

The effectiveness of psychological interventions for post-traumatic stress disorder in children, adolescents and young adults: A Systematic Review and Meta-Analysis

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Abstract

Background

Children and adolescents display different symptoms of posttraumatic stress disorder (PTSD) than adults. Whilst evidence for the effectiveness of psychological interventions has been synthesised for adults, this is not directly applicable to younger people. Therefore, this systematic review and meta-analysis synthesised studies investigating the effectiveness of psychological interventions for PTSD in children, adolescents and young adults. It provides an update to a previous review investigating interventions in children and adolescents, whilst investigating young adults for the first time.

Methods

We searched published and grey literature to obtain randomised control trials assessing psychological interventions for PTSD in young people published between 2011 and 2019. Quality of studies was assessed using the Cochrane Risk of Bias tool. Data was analysed using univariate random-effects meta-analysis.

Results

From 15,373 records, 27 met criteria for inclusion, and 16 were eligible for meta-analysis. There was a medium pooled effect size for all psychological interventions [$d=-0.44$, 95% CI (-0.68 to -0.20)], as well as for Trauma-Focused Cognitive Behavioural Therapy (TF-CBT) and Eye Movement Desensitisation and Reprocessing (EMDR) [$d=-0.30$, 95% CI (-0.58 to -0.02); $d=-0.46$, 95% CI (-0.81 to -0.12)].

Conclusions

Some, but not all, psychological interventions commonly used to treat PTSD in adults were effective in children, adolescents and young adults. Interventions specifically adapted for younger people were also effective. Our results support the

National Institute for Health and Care Excellence guidelines which suggest children and adolescents be offered TF-CBT as a first line treatment because of a larger evidence base, despite EMDR being more effective.

Main manuscript (4572 words)

Adverse experiences during childhood (age 3-12) and adolescence (age 13-18) are a risk factor for developing post-traumatic stress disorder (PTSD) and other adverse mental health outcomes (Ehlert, 2013; Heim & Nemeroff, 2001), including disruption of brain maturation and attachment as well as forming negative schemas (Eiland & Romeo, 2013; O'Dougherty Wright, Crawford, & Del Castillo, 2009; Styron & Janoff-Bulman, 1997). To prevent these negative outcomes effective PTSD treatment is essential.

PTSD is characterised by intrusive recollections of a traumatic event such as flashbacks and nightmares, avoidance of trauma-related stimuli, changes in affect and cognitions, and hyperarousal symptoms such as hypervigilance (DSM-5, American Psychiatric Association [APA], 2013). Children and adolescents may also experience symptoms including developmental regression, trauma-specific reenactment in play and changes in their arousal or reactivity, including externalising behaviour such as temper tantrums (APA, 2013). Interventions need to not only effectively treat these symptoms of PTSD but also need to be developmentally appropriate to be effective with this population (Baggerly & Exum, 2008). This can include being flexible with the content of treatment sessions based on the participant's attention span and their developmental level or including caregivers where appropriate (Foa, Chrestman, & Gilboa-Schechtman, 2008; Nevo & Manassis, 2011).

Effectiveness of PTSD interventions in children and adolescents was previously summarised in a systematic review (Gillies, Taylor, Gray, O'Brien, & D'Abrew, 2012). This review demonstrated effectiveness of psychological interventions, most notably CBT. However, this review only included a small number of studies (14) generally with low numbers of participants and was published in 2012, containing literature published up until 2011. We therefore aimed to update this review as well as expand it. Since publication of the previous review, other studies have been carried out examining the effectiveness of psychological interventions for PTSD in children and adolescents. In one study, the effect sizes for PTSD symptom change ranged from large to small depending on the control condition of the study. Cognitive Behavioural Therapy (CBT) was found to be the most effective at reducing PTSD symptoms, particularly when parents were included (Guttermann et al., 2016). In another study, Trauma Focused (TF) -CBT in particular showed large effects at reducing PTSD symptoms after treatment compared to waitlist controls. Eye Movement Desensitisation and Reprocessing (EMDR) was also found to be effective but to a lesser extent (Mavranouzouli et al., 2019).

In addition to children and adolescents, the present review included interventions in young adults, up to 25 years of age. As brain maturation continues into the early twenties (Pfefferbaum et al., 1994; Steinberg, 2014) this systematic review and meta-analysis investigated the effectiveness of PTSD interventions in young adults, as well as children and adolescents.

The primary aim of the present review was therefore to evaluate the efficacy of psychological interventions for PTSD in children, adolescents and young adults and determine if there is a superiority of any intervention. A secondary aim was to evaluate the efficacy of psychological interventions in children compared with psychological interventions in adolescents and young adults.

Methods

Search strategy and selection criteria

This systematic review and meta-analysis followed PRISMA guidelines. Our protocol was registered with PROSPERO (CRD42019141619). We systematically searched Embase, Medline and PsycINFO as well as Open Grey and Google Scholar to find relevant grey literature. We manually searched biographies of included citations. The final search was run on 17th July 2019 and included free-text and Medical Subject Headings (MeSH) terms and was adapted for each database (see supplementary methods). The search was limited to studies carried out in humans and published in the English language between 2011 and 2019, to systematically evaluate studies published after the previous systematic review (Gillies et al., 2012).

PICOS Criteria

Studies were considered eligible if they contained data from a randomised control trial (RCT) investigating the effectiveness of any psychological intervention in children (3-12 years of age), adolescents (13-18 years) or young adults (19-25 years) diagnosed with PTSD. Studies were included only if all participants were aged 3- 25. Authors were contacted for confirmation if necessary. Our primary outcome was reduction of PTSD symptoms on a validated scale. We included randomised control trials as well as cluster randomised control trials, but not matched control studies. We listed secondary outcomes investigated by the studies included in our systematic review but did not synthesise these. Included studies used various diagnostic classifications to assess PTSD including Diagnostic and Statistical Manual of Mental disorders (DSM) versions DSM-III, DSM-IV, DSM-IV-TR and DSM-5. We assumed sufficient commonalities to pool effect sizes.

