), we found …" use phrases such as, "In a previous study, Bennett and Kerig (2014) found …" Please note that if you have uploaded the files correctly, you will **not** be able to view the title page in the PDF and HTML proofs of your manuscript; however, the Editor and JTS editorial office staff can view this information.
4. **Preferred and Non-Preferred Reviewers:** During the submission process, authors may suggest the names of preferred reviewers; authors also may request that specific individuals not be selected as reviewers.

5.**Publication Style:** JTS follows the style recommendations of the 2010 *Publication Manual of the American Psychological Association* (APA; 6th edition) and submitted manuscripts must conform to these formatting guidelines. Manuscripts should use non-sexist language. Manuscripts must be formatted using letter or A4 page size, with 1 inch (2.54cm) margins on all sides, Times New Roman 12 point font (except for figures, which should be in12 point Arial font), and double-spacing for text, tables, references, and figures. Submit your manuscript in .doc or .docx format.

For assistance with APA style, in addition to consulting the manual itself, please note these helpful online sources that are freely available:http://www.apastyle.org/learn/tutorials/basics-tutorial.aspxandhttps://owl.english.purdue.edu/owl/section/2/10/.

6.**APAand JTS Style Pointers:** In addition to consulting the APA6th edition Publication manual, the resources indexed above, and the JTS Style Sheet posted online, please consider these pointers when formatting each section of the manuscript:

a. **Tense:** Throughout the manuscript, please use past tense for everything that has already happened, including the collection and analyses of the data being reported.
b. **Abstract:** The Main Document of the manuscript should begin with an abstract no longer than 250 words, placed on a separate page .In addition house style requires the reporting of an effect size for each finding discussed in the abstract; if there are many findings, present the range.
c. **Participants :** Please include in this subsection of the Method section information on sample characteristics, subsample comparisons, and analyses that describe the sample but are not focused on testing the hypotheses that are the aims of your manuscript.
d. **Procedure:** Please describe the procedure in sufficient detail so that it could be comprehended and replicated by another investigator. Identify by name the IRB or ethics committee (edited out for blind review in the submitted manuscript) that approved the research, and the manner in which consent was obtained.
e. **Measures:** In addition to providing citations, psychometric, and validation data for each measure administered, please provide coefficient alpha from your data for each measure for which this is appropriate.
f. **Data Analysis:** Include a separate subsection with this header in the Method section in which you describe the analyses performed, the software program(s)used, and make an explicit statement about missing data in your data set. If there are no missing data, so state; otherwise describe the extent of missing data and how they were handled in the data analyses.
g. **Results**(and throughout):Present percentages to1 decimal place, means and *SD*s to 2decimal places, and exact *p* values to 3 decimal places except for any< .001.Include leading zeros (e.g., 0.92) when reporting any statistic that can be greater than1.00 (or less than-1.00). For example, there is no leading zero used when reporting correlations, coefficient alphas, standardized betas, *p* values, or fit indices(e.g., *r*= .47, not 0.47).Report effect sizes for analyses conducted wherever possible and appropriate.

Appendix B – Multiple Imputation SPSS Output

Imputation Specifications

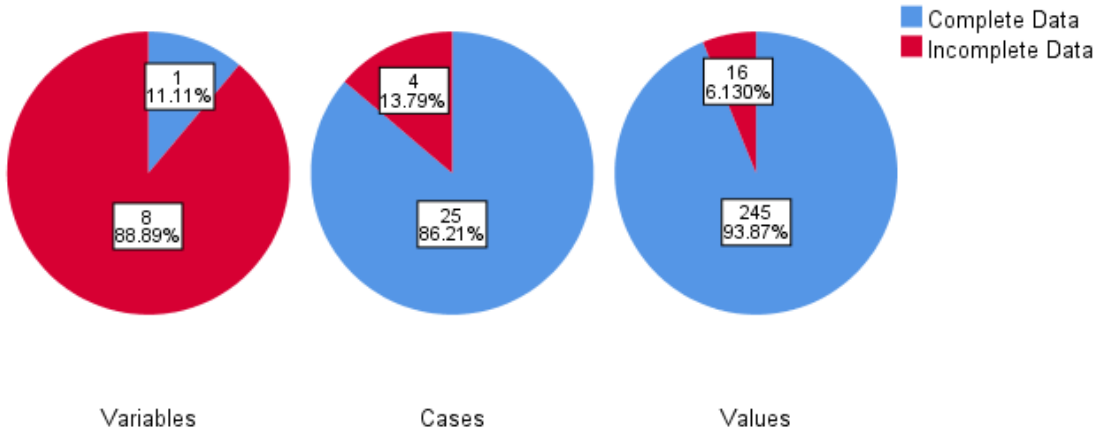
Imputation Method	Fully Conditional Specification
Number of Imputations	5
Model for Scale Variables	Linear Regression
Interactions Included in Models	(none)
Maximum Percentage of Missing Values	100.0%
Maximum Number of Parameters in Imputation Model	100

Imputation Constraints

	Role in Imputation		Imputed Values		
	Dependent	Predictor	Minimum	Maximum	Rounding
condition (1 WL, 2 CT)	No	Yes			
wk0_pdstotal	Yes	Yes	1	47	Integer
wk0_gadtotal	Yes	Yes	0	21	Integer
wk0_phqtotal	Yes	Yes	0	25	Integer
wk0_ghqtotal	Yes	Yes	8	50	Integer
wk11_pdstotal	Yes	Yes	0	43	Integer
wk11_gadtotal	Yes	Yes	0	19	Integer

wk11_phqtotal	Yes	Yes	0	23	Integer
wk11_ghqtotal	Yes	Yes	(none)	(none)	

Overall Summary of Missing Values



Imputation Results

Imputation Method		Fully Conditional Specification
Fully Conditional Specification Method Iterations		1000
Dependent Variables	Imputed	wk0_pdstotal,wk0_gadtotal,wk0_phqtotal,wk0_ghqtotal,wk11_pdstotal,wk11_gadtotal,wk11_phqtotal,wk11_ghqtotal
	Not Imputed(Too Many Missing Values)	
	Not Imputed(No Missing Values)	Condition

Imputation Sequence	Condition,wk0_pdstotal,wk0_gadtotal,wk0_phqtotal,wk0_ghqtotal,wk11_pdstotal,wk11_gadtotal,wk11_phqtotal,wk11_ghqtotal

Imputation Models

	Model			
	Type	Effects	Missing Values	Imputed Values
wk0_pdstotal	Linear Regression	Condition,wk0_gadtotal,wk0_phqtotal,wk0_ghqtotal,wk11_pdstotal,wk11_gadtotal,wk11_phqtotal,wk11_ghqtotal	1	5
wk0_gadtotal	Linear Regression	Condition,wk0_pdstotal,wk0_phqtotal,wk0_ghqtotal,wk11_pdstotal,wk11_gadtotal,wk11_phqtotal,wk11_ghqtotal	1	5

wk0_phqtotal	Linear Regression	Condition,wk0_pdstotal,wk0_gadtotal,wk0_ghqtotal,wk11_pdstotal,wk11_gadtotal,wk11_phqtotal,wk11_ghqtotal	1	5
wk0_ghqtotal	Linear Regression	Condition,wk0_pdstotal,wk0_gadtotal,wk0_phqtotal,wk11_pdstotal,wk11_gadtotal,wk11_phqtotal,wk11_ghqtotal	1	5
wk11_pdstotal	Linear Regression	Condition,wk0_pdstotal,wk0_gadtotal,wk0_phqtotal,wk0_ghqtotal,wk11_gadtotal,wk11_phqtotal,wk11_ghqtotal	3	15

wk11_gadtotal	Linear Regression	Condition,wk0_pdstotal,wk0_gadtotal,wk0_phqtotal,wk0_ghqtotal,wk11_pdstotal,wk11_phqtotal,wk11_ghqtotal	3	15
wk11_phqtotal	Linear Regression	Condition,wk0_pdstotal,wk0_gadtotal,wk0_phqtotal,wk0_ghqtotal,wk11_pdstotal,wk11_gadtotal,wk11_ghqtotal	3	15
wk11_ghqtotal	Linear Regression	Condition,wk0_pdstotal,wk0_gadtotal,wk0_phqtotal,wk0_ghqtotal,wk11_pdstotal,wk11_gadtotal,wk11_phqtotal	3	15

wk0_pdstotal

Data	Imputation	N	Mean	Std. Deviation	Minimum	Maximum
Original Data		28	16.3614	13.91623	1.0000	47.0000
Imputed Values	1	1	1.0000	.	1.0000	1.0000