Studies with participants with comorbid conditions were included, as were studies with participants with subthreshold symptoms, as subthreshold PTSD can generate distressing symptoms requiring similar levels of treatment to full PTSD (Carlier & Gersons, 1995; Foa, Riggs, & Gershuny, 1995).

We included any study investigating a psychological therapy, including psychoeducation, as this has shown to be effective at reducing PTSD symptoms compared to those who didn't receive psychoeducation (Oflaz, Hatipoglu, & Aydin., 2008). Included studies had to have a control group, including an alternative intervention, treatment as usual, waiting list control or no treatment.

Exclusion Criteria

Studies were excluded if they included samples within one month of trauma exposure, as they are not able to meet diagnostic criterion F according to DSM-5 (APA, 2013) and research consistently shows that the majority of individuals will recover naturally within the first few weeks after a trauma (Friedman, Resick, Bryant & Brewin, 2011). Conference papers and studies reporting data from other studies were excluded, as these did not include sufficient information to assess suitability. Studies with mixed participants who were young people and adults (i.e.: age range 15-40) were excluded.

Data extraction and analysis

Two authors (RJ-BB and MK) extracted data independently. Study-level data about study characteristics, rate-level data about treatment effects and meta-level data on study design and study quality were recorded in a standardized spreadsheet (see supplementary materials). Quality of yield was assessed using Cochrane Risk of bias tool. Studies assessing the effectiveness of interventions through improvement from a diagnosis of

PTSD ascertained via diagnostic interviews or via validated self-report PTSD scales were included in this review. Where available, we extracted summary-level data on effect sizes by age group (children, adolescents, young adults) and type of intervention used. We assessed small study effects (including publication bias) through visual inspection of a funnel plot and use of Egger's test where possible (Harbord, Harris & Sterne, 2009).

Measures of treatment effect

Based on the previous meta-analysis, we anticipated a high level of heterogeneity and specified use of random-effects meta-analysis. We calculated Cohen's D effect size for each study using means and standard deviations of post-intervention PTSD symptoms. When no standard deviation was reported, we computed the standard error using 95% confidence intervals. We pooled Cohen's D effect sizes when 3 or more studies were available, grouping studies by intervention.

We assessed statistical heterogeneity using the Q-test and quantified using the I^2 statistic, which identifies the proportion of the observed variance that reflects real differences in effect size. We carried out subgroup analysis by comparing the effectiveness of different psychological interventions to each other when more than two studies assessed the effectiveness of any particular intervention (Valentine, Pigott, & Rothstein, 2010). We also carried out subgroup analysis comparing the effects of treatment on children (all participants under the age of 12) compared with the effects of the same treatment on adolescents and young adults (participants between age 13 and 25) (Curtis, 2015; Jawroska & MacQueen, 2015).

We checked for normality of data and conducted a sensitivity analysis with only those studies including normally distributed data.

Results

Characteristics of Included Studies

We retrieved 15,155 studies, of which 27 met our inclusion criteria (see Figure 1). We achieved good inter-rater reliability between the two reviewers at ‘title and abstract’ and ‘full text’ screening stages ($k=0.714, p < 0.001$; $k=1.000, p < 0.001$).

The 27 eligible studies included 2,187 participants. Included studies had child populations ($n=3, 11\%$), adolescent and young adult populations ($n=7, 26\%$) and mixed populations ($n=17, 63\%$; Table 1). As indicated in Table 1, four studies (15%) included participants exposed to warfare (Barron, Abdallah, & Smith, 2013; Barron, Abdalla, & Heltne, 2016; Dawson et al., 2018; Ertl, Pfeiffer, Elbert, & Neuner, 2011). In these studies, the most frequently reported traumas were witnessing someone being killed and being used as a human shield. Two studies (7%) included participants exposed to natural disasters (Chen et al., 2014; De Roos et al., 2011). Chen et al. (2014) did not report the types of trauma participants were exposed to except the inclusion criteria: losing a parent in the earthquake. In De Roos et al. (2011), the most reported traumas were thinking they were going to die. Six studies (22%) included participants exposed to abuse (Church, Piña, Reategui, & Brooks, 2012; Cohen, Mannarino, & Iyengar, 2011; Deblinger, Mannarino, Cohen, Runyon, & Steer, 2011; Dorsey et al., 2014; Foa, McLean, Capaldi, & Rosenfield, 2013; Rosner et al., 2019). Two studies reported on sexual abuse (Deblinger et al., 2011; Foa et al., 2013) and one study on exposure to intimate partner violence specifically (Cohen et al., 2011).

Trauma Focused-Cognitive Behavioural therapy (TF-CBT) was the most commonly researched intervention with thirteen studies (48%, see Table 1) evaluating its effectiveness. A further two studies (7%) investigated the effectiveness of Teaching

Recovery Techniques (TRT), an intervention program based on cognitive behavioural principles and three studies (11%) investigated the effectiveness of standard (non-trauma-focused) CBT. In addition to TF-CBT, three studies investigated Prolonged Exposure (PE) (11%), three studies investigated Eye Movement Desensitisation and Reprocessing (EMDR) (11%) and one study investigated Narrative Exposure Therapy (NET) (4%).

Twenty-four studies investigated the effectiveness of the intervention on additional outcomes besides PTSD symptoms or diagnosis (all except Church et al., 2012; Pityaratstian et al., 2015; Schottelkorb, Doumas, & Garcia, 2012). The most common secondary outcome assessed was depressive symptoms (n=22). A table displaying key findings for the effectiveness of the psychological interventions for the additional outcomes can be seen in supplementary materials.

Quality of Included Studies

As indicated in Table 2, one study was rated as Low risk of bias (4%), sixteen studies were rated as having some concerns (59%) and ten studies were rated as having high risk of bias (37%). All studies used valid and reliable outcome measures, however, only nineteen studies reported using blind assessors at follow up (70%). There was a high risk of bias in three studies (11%) regarding deviations from the intended interventions, six studies (22%) regarding missing outcome data and three studies (11%) regarding risk of bias in measurement of the outcome. One study (4%) had risk of bias in selection of the reported result (full results in Table 2).

Meta-analysis

The meta-analysis included sixteen studies (59%) (Barron et al., 2016; Chen et al., 2014; Church et al., 2012; Cohen et al., 2011; De Roos et al., 2011; De Roos et al., 2017; Diehle, Opmeer, Boer, Mannarino, & Lindauer, 2014; Ertl et al., 2011; Foa et al., 2013; Ford, Steinberg, Hawke, Levine, & Zhang, 2012; Goldbeck, Muche, Sachser,

Tutus, & Rosner, 2016; Jensen et al., 2014; Nixon, Sterk, & Pearce, 2012; Pityaratstian et al., 2015; Scheeringa, Weems, Cohen, Amaya-Jackson, & Guthrie, 2011; Schottelkorb et al., 2012). For the remaining eleven studies (39%) insufficient data was available to be able to include them (Barron et al., 2013; Dawson et al., 2018; Deblinger et al., 2011; Dorsey et al., 2014; Mannarino, Cohen, Deblinger, Runyon, & Steer, 2012; Murray et al., 2015; Nixon et al., 2017; Pfeiffer et al., 2018; Rosner et al., 2019; Roussouw et al., 2016; Roussouw, Yadin, Alexander, & Seedat, 2018).

Negative effect sizes indicate superiority of the intervention over the control condition at reducing PTSD symptoms, positive effect sizes the opposite. The individual effect sizes for the sixteen eligible studies can be seen in supplementary materials.

Pooling nineteen effect sizes from sixteen studies showed psychological interventions were better than control conditions at reducing PTSD symptoms [$d=-0.44$, 95% CI (-0.68 to -0.20)] (see Figure 2). There was moderate heterogeneity between the studies ($I^2=70.1\%$). This heterogeneity was anticipated given temporal, geographic and methodological differences and also justifies the use of a random effects model.

Subgroup analyses

Ten studies were eligible for inclusion in the subgroup analysis investigating the effectiveness of specific interventions. Three studies investigated general (non-trauma-focused) CBT (Chen et al., 2014 ; De Roos et al., 2011; Pityaratstian et al., 2015) which was no more effective at reducing PTSD symptoms compared to the control conditions [$d=-0.09$, 95% CI (-0.49 to 0.30)]. There was low heterogeneity between the studies ($I^2=0\%$). Three studies investigated EMDR (De Roos et al., 2011; De Roos et al., 2017; Diehle et al., 2014). Seven studies investigated TF-CBT (Cohen et al., 2011; Diehle et

al., 2014; Goldbeck et al., 2016; Jensen et al., 2014; Nixon et al., 2012; Scheeringa et al., 2011; Schottelkorb et al., 2012). Both EMDR and TF-CBT was superior at reducing PTSD symptoms compared with general CBT. EMDR was superior at reducing PTSD symptoms compared with TF-CBT [$d=-0.46$, 95% CI (-0.81 to -0.12) vs $d=-0.30$, 95% CI (-0.58 to -0.02)] (see Figure 3). There was high heterogeneity between the EMDR studies ($I^2=85.9\%$) and low heterogeneity between the TF-CBT studies ($I^2=10.7\%$).

The subgroup analysis, pertaining to our secondary aim of comparing psychological interventions in children with psychological interventions in adolescents and young adults, included five effect sizes from four studies. One effect size was evaluating interventions in children exclusively (Scheeringa et al., 2011). Four effect sizes were evaluating interventions in adolescents and young adults exclusively (Ertl et al., 2011; Foa et al., 2013; Ford et al., 2012). Pooling the 4 effect sizes in adolescents and young adults, showed interventions were better than control conditions in reducing PTSD symptoms in adolescents and young adults [$d=-0.30$, 95% CI (-0.58 to -0.02)] (see Supplementary materials for forest plot). There was low heterogeneity between the studies included in this meta-analysis ($I^2=47.6\%$). The effect size for the only eligible study investigating the effectiveness of a psychological intervention in children was $d=-1.18$, 95% CI (-2.50 to 0.14).

Sensitivity analyses

Eight effect sizes from five studies with normally distributed data (Barron et al., 2016; Chen et al., 2014; De. Roos et al., 2017; Ertl et al., 2011; Pityaratstian et al., 2015) were entered into a sensitivity analysis. The pooled effect size was $d=-0.59$, 95% CI (-0.89 to -0.29) indicating a medium effect at reducing PTSD symptoms. There was

moderate heterogeneity between these studies ($I^2=53\%$) (see supplementary materials for forest plot).

A funnel plot was created to visually assess asymmetry and was plotted with negative effect sizes indicating superiority of the intervention (see supplementary materials). There was evidence of asymmetry and evidence of small study effects. The Egger's test demonstrated some evidence of small study effects [bias= 0.539 95% CI= -0.134 to 1.21), $p=0.109$]. This was driven by one outlier: Church et al. (2012). This study had a large effect size ($d=-8.54$) and small sample size ($n=16$). Once this study was removed there was no longer any evidence of a small study effects [bias= 0.299 95% CI= -0.982 to 0.158), $p=0.627$].