	2	1	14.0000	.	14.0000	14.0000
	3	1	5.0000	.	5.0000	5.0000
	4	1	24.0000	.	24.0000	24.0000
	5	1	1.0000	.	1.0000	1.0000
Complete Data After Imputation	1	29	15.8317	13.96001	1.0000	47.0000
	2	29	16.2800	13.67250	1.0000	47.0000
	3	29	15.9697	13.82736	1.0000	47.0000
	4	29	16.6248	13.73888	1.0000	47.0000
	5	29	15.8317	13.96001	1.0000	47.0000

wk0_gadtotal

Data	Imputation	N	Mean	Std. Deviation	Minimum	Maximum
Original Data		28	8.3929	7.33505	.0000	21.0000
Imputed Values	1	1	7.0000	.	7.0000	7.0000
	2	1	1.0000	.	1.0000	1.0000
	3	1	3.0000	.	3.0000	3.0000
	4	1	.0000	.	.0000	.0000
	5	1	5.0000	.	5.0000	5.0000
Complete Data After Imputation	1	29	8.3448	7.20752	.0000	21.0000
	2	29	8.1379	7.33253	.0000	21.0000
	3	29	8.2069	7.27215	.0000	21.0000
	4	29	8.1034	7.36956	.0000	21.0000
	5	29	8.2759	7.23038	.0000	21.0000

wk0_phqtotal

Data	Imputation	N	Mean	Std. Deviation	Minimum	Maximum
Original Data		28	8.4777	7.85282	.0000	25.0000
Imputed Values	1	1	10.0000	.	10.0000	10.0000
	2	1	1.0000	.	1.0000	1.0000
	3	1	4.0000	.	4.0000	4.0000
	4	1	11.0000	.	11.0000	11.0000
	5	1	8.0000	.	8.0000	8.0000
Complete Data After Imputation	1	29	8.5302	7.71649	.0000	25.0000
	2	29	8.2198	7.83533	.0000	25.0000
	3	29	8.3233	7.75601	.0000	25.0000
	4	29	8.5647	7.72552	.0000	25.0000
	5	29	8.4612	7.71182	.0000	25.0000

wk0_ghqtotal

Data	Imputation	N	Mean	Std. Deviation	Minimum	Maximum
Original Data		28	29.9730	17.06703	5.0000	67.0000
Imputed Values	1	1	48.0000	.	48.0000	48.0000
	2	1	32.0000	.	32.0000	32.0000
	3	1	24.0000	.	24.0000	24.0000
	4	1	38.0000	.	38.0000	38.0000
	5	1	37.0000	.	37.0000	37.0000
Complete Data After Imputation	1	29	30.5947	17.09054	5.0000	67.0000
	2	29	30.0429	16.76372	5.0000	67.0000
	3	29	29.7671	16.79616	5.0000	67.0000

	4	29	30.2498	16.82565	5.0000	67.0000
	5	29	30.2153	16.81021	5.0000	67.0000

wk11_pdstotal

Data	Imputation	N	Mean	Std. Deviation	Minimum	Maximum
Original Data		26	13.5000	14.87279	.0000	42.5000
Imputed Values	1	3	9.3333	10.40833	1.0000	21.0000
	2	3	14.3333	5.85947	10.0000	21.0000
	3	3	14.6667	17.47379	.0000	34.0000
	4	3	10.3333	2.51661	8.0000	13.0000
	5	3	12.0000	12.12436	1.0000	25.0000
Complete Data After Imputation	1	29	13.0690	14.38422	.0000	42.5000
	2	29	13.5862	14.14281	.0000	42.5000
	3	29	13.6207	14.81352	.0000	42.5000
	4	29	13.1724	14.10375	.0000	42.5000
	5	29	13.3448	14.42970	.0000	42.5000

wk11_gadtotal

Data	Imputation	N	Mean	Std. Deviation	Minimum	Maximum
Original Data		26	7.6282	7.29647	.0000	18.6667
Imputed Values	1	3	6.0000	2.00000	4.0000	8.0000
	2	3	6.0000	3.60555	2.0000	9.0000
	3	3	5.3333	4.50925	1.0000	10.0000
	4	3	5.3333	2.30940	4.0000	8.0000

	5	3	9.0000	8.54400	.0000	17.0000
Complete Data After	1	29	7.4598	6.93359	.0000	18.6667
Imputation	2	29	7.4598	6.97980	.0000	18.6667
	3	29	7.3908	7.03510	.0000	18.6667
	4	29	7.3908	6.95853	.0000	18.6667
	5	29	7.7701	7.27526	.0000	18.6667

wk11_phqtotal

Data	Imputation	N	Mean	Std. Deviation	Minimum	Maximum
Original Data		26	7.5385	7.35381	.0000	23.0000
Imputed Values	1	3	7.3333	3.21455	5.0000	11.0000
	2	3	7.0000	5.56776	2.0000	13.0000
	3	3	3.3333	1.52753	2.0000	5.0000
	4	3	3.6667	1.15470	3.0000	5.0000
	5	3	10.6667	11.23981	1.0000	23.0000
Complete Data After	1	29	7.5172	7.00189	.0000	23.0000
Imputation	2	29	7.4828	7.10820	.0000	23.0000
	3	29	7.1034	7.08164	.0000	23.0000
	4	29	7.1379	7.05830	.0000	23.0000
	5	29	7.8621	7.63205	.0000	23.0000

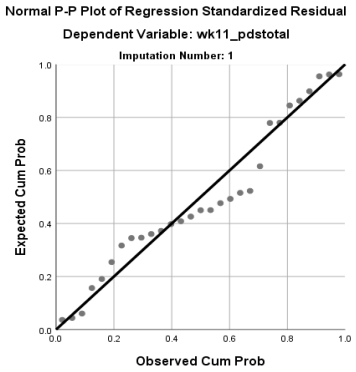
wk11_ghqtotal

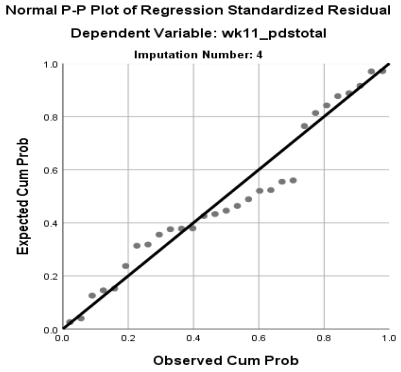
Data	Imputation	N	Mean	Std. Deviation	Minimum	Maximum
Original Data		26	23.8545	11.75629	8.0000	50.0000

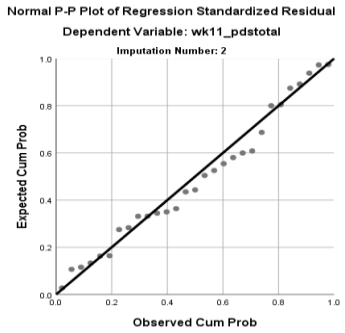
Imputed Values	1	3	27.0294	9.73599	16.4516	35.6156
	2	3	22.8175	18.75153	2.5368	39.5259
	3	3	20.3343	6.76585	12.9990	26.3304
	4	3	17.7684	13.20731	9.9823	33.0177
	5	3	19.8892	15.41061	6.8334	36.8883
Complete Data After Imputation	1	29	24.1830	11.45168	8.0000	50.0000
	2	29	23.7472	12.19103	2.5368	50.0000
	3	29	23.4904	11.30762	8.0000	50.0000
	4	29	23.2249	11.80762	8.0000	50.0000
	5	29	23.4443	11.91117	6.8334	50.0000