Discussion

Summary of main findings

This systematic review included 27 studies. The psychological intervention investigated most frequently was TF-CBT. Most studies had mixed populations spanning childhood, adolescents and young adulthood, although 7 studies investigated the effectiveness of a psychological intervention in adolescents and young adults exclusively and 3 studies investigated the effectiveness of interventions in children exclusively.

The meta-analysis included 16 eligible RCTs. There was a moderate effect of the included interventions at reducing PTSD symptoms in children, adolescents and young adults. TF-CBT and EMDR both had a moderate effect size and were superior to general (non trauma-focused) CBT at reducing PTSD symptoms in this population. EMDR had the greatest effect at reducing PTSD symptoms. Interventions for adolescents and young adults exclusively had a low effect on PTSD symptoms. In the one study eligible for the meta-analysis investigating psychological interventions for children exclusively, TF-CBT was no more effective than the waiting list control.

Comparison with existing literature

This review showed psychological interventions were superior to controls at reducing PTSD symptoms. Similarly, in Gillies et al. (2012) those receiving psychological therapies had a greater reduction in PTSD symptoms compared with the control interventions (SMD -1.05, 95% CI -1.52 to -0.58, $I^2=62$).

This review found EMDR to be most effective at reducing PTSD symptoms although with fewer studies investigating this intervention compared to TF-CBT. A previous meta-analysis looking at the effectiveness of EMDR for PTSD in children, found EMDR had a medium effect at reducing PTSD symptoms when this intervention was compared with non-established treatments and no-treatment controls ($d=0.56$; Rodenburg, Benjamin, De Roos, Meijer, & Stams, 2009). In contrast, in Gillies et al. (2012) there was no difference in reduction in PTSD symptoms between those receiving EMDR and those receiving the control condition in the only study investigating EMDR (SMD -0.61, 95% CI -1.96 to 0.74, $I^2=85\%$). This discrepancy may be due to inadequate power to detect differences between intervention groups; the only study in the Gillies et al. (2012) review had 33 participants.

The present review also supported the effectiveness of TF-CBT at reducing PTSD symptoms in children, adolescents and young adults. This has also been demonstrated to be effective in a systematic review by Cary and McMillen (2012) looking at the effectiveness of TF-CBT specifically, where TF-CBT was superior at reducing PTSD symptoms in children and youth compared with control conditions ($g=0.671$).

The sub-group analysis carried out in this systematic review found TF-CBT and EMDR both had a moderate effect at reducing PTSD symptoms, whilst general CBT was no more effective than the control interventions it was compared to. EMDR was the psychological intervention that had the greatest effect at reducing PTSD symptoms in

children, adolescents and young adults. Similarly in adults, trauma-focused psychological treatments including TF-CBT and EMDR have been found to be effective for PTSD in adults (Ehlers et al., 2010). Whereas, interventions not focusing on patients' trauma were less effective at reducing PTSD symptoms in adults or have not been sufficiently studied (Ehlers et al., 2010).

In contrast to the results of this review, in Gilles et al. (2012), general CBT was found to be superior to control conditions at reducing PTSD symptoms (SMD -1.34, 95% CI -1.79 to -0.89). General CBT was also found to have greater likelihood of recovery compared to EMDR in a systematic review looking at the effectiveness of PTSD interventions in adults, (RR=0.35, 95% CI 0.16 to 0.79, $p=0.01$). Furthermore, this systematic review found Trauma-Focused CBT to be more effective than EMDR at reducing PTSD symptoms unlike previous meta-analyses (Guttermann et al., 2016; Mavranezouli et al., 2019).

In this systematic review we found limited support for Narrative Exposure Therapy which is an established therapy for PTSD in adults. (Mendes, Mello, Ventura, Passarela, & Mari, 2008).

The quality of studies in this review is similar to the quality of included studies in the Gilles et al. (2012) systematic review where 59% of the included studies were rated as having some concerns for Risk of Bias.

Interpretation of findings

This review found a strong evidence base for the effectiveness of TF-CBT and some support for the effectiveness of EMDR, which provides further evidence and justification for the National Institute for Health and Care Excellence (NICE) guideline suggesting TF-CBT should be offered as a first line of treatment to children and adolescents who present with PTSD symptoms, with EMDR being offered if there is non-

response. The results of the subgroup analysis suggest that general (non-trauma-focused) CBT is no more effective at reducing PTSD symptoms than the interventions it was compared to. Previously, when comparing general CBT to non-active controls it was found to be effective for PTSD in children, adolescents and young adults. It may be that as CBT has previously been demonstrated to be effective at reducing PTSD symptoms compared to non-active controls, more recent studies included in this review have compared CBT to other active treatments, which may explain its lack of superiority to control conditions.

One included study provides evidence that group-based CBT is potentially effective at reducing PTSD symptoms in children, adolescents and young adults. In services with long waiting-lists or financial burden group interventions may be time and cost-effective as several patients can be treated with a small number of therapists (Gauthie, Dalziel, & Gauthier, 1987). This could be considered superior to patients remaining on waiting lists for individual treatment, but warrants further investigation, as group treatments for PTSD have not previously been recommended in NICE guidance.

The lack of clear evidence supporting the effectiveness of Narrative Exposure therapy in children, adolescents and young adults suggests that for some interventions simply using established protocols for adults may not be sufficient for PTSD symptom reduction. In some studies investigating Prolonged Exposure therapy there were adaptations made for children and adolescents (Foa et al., 2008). The individual studies found greater PTSD symptom reduction in Prolonged Exposure conditions compared to control conditions (Foa et al., 2013; Rossouw et al., 2016; Rossouw et al., 2018). It may be the case that adaptations, such as allowing flexibility for the counsellor to spend more time on modules depending on the adolescent's developmental level and attention span, were helpful in improving the effectiveness of the psychological interventions.

However, it may also be the case that small sample sizes made it difficult to detect small differences between intervention groups in some studies. More and larger individual RCTs are needed to assess the effectiveness of non TF-CBT interventions for PTSD in children, adolescents and young adults such as Prolonged Exposure therapy and Narrative Exposure Therapy as we found mixed results regarding their effectiveness from the included studies. Whilst this intervention may be effective in this population, as it is in adults, more research is needed with larger sample sizes in order to detect small differences between intervention groups, before its introduction to the clinic. In addition, a mega-analysis could be conducted which involves aggregating individual-participant data from multiple studies and analysing this data jointly (Boedhoe et al., 2018). This overcomes some limitations of traditional meta-analysis research including low statistical power to detect effects (Boedhoe et al., 2018).

There needs to be more research assessing the effectiveness of interventions in children, defined as aged 12 and under only. In the one study which met our criteria for inclusion in the subgroup analysis: where all participants were children between 3 and 12, they defined their population as pre-school children. The majority of the included studies in this review included participants spanning childhood and adolescence. The effect of an intervention may be generalised across the whole sample in mixed population studies, when it may be more effective at particular developmental stages. This meant it was difficult to achieve the second aim of this review and to evaluate the efficacy of psychological interventions in children compared to in adolescents and young adults. This research is necessary especially as PTSD manifests differently in children compared with adults (DSM-5, APA, 2013) and therefore by inference between children and young adults. PTSD symptoms may also manifest differently in pre-school children, as used in the study by Scheeringa et al., and children more generally.

In addition, further research investigating the effectiveness of psychological interventions at improving PTSD symptoms in children, adolescents and young adults could look at the young person in the broader context they are involved such as family systems and the school environment. Research has previously shown that including caregivers improves the effectiveness of psychological interventions in children and adolescents (Nevo & Manassis, 2011). It may be the case that including school networks during psychological interventions also has a beneficial impact on PTSD symptoms.

Strengths and limitations

This is the most up-to-date, comprehensive and largest systematic review and meta-analysis of psychological interventions for PTSD in children, adolescents and young adults carried out to date. Furthermore, PRISMA guidelines were followed throughout and a completed PRISMA checklist can be viewed in supplementary materials. These guidelines ensure clarity, transparency and key information is properly reported (Liberati et al., 2009) making the review, which provides up to date evidence, useful for both policy and clinical practice. Lastly, the sensitivity analysis also demonstrated a moderate effect of the interventions on PTSD symptoms. A sensitivity analysis, with similar results to the primary analysis, demonstrates the findings from this meta-analysis are not dependent on arbitrary decisions and indicates robust findings (Higgins & Green, 2011).

This study should also be considered in light of its weaknesses. First, the inclusion criteria were limited to studies in English as it was not feasible to translate non-English studies. This could theoretically lead to inflation of effect sizes due to negative results being more likely to be published in languages other than English (Grégoire et al., 1995). However, research examining this language bias has conflicting results and there are

suggestions the effect of studies published in non-English language in a meta-analysis may be minimal (Higgins & Green, 2011). Furthermore, the funnel plot and Egger's test indicated no evidence of small study effects after removal of a single outlier.

A further limitation is that not all included studies had participants with diagnosed PTSD; some had participants with subthreshold PTSD symptoms. This may reduce the external validity of this research as findings regarding the effectiveness of these interventions may not be applicable to clinical PTSD populations. However, it has been suggested subthreshold PTSD symptoms are often clinically significant and do require treatment (McLaughlin et al., 2015).

Third, the evidence base is still limited particularly for non-CBT interventions. A small number of studies (n=14) investigated such interventions creating uncertainty regarding the precision with which their efficacy could be estimated. Furthermore, some studies had a small sample size which reduces the power to detect differences in PTSD symptoms between the groups following interventions (Donner, 1984). Therefore, it is possible there were differences in PTSD symptoms between groups but due to inadequate power, these differences were missed. Nevertheless, this is still the largest systematic review and meta-analysis to date looking at the effectiveness of psychological interventions in children, adolescents and young adults. Therefore, this review had more statistical power to detect differences between intervention groups than other reviews carried out previously.

Conclusion

The primary aim of this review: to evaluate the efficacy of psychological interventions for PTSD in children, adolescents and young adults and determine if there is superiority of any intervention, was met. Though hampered by a relatively small

number of included studies and small sample sizes, this systematic review and meta-analysis provides evidence for the effectiveness of a range of psychological interventions for reducing PTSD symptoms in children, adolescents and young adults particularly TF-CBT and EMDR.

A secondary aim was to evaluate the efficacy of psychological interventions in children compared with psychological interventions in adolescents and young adults. As there were limited studies assessing the effectiveness of psychological interventions in children we were unable to meet this aim. This review did demonstrate established treatments for adults should not be assumed to be effective in children, adolescents and young adults such as Narrative Exposure Therapy with no adaptations to the study protocol specifically targeted towards children. Furthermore, interventions that are not currently recommended for PTSD in adults such as group CBT might be effective in children, adolescents and young adults, however only a small number of individual studies looked at these interventions so conclusions should be drawn in light of this.

Overall, the present review suggests that current NICE guidelines are appropriate, that interventions not currently recommended for use in children, adolescents and young adults might be suitable for this age group, and that there is a clear need for further research into the effectiveness of psychological treatments for PTSD in this age group.