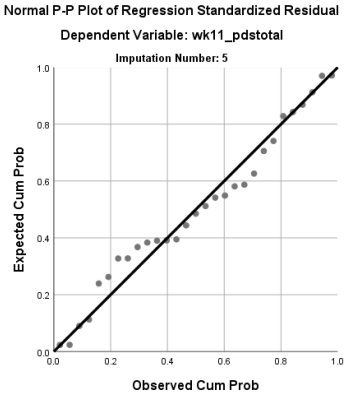
Appendix B – Normality of residuals P-P plots

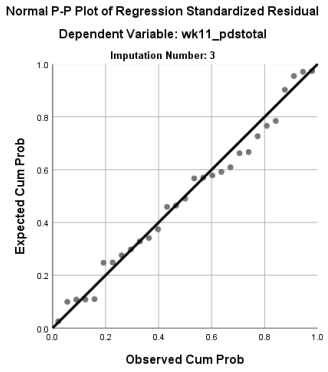
PTSD (5 imputations)



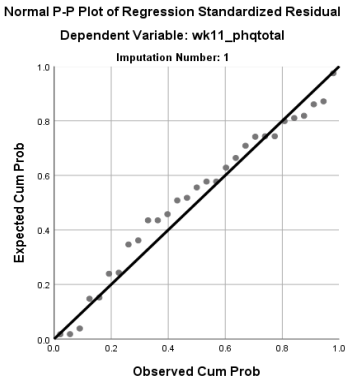


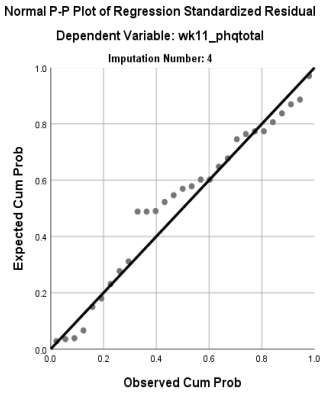


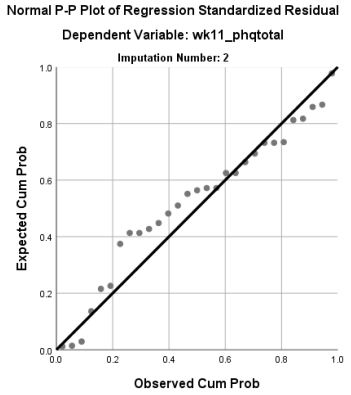


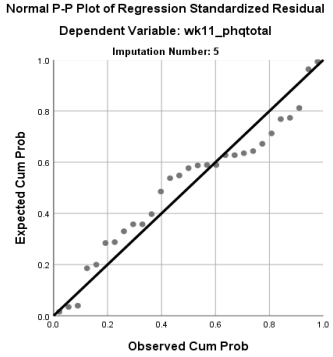


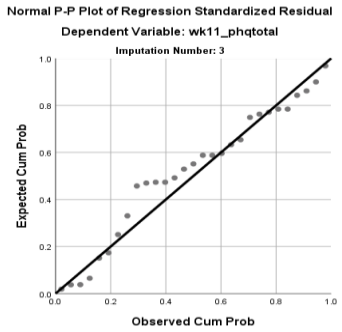
Depression (5 imputations)





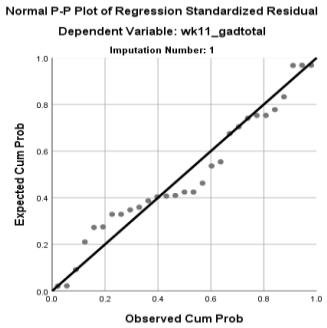


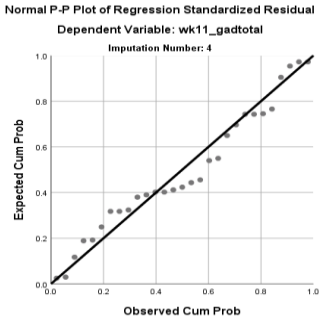


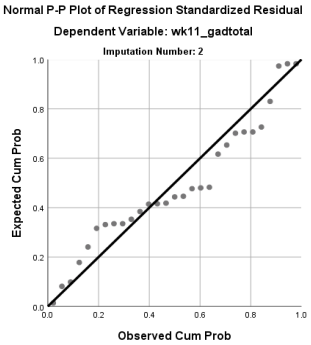


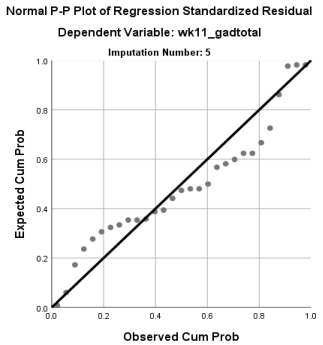
Appendix B – Continued.

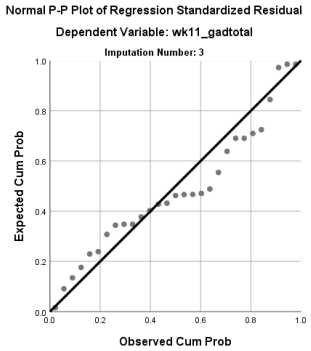
Anxiety (5 imputations)



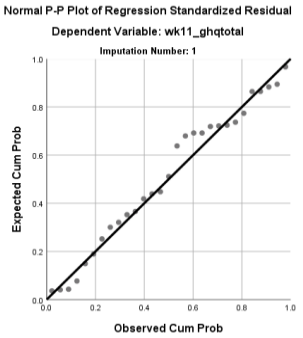


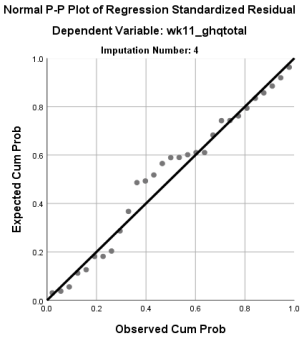


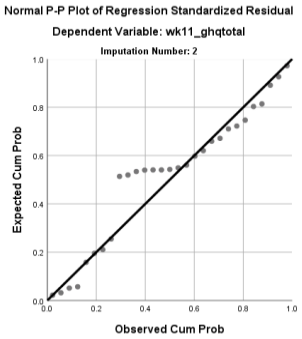


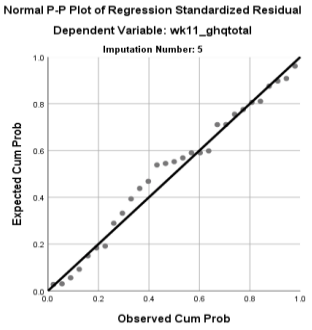


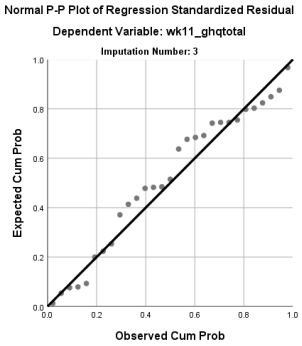
General Mental Health (5 imputations)