References

- Aarts, S., Van den Akker, M., & Winkens, B. (2014). The importance of effect sizes. *European Journal of General Practice, 20* (1), 61-64.
- American Psychological Association (2002). *Developing adolescents: A reference for professionals*. Washington, DC: American Psychological Association.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Andersen, S.L., & Navalta, C.P. (2004). Altering the course of neurodevelopment: a framework for understanding the enduring effects of psychotropic drugs. *International Journal of Developmental Neuroscience, 22*, 423-440.
- Baggerly, J., & Exum, H.A. (2008). Counseling Children after natural disasters: Guidance for family therapists. *The American Journal of Family Therapy, 36* (1), 79-83.
- Barron, I.G., Abdallah, G., & Smith, P. (2013). Randomized Control Trial of a CBT Trauma Recovery Program in Palestian Schools. *Journal of Loss and Trauma, 18*, 4, 306-321.
- Barron, I., Abdallah, G., & Heltne, U. (2016). Randomized Control Trial of Teaching Recovery Techniques in Rural Occupied Palestine: Effect on Adolescent Dissociation. *Journal of Aggression, Maltreatment and Trauma, 25*(9), 955-973.
- Barton, S. (2000). Which Clinical studies provide the best evidence? *British Medical Journal, 321*, 255.
- Bedi, S., Nelson, E.C., Lynskey, M.T., McCutcheon, V.V., Heath, A.C., Madden, P.A.F., & Martin, N.CG. (2011). Risk for Suicidal Thoughts and Behaviour after

- Childhood Sexual Abuse in Women and Men. *Suicide and Life Threatening Behaviour*, 41 (4), 406-415.
- Benjet, C., Bromet, E., Karam, E.G., Kessler, R.C., McLaughlin, K.A., Ruscio, A.M., ... Koenen, K.C. (2016). The epidemiology of traumatic event exposure worldwide: results from the World Mental Health Survey Consortium. *Psychological Medicine*, 46 (2), 327-343.
- Blagys, M.D., & Hilsenroth, M.J. (2000). Distinctive features of short-term psychodynamic- interpersonal psychotherapy: A review of the Comparative Psychotherapy process literature. *Journal of Clinical Psychology*, 7, 167-188.
- Boedhoe, P.S.W., Heymans, M.W., Schmaal, L., Abe, Y., Alonso, P., Ameis, S.H...Twisk, J.W.R. (2018). An Empirical Comparison of Meta- and Mega-Analysis with data from the ENIGMA Obsessive-Compulsive Disorder Working Group. *Frontiers in Neuroinformatics*, 12, 102. doi: [10.3389/fninf.2018.00102](https://doi.org/10.3389/fninf.2018.00102)
- Bowlby, J. (1988). *A secure base: Parent-child attachment and healthy human development*. New York, NY, US: Basic Books.
- Bryant, R.A., Sackville, T., Dang, S.T., Moulds, M., & Guthrie, R. (1999). Treating Acute Stress Disorder: An Evaluation of Cognitive Behaviour Therapy and Supportive Counselling Techniques. *American Journal of Psychiatry*, 156, 1780-1786.
- Cary, C.E., & McMillen, J.C. (2012). The data behind the dissemination: A systematic review of trauma-focused behavioural therapy for use with children and youth. *Children and Youth Services Review*, 34, 748-757.
- Chen, Y., Wu Shen, W., Gao, K., Lam, C.S., Chang, W.C., & Deng, H. (2014). Effectiveness RCT of a CBT Intervention for youths who lost parents in the Sichuan, China, Earthquake. *Psychiatric Services*, 65 (2), 259- 262.

- Church, D. (2010). The treatment of combat trauma in veterans using EFT (Emotional Freedom Techniques): A Pilot Protocol. *Traumatology, 16*, 55-65.
- Church, D., Piña, O., Reategui, C., & Brooks, A. (2012). Single-Session Reduction of the Intensity of Traumatic Memories in Abused Adolescents after EET: A Randomized Controlled Pilot Study. *Traumatology, 18* (3), 73-79.
- Cohen, J.A., Mannarino, A.P., & Iyengar, S. (2011). Community Treatment of Posttraumatic Stress Disorder for Children Exposed to Intimate Partner Violence. *Archives of Pediatrics and Adolescent Medicine, 165*(1), 16-21.
- Copeland, W.E., Keeler, G., & Angold, A. (2007). Traumatic Events and Posttraumatic Stress in Childhood. *Archives of General Psychiatry, 64* (5), 577-584.
- Costello, E.J., Erkanli, A., Fairbank, J.A., & Angold, A. (2002). The Prevalence of Potentially Traumatic Events in Childhood and Adolescence. *Journal of Traumatic Stress, 15* (2), 99-112.
- Cumming, G. (2013). Cohen's d needs to be readily interpretable: Comment on Shieh (2013). *Behaviour Research Methods, 45* (4), 968-971.
- Curtis, A.C. (2015). Defining Adolescence. *Journal of Adolescent and Family Health, 7*(2), Article 2.
- Dawson, K., Joscelyne, A., Meijer, C., Steel, Z., Silove, D., & Bryant, R.A. (2018). A controlled trial of trauma-focused therapy versus problem-solving in Islamic Children affected by civil conflict and disaster in Aceh, Indonesia. *Australian and New Zealand Journal of Psychiatry, 52* (3), 253-261.
- De Roos, C., Greenwald, R., Den Hollander-Gijsman, M., Noorthoorn, E., Van Burren, S., & De Jongh, A. (2011). A randomized comparison of cognitive behavioural therapy (CBT) and eye movement desensitisation and reprocessing (EMDR) in

disaster-exposed children. *European Journal of Psychotraumatology*, 2, 5694.

Doi: 10.3402/ejpt.v2i0.5694

De Roos, C., Van der Oord, S., Zijlstra, B., Lucassen, S., Perrin, S., Emmelkamp, P., &

DE Jongh, A. (2017). Comparison of eye movement desensitization and reprocessing therapy, cognitive behavioral therapy, and wait-list in pediatric

posttraumatic disorder following single-incident trauma: a multicenter

randomized clinical trial. *The Journal of Child Psychology and Psychiatry*, 58

(11), 1219-1228.

Deblinger, E., Mannarino, A.P., Cohen, J.A., Runyon, M.K., & Steer, R.A. (2011).

Trauma-focused Cognitive Behavioural Therapy for Children: Impact of the

Trauma Narrative and Treatment Length. *Depression and Anxiety*, 28 (1), 67-75.

Diehle, J., Opmeer, B.C., Boer, F., Mannarino, A.P., & Lindauer, R.J.L. (2015).

Trauma-focused cognitive behavioral therapy or eye movement desensitization

and reprocessing: what works in children with posttraumatic stress symptoms? A

randomized controlled trial. *European Child and Adolescent Psychiatry*, 24,

227-236.

Donner, A. (1984). Approaches to sample size estimation in the design of clinical trials-

a review. *Statistics in Medicine*, 3, 199-214.

Dorsey, S., Pullman, M.D., Berliner, L., Koschmann, E., McKay, M., & Deblinger, E.

(2014). Engaging Foster Parents in Treatment: A Randomized Trial of

Supplementing Trauma-focused Cognitive Behavioral Therapy with Evidence-

based Engagement Strategies. *Child Abuse and Neglect*, 38 (9), 1508-1230.

Ehlers, A., & Clark, D.M. (2000). A cognitive model of posttraumatic stress disorder.

Behaviour Research and Therapy, 38, 319-345.

- Ehlers, A., Bisson, J., Clark, D.M., Creamer, M., Pilling, S., Richards, D., ... & Yule. W. (2010). Do all psychological treatments really work the same in posttraumatic stress disorder? *Clinical Psychology Review, 30* (2), 269-276.
- Ehlers, A., Clark, D.M., Hackmann, A., McManus, F., & Fennell, M. (2005). Cognitive therapy for post-traumatic stress disorder development and evaluation. *Behaviour Research and Therapy, 43*, 413-431.
- Ehlert, U. (2013). Enduring psychobiological effects of childhood adversity. *Psychoneuroendocrinology, 38*(9), 1850-1857.
- Eiland, L., & Romeo. R.D. (2013). Stress and the developing adolescent brain. *Neuroscience, 249*, 162-171.
- Elliott, G.R., & Feldman, S.S. (1900). Capturing the adolescent experience. In S.S. Fedlman and G.R. Elliot (Eds.), *At the threshold: The developing adolescent* (pp 1-13). Cambridge: Harvard University Press.
- Ertl, V., Pfeiffer, A., Elbert, T., Neuner, F. (2011). Community-Implemented Trauma Therapy for Former Child Soldiers in Northern Uganda. *Journal of the American Medical Association, 306*, 5.
- Foa, E.B., Chestman, K., & Gilboa-Schechtman, E. (2008). Prolonged Exposure Manual for Children and Adolescents suffering from PTSD. New York, NY: Oxford University Press.
- Foa, E.B., Johnson, K.M., Feeny, N.C., Treadwell, K.R. (2001). The child PTSD symptom scale: a preliminary examination of its psychometric properties. *Journal of Clinical Child and Adolescent Psychology, 30* (3), 376-384.
- Foa, E.B., McLean, C.P., Capaldi, S., & Rosenfield, D. (2013). Prolonged Exposure vs Supportive Counseling for Sexual Abuse-Related PTSD in Adolescent Girls A

- Randomized Clinical Trial. *Journal of the American Medical Association*, 310 (24), 2650-2657.
- Foa, E.B., Riggs, D.S., Gershuny, B.S. (1995). Arousal, numbing and intrusion. *American Journal of Psychiatry*, 152, 116-210.
- Ford, J.D., Steinberg, K.L., Hawke, J., Levine, J., & Zhang, W. (2012). Randomized Trial Comparison of Emotion Regulation and Relational Psychotherapies for PTSD with Girls Involved in Delinquency. *Journal of Clinical Child and Adolescent Psychology*, 41 (1), 27-37.
- Friedman, M.J., Resick, P.A., Bryant, R.A., & Brewin, C.R. (2011). Considering PTSD for DSM-5. *Depression and Anxiety*, 28, 750-769.
- Gauthier, L., Dalziel, S., & Gauthier, S. (1987). The Benefits of Group Occupational Therapy for Patients with Parkinson's Disease. *The American Journal of Occupational Therapy*, 41,6, 360-365.
- Gillies, D., Taylor, F., Gray, C., O'Brien, L., & D'Abrew, N.(2012). Psychological therapies for the treatment of post-traumatic stress disorder in children and adolescents. *Cochrane Database of Systematic Reviews*, 12, DOI:10.1002/14651858.CD006726.pub2
- Goldbeck. L., Muche, R., Sachser, C., Tutus, D., & Rosner, R. (2016). Effectiveness of Trauma-Focused Cognitive Behavioural Therapy for Children and Adolescents: A Randomized Controlled Trial in Eight German Mental Health Clinics. *Psychotherapy and Psychosomatics*, 85, 159-170.
- Gutermann, J., Schreiber, F., Matulis, S., Schwartzkopff, L., Deppe, J., & Steil, R. (2016). Psychological Treatments for Symptoms of Posttraumatic Stress Disorder in Children, Adolescents, and Young Adults: A Meta-Analysis. *Clinical Child and Family Psychology Review*, 19, 77-93.