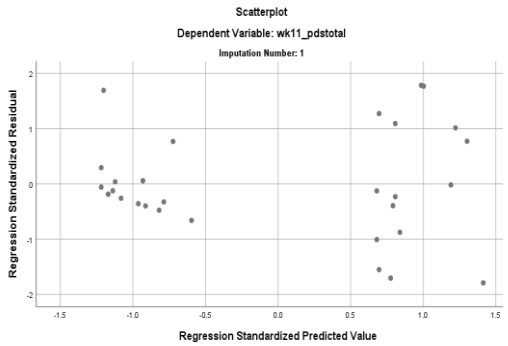


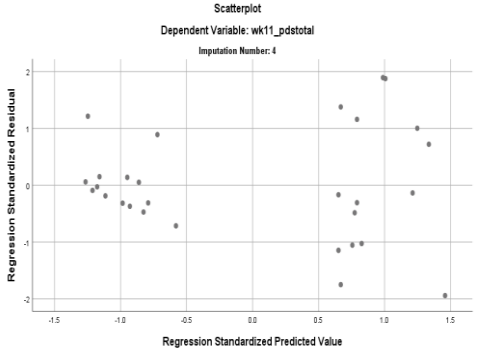


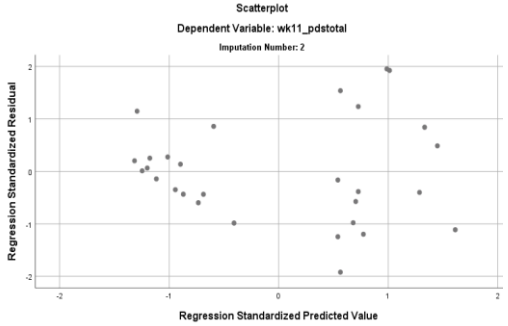


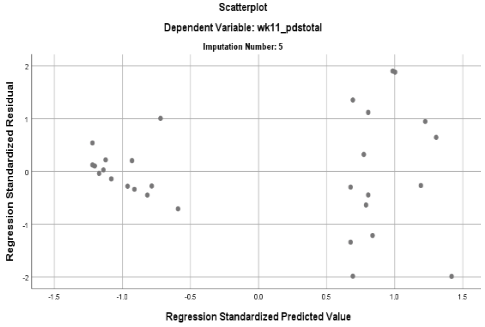
Appendix C – Scatterplots of residuals

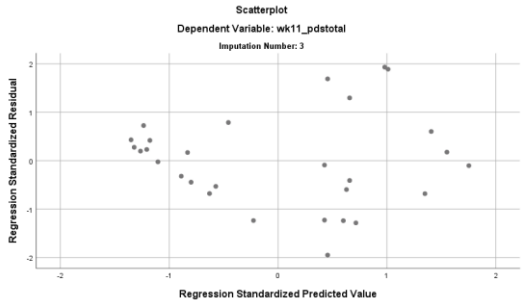
PTSD (5 imputations)



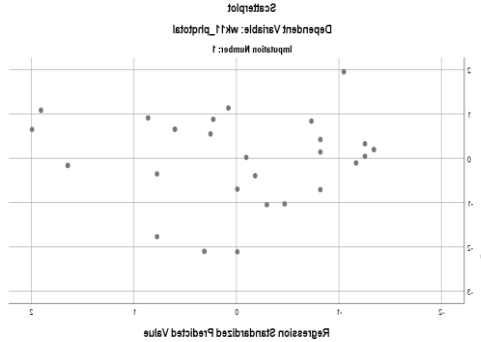


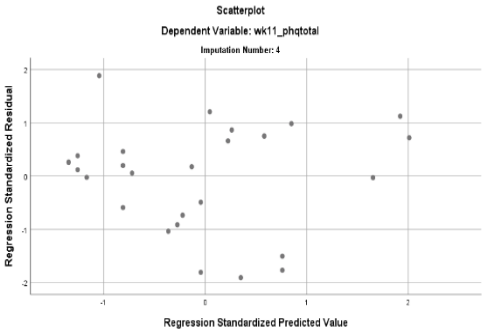


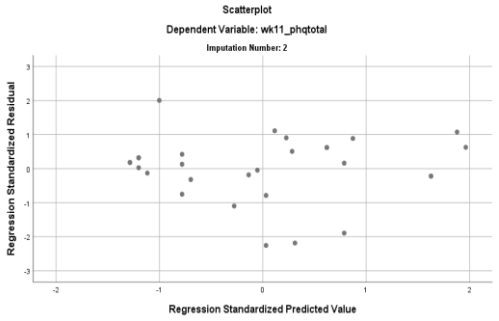


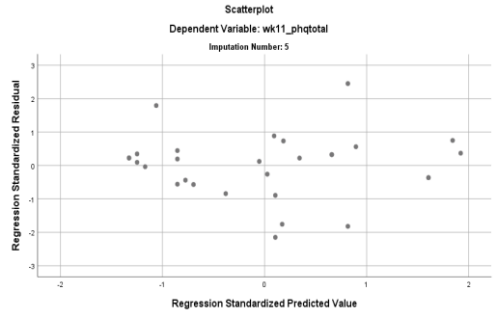


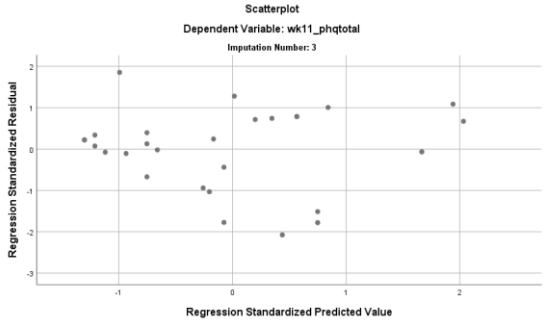
Depression (5 imputations)





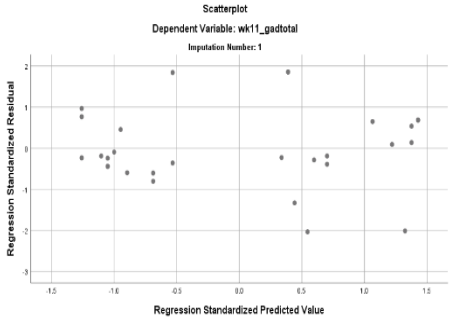


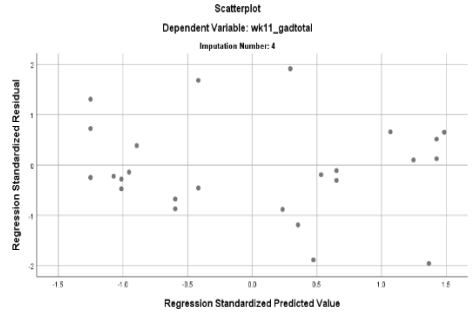


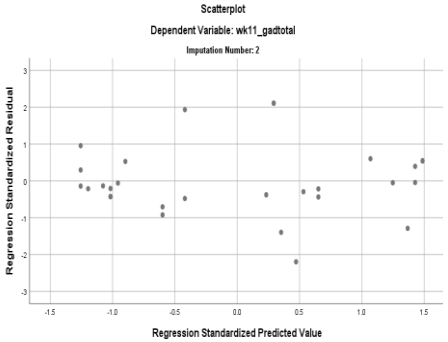


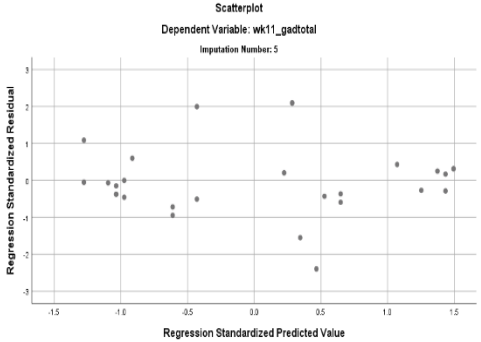
Appendix C – Continued

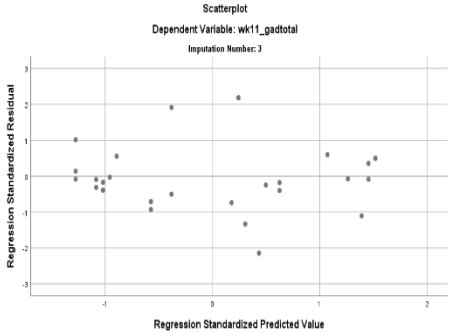
Anxiety (5 imputations)



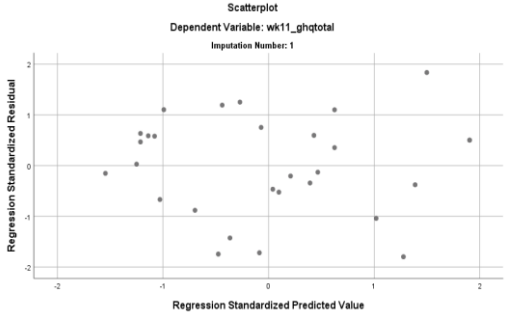


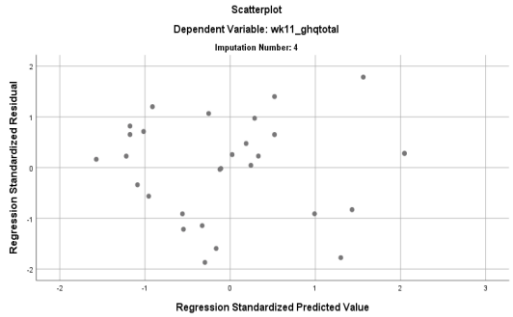


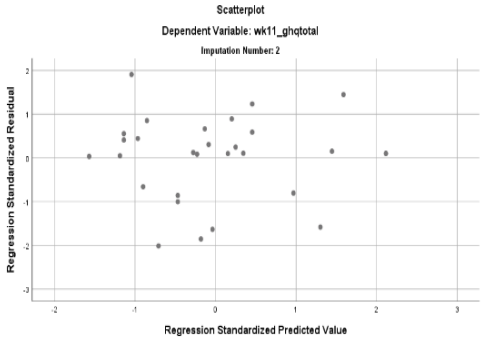


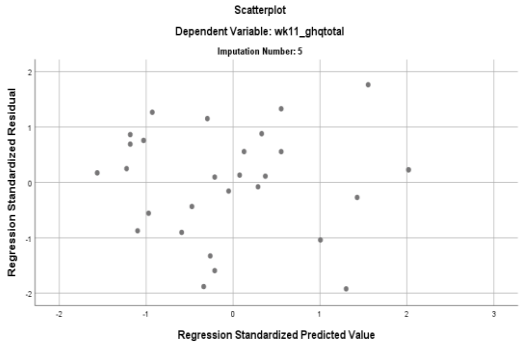


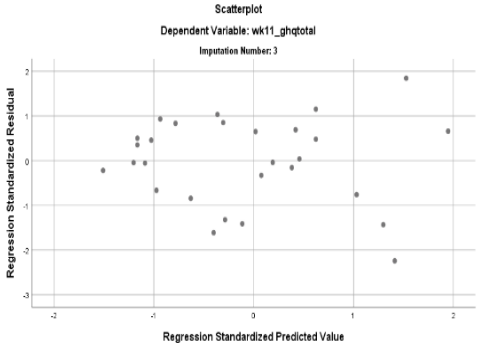
General Mental Health (5 imputations)











Appendix D – Outputs for regressions

Parent PTSD

Model Summary[b]

Imputation Number	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Original data	1	.816[a]	.665	.635	9.11277
1	1	.651[a]	.424	.379	11.33308
2	1	.776[a]	.603	.572	9.25008
3	1	.820[a]	.673	.647	8.79539
4	1	.715[a]	.512	.474	10.22783
5	1	.768[a]	.590	.559	9.58468

a. Predictors: (Constant), condition (1 WL, 2 CT), wk0_pdstotal

b. Dependent Variable: wk11_pdstotal

ANOVA[a]

Imputation Number	Model		Sum of Squares	df	Mean Square	F	Sig.
Original data	1	Regression	3627.922	2	1813.961	21.844	.000[b]
		Residual	1826.938	22	83.043		
		Total	5454.860	24			
1	1	Regression	2453.957	2	1226.979	9.553	.001[b]
		Residual	3339.405	26	128.439		
		Total	5793.362	28			
2	1	Regression	3375.873	2	1687.936	19.727	.000[b]
		Residual	2224.661	26	85.564		

		Total	5600.534	28			
3	1	Regression	4132.994	2	2066.497	26.713	.000[b]
		Residual	2011.333	26	77.359		
		Total	6144.328	28			
4	1	Regression	2849.818	2	1424.909	13.621	.000[b]
		Residual	2719.819	26	104.608		
		Total	5569.638	28			
5	1	Regression	3441.534	2	1720.767	18.731	.000[b]
		Residual	2388.517	26	91.866		
		Total	5830.052	28			

a. Dependent Variable: wk11_pdstotal

b. Predictors: (Constant), condition (1 WL, 2 CT), wk0_pdstotal

Collinearity Diagnostics[a]

					Variance Proportions		
Imputation Number	Model	Dimension	Eigenvalue	Condition Index	(Constant)	wk0_pdstotal	condition (1 WL, 2 CT)
Original data	1	1	2.669	1.000	.01	.04	.01
		2	.279	3.093	.04	.94	.07
		3	.052	7.174	.95	.02	.92
1	1	1	2.612	1.000	.01	.05	.01
		2	.339	2.775	.02	.88	.06
		3	.049	7.281	.96	.07	.93
2	1	1	2.636	1.000	.01	.05	.01
		2	.315	2.894	.03	.90	.07

		3	.050	7.274	.96	.06	.92
3	1	1	2.620	1.000	.01	.05	.01
		2	.330	2.816	.03	.89	.06
		3	.049	7.282	.96	.07	.92
4	1	1	2.645	1.000	.01	.04	.01
		2	.304	2.948	.03	.91	.07
		3	.050	7.251	.96	.05	.92
5	1	1	2.612	1.000	.01	.05	.01
		2	.339	2.775	.02	.88	.06
		3	.049	7.281	.96	.07	.93

a. Dependent Variable: wk11_pdstotal

Residuals Statistics[a]

Imputation Number		Minimum	Maximum	Mean	Std. Deviation	N
Original data	Predicted Value	-3.7733	33.7514	13.8400	12.29485	25
	Residual	-17.85730	15.99274	.00000	8.72482	25
	Std. Predicted Value	-1.433	1.619	.000	1.000	25
	Std. Residual	-1.960	1.755	.000	.957	25
1	Predicted Value	1.6669	26.2976	13.0690	9.36169	29
	Residual	-20.29757	20.20555	.00000	10.92083	29
	Std. Predicted Value	-1.218	1.413	.000	1.000	29
	Std. Residual	-1.791	1.783	.000	.964	29
2	Predicted Value	-.8684	31.2881	13.5862	10.98030	29
	Residual	-17.77503	18.07178	.00000	8.91360	29
	Std. Predicted Value	-1.316	1.612	.000	1.000	29

	Std. Residual	-1.922	1.954	.000	.964	29
3	Predicted Value	-2.7830	34.9033	13.6207	12.14936	29
	Residual	-17.14815	16.98416	.00000	8.47545	29
	Std. Predicted Value	-1.350	1.752	.000	1.000	29
	Std. Residual	-1.950	1.931	.000	.964	29
4	Predicted Value	.4097	27.8814	13.1724	10.08857	29
	Residual	-19.88144	19.36765	.00000	9.85578	29
	Std. Predicted Value	-1.265	1.458	.000	1.000	29
	Std. Residual	-1.944	1.894	.000	.964	29
5	Predicted Value	-.1782	29.0614	13.3448	11.08657	29
	Residual	-19.06142	18.22858	.00000	9.23603	29
	Std. Predicted Value	-1.220	1.418	.000	1.000	29
	Std. Residual	-1.989	1.902	.000	.964	29
Pooled	Predicted Value			13.3586		29
	Residual			.00000		29
	Std. Predicted Value			.000		29
	Std. Residual			.000		29

a. Dependent Variable: wk11_pdstotal

Coefficients[a]

Imputation Number	Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
			B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
Original data	1	(Constant)	42.391	5.964		7.108	.000	30.023	54.759		
		wk0_pdstotal	.366	.145	.313	2.522	.019	.065	.666	.989	1.011
		condition (1 WL, 2 CT)	-23.265	3.669	-.787	-6.342	.000	-30.873	-15.657	.989	1.011
1	1	(Constant)	37.043	7.126		5.198	.000	22.395	51.692		
		wk0_pdstotal	.149	.154	.145	.972	.340	-.166	.465	.998	1.002
		condition (1 WL, 2 CT)	-17.763	4.216	-.628	-4.213	.000	-26.429	-9.097	.998	1.002
2	1	(Constant)	39.651	5.789		6.850	.000	27.752	51.550		
		wk0_pdstotal	.256	.128	.247	2.001	.056	-.007	.519	1.000	1.000
		condition (1 WL, 2 CT)	-20.388	3.438	-.733	-5.931	.000	-27.454	-13.321	1.000	1.000
3	1	(Constant)	40.029	5.525		7.245	.000	28.672	51.386		
		wk0_pdstotal	.350	.120	.327	2.911	.007	.103	.597	.999	1.001
		condition (1 WL, 2 CT)	-21.581	3.270	-.741	-6.599	.000	-28.304	-14.858	.999	1.001
4	1	(Constant)	38.881	6.360		6.113	.000	25.807	51.954		
		wk0_pdstotal	.177	.141	.173	1.259	.219	-.112	.466	1.000	1.000
		condition (1 WL, 2 CT)	-19.324	3.801	-.697	-5.084	.000	-27.138	-11.511	1.000	1.000
5	1	(Constant)	41.687	6.027		6.917	.000	29.298	54.075		
		wk0_pdstotal	.179	.130	.173	1.375	.181	-.088	.446	.998	1.002
		condition (1 WL, 2 CT)	-21.022	3.565	-.741	-5.896	.000	-28.351	-13.693	.998	1.002
Pooled	1	(Constant)	39.458	6.463		6.105	.000	26.765	52.151		
		wk0_pdstotal	.222	.162		1.372	.177	-.104	.549		
		condition (1 WL, 2 CT)	-20.015	4.029		-4.967	.000	-27.982	-12.049		

a. Dependent Variable: wk11_pdstotal

Parent depression

Model Summary[b]

Imputation Number	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Original data	1	.878[a]	.771	.751	3.68566
1	1	.874[a]	.763	.745	3.53524
2	1	.887[a]	.787	.770	3.40765
3	1	.860[a]	.740	.720	3.74745
4	1	.855[a]	.731	.710	3.80143
5	1	.865[a]	.747	.728	3.98051

a. Predictors: (Constant), wk0_phqtotal, condition (1 WL, 2 CT)

b. Dependent Variable: wk11_phqtotal

ANOVA[a]

Imputation Number	Model		Sum of Squares	df	Mean Square	F	Sig.
Original data	1	Regression	1008.650	2	504.325	37.126	.000[b]
		Residual	298.850	22	13.584		
		Total	1307.500	24			
1	1	Regression	1047.795	2	523.897	41.919	.000[b]
		Residual	324.947	26	12.498		
		Total	1372.741	28			
2	1	Regression	1112.828	2	556.414	47.917	.000[b]
		Residual	301.914	26	11.612		
		Total	1414.741	28			
3	1	Regression	1039.061	2	519.531	36.995	.000[b]

		Residual	365.129	26	14.043		
		Total	1404.190	28			
4	1	Regression	1019.226	2	509.613	35.265	.000[b]
		Residual	375.723	26	14.451		
		Total	1394.948	28			
5	1	Regression	1218.993	2	609.496	38.468	.000[b]
		Residual	411.955	26	15.844		
		Total	1630.948	28			

a. Dependent Variable: wk11_phqtotal

b. Predictors: (Constant), wk0_phqtotal, condition (1 WL, 2 CT)

Collinearity Diagnostics[a]

Imputation Number	Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions condition (1 WL, 2 CT)	Variance Proportions wk0_phqtotal
Original data	1	1	2.556	1.000	.01	.01	.04
		2	.403	2.518	.01	.06	.70
		3	.040	7.950	.98	.93	.25
1	1	1	2.573	1.000	.01	.01	.05
		2	.385	2.586	.01	.06	.74
		3	.043	7.779	.98	.93	.21
2	1	1	2.545	1.000	.01	.01	.05
		2	.414	2.480	.01	.05	.72
		3	.041	7.843	.98	.93	.23

3	1	1	2.556	1.000	.01	.01	.05
		2	.402	2.522	.01	.06	.73
		3	.042	7.833	.98	.93	.23
4	1	1	2.575	1.000	.01	.01	.05
		2	.383	2.594	.01	.06	.75
		3	.043	7.765	.98	.93	.21
5	1	1	2.568	1.000	.01	.01	.05
		2	.390	2.568	.01	.06	.74
		3	.042	7.802	.98	.93	.22

a. Dependent Variable: wk11_phqtotal

Residuals Statistics[a]

Imputation Number		Minimum	Maximum	Mean	Std. Deviation	N
Original data	Predicted Value	-.6146	19.8688	7.8000	6.48283	25
	Residual	-7.69230	6.82782	.00000	3.52875	25
	Std. Predicted Value	-1.298	1.862	.000	1.000	25
	Std. Residual	-2.087	1.853	.000	.957	25
1	Predicted Value	-.6894	19.7069	7.5172	6.11729	29
	Residual	-7.46088	6.89241	.00000	3.40665	29
	Std. Predicted Value	-1.342	1.993	.000	1.000	29
	Std. Residual	-2.110	1.950	.000	.964	29
2	Predicted Value	-.6165	19.8664	7.4828	6.30427	29
	Residual	-7.68415	6.82889	.00000	3.28369	29
	Std. Predicted Value	-1.285	1.964	.000	1.000	29
	Std. Residual	-2.255	2.004	.000	.964	29

3	Predicted Value	-.8328	19.4836	7.1034	6.09174	29
	Residual	-7.77367	6.94877	.00000	3.61114	29
	Std. Predicted Value	-1.303	2.032	.000	1.000	29
	Std. Residual	-2.074	1.854	.000	.964	29
4	Predicted Value	-.9839	19.2669	7.1379	6.03332	29
	Residual	-7.25386	7.16533	.00000	3.66315	29
	Std. Predicted Value	-1.346	2.010	.000	1.000	29
	Std. Residual	-1.908	1.885	.000	.964	29
5	Predicted Value	-.8959	20.5363	7.8621	6.59814	29
	Residual	-8.55902	9.75422	.00000	3.83571	29
	Std. Predicted Value	-1.327	1.921	.000	1.000	29
	Std. Residual	-2.150	2.450	.000	.964	29
Pooled	Predicted Value			7.4207		29
	Residual			.00000		29
	Std. Predicted Value			.000		29
	Std. Residual			.000		29

a. Dependent Variable: wk11_phqtotal

Coefficients[a]

Imputation Number	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
			B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
Original data	1	(Constant)	13.882	2.789		4.977	.000	8.097	19.666		
		condition (1 WL, 2 CT)	-7.248	1.553	-.501	-4.669	.000	-10.468	-4.028	.903	1.107
		wk0_phqtotal	.529	.097	.582	5.430	.000	.327	.732	.903	1.107
1	1	(Constant)	13.481	2.421		5.570	.000	8.506	18.457		
		condition (1 WL, 2 CT)	-7.085	1.359	-.515	-5.215	.000	-9.878	-4.292	.935	1.070
		wk0_phqtotal	.532	.090	.587	5.946	.000	.348	.717	.935	1.070
2	1	(Constant)	13.866	2.360		5.875	.000	9.015	18.717		
		condition (1 WL, 2 CT)	-7.241	1.324	-.518	-5.467	.000	-9.964	-4.519	.914	1.094
		wk0_phqtotal	.530	.086	.584	6.161	.000	.353	.706	.914	1.094
3	1	(Constant)	11.888	2.590		4.591	.000	6.565	17.211		
		condition (1 WL, 2 CT)	-6.360	1.452	-.457	-4.382	.000	-9.344	-3.377	.920	1.086
		wk0_phqtotal	.558	.095	.611	5.865	.000	.363	.754	.920	1.086
4	1	(Constant)	12.576	2.597		4.842	.000	7.237	17.915		
		condition (1 WL, 2 CT)	-6.780	1.459	-.489	-4.647	.000	-9.779	-3.781	.937	1.067
		wk0_phqtotal	.539	.096	.590	5.610	.000	.341	.736	.937	1.067
5	1	(Constant)	15.931	2.736		5.824	.000	10.308	21.554		
		condition (1 WL, 2 CT)	-8.413	1.534	-.561	-5.485	.000	-11.567	-5.260	.930	1.075
		wk0_phqtotal	.521	.101	.526	5.148	.000	.313	.729	.930	1.075
Pooled	1	(Constant)	13.549	3.053		4.438	.000	7.392	19.705		
		condition (1 WL, 2 CT)	-7.176	1.658		-4.329	.000	-10.492	-3.860		
		wk0_phqtotal	.536	.095		5.643	.000	.350	.722		

a. Dependent Variable: wk11_phqtotal

Parent anxiety

Model Summary[b]

Imputation Number	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Original data	1	.781[a]	.610	.575	4.74357
1	1	.719[a]	.517	.480	4.99859
2	1	.777[a]	.604	.573	4.56062
3	1	.781[a]	.611	.581	4.55601
4	1	.702[a]	.493	.454	5.14047
5	1	.813[a]	.661	.635	4.39347

a. Predictors: (Constant), wk0_gadtotal, condition (1 WL, 2 CT)

b. Dependent Variable: wk11_gadtotal

ANOVA[a]

Imputation Number	Model		Sum of Squares	df	Mean Square	F	Sig.
Original data	1	Regression	775.412	2	387.706	17.230	.000[b]
		Residual	495.032	22	22.501		
		Total	1270.444	24			
1	1	Regression	696.459	2	348.229	13.937	.000[b]
		Residual	649.633	26	24.986		
		Total	1346.092	28			
2	1	Regression	823.310	2	411.655	19.792	.000[b]

		Residual	540.782	26	20.799		
		Total	1364.092	28			
3	1	Regression	846.104	2	423.052	20.381	.000[b]
		Residual	539.689	26	20.757		
		Total	1385.793	28			
4	1	Regression	668.758	2	334.379	12.654	.000[b]
		Residual	687.035	26	26.424		
		Total	1355.793	28			
5	1	Regression	980.155	2	490.078	25.389	.000[b]
		Residual	501.868	26	19.303		
		Total	1482.023	28			

a. Dependent Variable: wk11_gadtotal

b. Predictors: (Constant), wk0_gadtotal, condition (1 WL, 2 CT)

Collinearity Diagnostics[a]

Imputation Number	Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions condition (1 WL, 2 CT)	Variance Proportions wk0_gadtotal
Original data	1	1	2.608	1.000	.01	.01	.04
		2	.353	2.716	.01	.07	.67
		3	.039	8.183	.98	.92	.29
1	1	1	2.583	1.000	.01	.01	.04
		2	.378	2.613	.01	.06	.67
		3	.039	8.142	.98	.93	.28
2	1	1	2.561	1.000	.01	.01	.04

		2	.400	2.530	.01	.06	.66
		3	.038	8.184	.98	.93	.30
3	1	1	2.570	1.000	.01	.01	.04
		2	.392	2.560	.01	.06	.66
		3	.038	8.179	.98	.93	.29
4	1	1	2.557	1.000	.01	.01	.04
		2	.405	2.513	.01	.06	.66
		3	.038	8.184	.98	.93	.30
5	1	1	2.577	1.000	.01	.01	.04
		2	.385	2.588	.01	.06	.67
		3	.039	8.165	.98	.93	.29

a. Dependent Variable: wk11_gadtotal

Residuals Statistics[a]

Imputation Number		Minimum	Maximum	Mean	Std. Deviation	N
Original data	Predicted Value	.4197	16.4246	7.9333	5.68409	25
	Residual	-10.39325	9.33777	.00000	4.54162	25
	Std. Predicted Value	-1.322	1.494	.000	1.000	25
	Std. Residual	-2.191	1.969	.000	.957	25
1	Predicted Value	1.1792	14.5818	7.4598	4.98734	29
	Residual	-10.17993	9.26354	.00000	4.81676	29
	Std. Predicted Value	-1.259	1.428	.000	1.000	29
	Std. Residual	-2.037	1.853	.000	.964	29
2	Predicted Value	.6472	15.5240	7.4598	5.42254	29
	Residual	-10.01786	9.62049	.00000	4.39473	29

	Std. Predicted Value	-1.256	1.487	.000	1.000	29
	Std. Residual	-2.197	2.109	.000	.964	29
3	Predicted Value	.3778	15.7369	7.3908	5.49709	29
	Residual	-9.77382	9.94515	.00000	4.39028	29
	Std. Predicted Value	-1.276	1.518	.000	1.000	29
	Std. Residual	-2.145	2.183	.000	.964	29
4	Predicted Value	1.2771	14.6493	7.3908	4.88715	29
	Residual	-10.06720	9.83871	.00000	4.95348	29
	Std. Predicted Value	-1.251	1.485	.000	1.000	29
	Std. Residual	-1.958	1.914	.000	.964	29
5	Predicted Value	.2149	16.6113	7.7701	5.91655	29
	Residual	-10.52658	9.21387	.00000	4.23366	29
	Std. Predicted Value	-1.277	1.494	.000	1.000	29
	Std. Residual	-2.396	2.097	.000	.964	29
Pooled	Predicted Value			7.4943		29
	Residual			.00000		29
	Std. Predicted Value			.000		29
	Std. Residual			.000		29

a. Dependent Variable: wk11_gadtotal

Coefficients[a]

Imputation Number	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
			B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
Original data	1	(Constant)	17.529	3.693		4.746	.000	9.870	25.187		
		condition (1 WL, 2 CT)	-8.554	2.004	-.600	-4.268	.000	-12.711	-4.397	.897	1.114
		wk0_gadtotal	.355	.145	.344	2.452	.023	.055	.655	.897	1.114
1	1	(Constant)	17.109	3.598		4.756	.000	9.714	24.504		
		condition (1 WL, 2 CT)	-7.965	1.967	-.584	-4.048	.000	-12.009	-3.921	.891	1.122
		wk0_gadtotal	.259	.139	.269	1.865	.073	-.026	.544	.891	1.122
2	1	(Constant)	16.797	3.305		5.082	.000	10.003	23.591		
		condition (1 WL, 2 CT)	-8.075	1.812	-.588	-4.457	.000	-11.800	-4.351	.875	1.143
		wk0_gadtotal	.324	.126	.340	2.577	.016	.066	.582	.875	1.143
3	1	(Constant)	16.364	3.298		4.962	.000	9.585	23.142		
		condition (1 WL, 2 CT)	-7.993	1.805	-.578	-4.428	.000	-11.703	-4.283	.880	1.137
		wk0_gadtotal	.351	.126	.363	2.779	.010	.091	.610	.880	1.137
4	1	(Constant)	15.797	3.727		4.239	.000	8.137	23.457		
		condition (1 WL, 2 CT)	-7.260	2.045	-.531	-3.550	.001	-11.463	-3.056	.873	1.146
		wk0_gadtotal	.291	.141	.308	2.063	.049	.001	.581	.873	1.146
5	1	(Constant)	17.975	3.173		5.666	.000	11.454	24.496		
		condition (1 WL, 2 CT)	-8.880	1.735	-.621	-5.118	.000	-12.447	-5.313	.885	1.130
		wk0_gadtotal	.358	.122	.356	2.933	.007	.107	.609	.885	1.130
Pooled	1	(Constant)	16.808	3.541		4.746	.000	9.859	23.758		
		condition (1 WL, 2 CT)	-8.035	1.979		-4.059	.000	-11.926	-4.143		
		wk0_gadtotal	.317	.139		2.282	.023	.044	.589		

a. Dependent Variable: wk11_gadtotal

Parent general mental health

Model Summary[b]

Imputation Number	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Original data	1	.871[a]	.759	.737	6.15295
1	1	.863[a]	.744	.725	6.01000
2	1	.836[a]	.698	.675	6.95054
3	1	.823[a]	.677	.652	6.67295
4	1	.873[a]	.762	.743	5.98104
5	1	.883[a]	.780	.764	5.79158

a. Predictors: (Constant), wk0_ghqtotal, condition (1 WL, 2 CT)

b. Dependent Variable: wk11_ghqtotal

ANOVA[a]

Imputation Number	Model		Sum of Squares	df	Mean Square	F	Sig.
Original data	1	Regression	2617.881	2	1308.940	34.574	.000[b]
		Residual	832.894	22	37.859		
		Total	3450.775	24			
1	1	Regression	2732.827	2	1366.414	37.830	.000[b]
		Residual	939.122	26	36.120		
		Total	3671.950	28			
2	1	Regression	2905.330	2	1452.665	30.070	.000[b]
		Residual	1256.062	26	48.310		

		Total	4161.392	28			
3	1	Regression	2422.407	2	1211.204	27.201	.000[b]
		Residual	1157.736	26	44.528		
		Total	3580.143	28			
4	1	Regression	2973.662	2	1486.831	41.563	.000[b]
		Residual	930.093	26	35.773		
		Total	3903.755	28			
5	1	Regression	3100.423	2	1550.211	46.216	.000[b]
		Residual	872.103	26	33.542		
		Total	3972.526	28			

a. Dependent Variable: wk11_ghqtotal

b. Predictors: (Constant), wk0_ghqtotal, condition (1 WL, 2 CT)

Collinearity Diagnostics[a]

Imputation Number	Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions condition (1 WL, 2 CT)	Variance Proportions wk0_ghqtotal
Original data	1	1	2.737	1.000	.01	.01	.02
		2	.234	3.422	.00	.14	.48
		3	.029	9.632	.99	.85	.50
1	1	1	2.737	1.000	.01	.01	.02
		2	.230	3.451	.01	.14	.55
		3	.033	9.078	.99	.85	.43
2	1	1	2.733	1.000	.01	.01	.02
		2	.235	3.407	.01	.13	.52

		3	.031	9.343	.99	.86	.46
3	1	1	2.728	1.000	.01	.01	.02
		2	.241	3.365	.00	.13	.51
		3	.031	9.425	.99	.86	.47
4	1	1	2.736	1.000	.01	.01	.02
		2	.233	3.430	.01	.14	.53
		3	.032	9.257	.99	.85	.45
5	1	1	2.735	1.000	.01	.01	.02
		2	.233	3.427	.01	.14	.52
		3	.032	9.273	.99	.85	.45

a. Dependent Variable: wk11_ghqtotal

Residuals Statistics[a]

Imputation Number		Minimum	Maximum	Mean	Std. Deviation	N
Original data	Predicted Value	7.6883	44.4860	23.9376	10.44406	25
	Residual	-11.21900	10.21618	.00000	5.89100	25
	Std. Predicted Value	-1.556	1.967	.000	1.000	25
	Std. Residual	-1.823	1.660	.000	.957	25
1	Predicted Value	8.9191	42.9869	24.1830	9.87932	29
	Residual	-10.79689	11.01840	.00000	5.79138	29
	Std. Predicted Value	-1.545	1.903	.000	1.000	29
	Std. Residual	-1.796	1.833	.000	.964	29
2	Predicted Value	7.7579	45.2920	23.7472	10.18635	29
	Residual	-13.99560	13.26998	.00000	6.69771	29
	Std. Predicted Value	-1.570	2.115	.000	1.000	29

	Std. Residual	-2.014	1.909	.000	.964	29
3	Predicted Value	9.4580	41.6008	23.4904	9.30132	29
	Residual	-14.95517	12.30575	.00000	6.43022	29
	Std. Predicted Value	-1.509	1.947	.000	1.000	29
	Std. Residual	-2.241	1.844	.000	.964	29
4	Predicted Value	7.0223	44.3254	23.2249	10.30545	29
	Residual	-11.17213	10.66248	.00000	5.76347	29
	Std. Predicted Value	-1.572	2.048	.000	1.000	29
	Std. Residual	-1.868	1.783	.000	.964	29
5	Predicted Value	7.0017	44.6786	23.4443	10.52280	29
	Residual	-11.12465	10.20926	.00000	5.58091	29
	Std. Predicted Value	-1.563	2.018	.000	1.000	29
	Std. Residual	-1.921	1.763	.000	.964	29
Pooled	Predicted Value			23.6180		29
	Residual			.00000		29
	Std. Predicted Value			.000		29
	Std. Residual			.000		29

a. Dependent Variable: wk11_ghqtotal

Coefficients[a]

Imputation Number	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
			B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
Original data	1	(Constant)	26.140	5.683		4.599	.000	14.354	37.926		
		condition (1 WL, 2 CT)	-10.294	2.705	-.438	-3.805	.001	-15.905	-4.684	.829	1.206
		wk0_ghqtotal	.427	.083	.593	5.158	.000	.256	.599	.829	1.206
1	1	(Constant)	30.083	4.847		6.207	.000	20.121	40.046		
		condition (1 WL, 2 CT)	-11.492	2.375	-.510	-4.840	.000	-16.374	-6.611	.885	1.131
		wk0_ghqtotal	.364	.071	.543	5.153	.000	.219	.509	.885	1.131
2	1	(Constant)	19.945	5.775		3.454	.002	8.075	31.815		
		condition (1 WL, 2 CT)	-7.312	2.794	-.305	-2.617	.015	-13.055	-1.569	.855	1.170
		wk0_ghqtotal	.487	.085	.670	5.752	.000	.313	.662	.855	1.170
3	1	(Constant)	27.930	5.594		4.993	.000	16.432	39.428		
		condition (1 WL, 2 CT)	-10.124	2.703	-.455	-3.746	.001	-15.679	-4.569	.842	1.188
		wk0_ghqtotal	.355	.082	.528	4.340	.000	.187	.523	.842	1.188
4	1	(Constant)	23.134	4.922		4.700	.000	13.016	33.252		
		condition (1 WL, 2 CT)	-9.190	2.389	-.396	-3.847	.001	-14.101	-4.279	.865	1.155
		wk0_ghqtotal	.453	.072	.646	6.280	.000	.305	.602	.865	1.155
5	1	(Constant)	25.034	4.775		5.243	.000	15.220	34.849		
		condition (1 WL, 2 CT)	-10.127	2.316	-.432	-4.373	.000	-14.888	-5.367	.864	1.158
		wk0_ghqtotal	.444	.070	.627	6.342	.000	.300	.588	.864	1.158
Pooled	1	(Constant)	25.225	6.782		3.720	.001	11.214	39.237		
		condition (1 WL, 2 CT)	-9.649	3.037		-3.178	.003	-15.779	-3.519		
		wk0_ghqtotal	.421	.099		4.236	.000	.216	.626		

a. Dependent Variable: wk11_ghqtotal