- Grégoire, G., Derderian, F. & Le Lorier, J. (1995). Selecting the language of the publications included in a meta-analysis: Is there a Tower of Babel bias? *Journal of Clinical Epidemiology*, 48, 159-163.
- Harbord, R., Harris, R., & Sterne, J. (2009). Updated tests for small-study effects in meta-analyses. In J. A. Sterne (Ed.), *Meta-Analysis in Stata: An Updated Collection from the Stata Journal*. (pp. 138–150). College Station, TX: Stata Press.
- Heim, C., & Nemeroff, C.B (2001). The role of childhood trauma in the neurobiology of mood and anxiety disorders: preclinical and clinical studies. *Biological Psychiatry*, 49, 1023-1039.
- Higgins, J.P.T., & Green, S. (2011). *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0*. The Cochrane Collection.
- Higgins, J.P.T., Sterne, J.A.C., Savovic, J., Page, M.J., Hrobjartsson A., Boutron, I., Reeves, B., Eldrige, S. (2016). A revised tool for assessing risk of bias in randomised trials In: Chandler J, McKensize J, Boutron, I., Welcvh V. *Cochrane Methods. Cochrane Database of Systematic Reviews*, 11, Dx.doi.org/10.1002/14651858.CD201601
- Higgins, J.P., Thompson, S.G., Deeks, J.J., Altman, D.G. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal*, 327, 557-560.
- Jackson, D., & White, I.R. (2018). When should meta-analysis avoid making hidden normality assumptions? *Biometrical Journal*, 60 (6), 1040-1058.
- Jawroska, N., & MacQueen, G. (2015). Adolescence as a unique developmental period. *Journal of Psychiatry Neuroscience*, 40 (5), 291-293.

- Jeffries, F.W., & Davis, P. (2013). What is the role of Eye movements in Eye Movement Desensitisation and Reprocessing (EMDR) for post-traumatic stress disorder (PTSD)? A Review. *Behavioural and Cognitive Psychotherapy*, 41(3), 290-300.
- Jensen, T.K., Holt, T., Ormhaug, S.M., Egeland, K., Granly, L., Hoaas, L.C., ... Wentzel-Larsen, T. (2014). A Randomized Effectiveness Study Comparing Trauma-Focused Cognitive Behavioral Therapy with Therapy as Usual for Youth. *Journal of Clinical Child and Adolescent Psychology*, 43 (3), 356-369.
- Liberati, A., Altman, D.G., Tetzlaff, J., Mulrow, C., Gøtzsche, P.C., Ioannidis, J.P.A., Clarke, M., Devereaux, P.J., Kleijnen, J., & Moher, D. (2009). The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration. *PLoS Medicine*, 6 (7), [e1000100.doi:10.1371/journal.pmed.1000100](https://doi.org/10.1371/journal.pmed.1000100)
- Macdonald, G., Higgins, J.P.T., Ramchandani, P., Valentine, J.C., Bronger, L.P., Klein, P., ... Taylor, M. (2012). Cognitive-behavioural interventions for children who have been sexually abused (Review). *Cochrane Database of Systematic Reviews*, 5, DOI: 10.1002/14651858.CD001930.pub3.
- Mannarino, A.P., Cohen, J.A., Deblinger, E., Runyon, M.K., & Steer, R.A. (2012). Trauma-Focused Cognitive Behavioral Therapy for Children Sustained Impact of Treatment 6 and 12 Months Later. *Child Maltreatment*, 17 (3), 231-241.
- Mavranouzouli, I., Megnin- Viggars, O., Daly, C., Dias, S., Stockton, S., Meiser-Stedman, R., ... Pilling, S. (2020). Research Review: Psychological and psychosocial treatments for children and young people with post-traumatic stress disorder: a network meta-analysis. *The Journal of Child Psychology and Psychiatry*, 61(1), 18-29.

- McHugh, M.L. (2012). Interrater reliability: the kappa statistic. *Biochem Medica (Zagreb)*, 22 (3), 276-282.
- McLaughlin, K.A., Koenen, K.C., Friedman, M.J., Ruscio, A.M., Karam, E.G., Shahly, V., ... Kessler, R.C. (2015). Sub-threshold Post traumatic stress disorder in the WHO World Mental Health Surveys. *Biological Psychiatry*, 77 (4), 375-384.
- Mendes, D.D., Mello, M.F., Ventura, P., Passarela, C.M., Mari, J.J. (2008). A systematic review on the effectiveness of cognitive behavioural therapy for posttraumatic stress disorder. *International Journal of Psychiatry in Medicine*, 38 (3), 241-259.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G. The Prisma Group. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses. *British Medical Journal*, 339, b2535.
- Mørkved, N., Hartmann, K., Aarsheim L.M., Holen, D., Milde, A.M., Bomyea, J., & Thorp. S.R. (2014). A comparison of Narrative Exposure Therapy and Prolonged Exposure therapy for PTSD. *Clinical Psychology Review*, 34 (6), 453-467.
- Murray, L.K., Skavenski, S., Kane, J.C., Mayeya, J., Dorsey, S., Cohen, J.A., ...Bolton, P.A. (2015). Effectiveness of Trauma-Focused Cognitive Behavioural Therapy Among Trauma-Affected Children in Lusaka, Zambia: A Randomized Clinical Trial. *Journal of American Medical Association Pediatrics*, 169 (8), 761-769.
- National Institute of Mental Health, (2001). *Helping children and adolescents cope with violence and disasters*, Bethesda, MD: National Institute of Mental Health.
<http://www.nimh.nih.gov/publicat/violence.cfm>
- National Institute for Care and Excellence. (2018). *Psychological interventions for prevention and treatment of children and young people*. Retrieved from

<https://www.nice.org.uk/guidance/ng116/chapter/Recommendations#management-of-ptsd-in-children-young-people-and-adults>

- Neuner, F., Schauer, M., Klaschik, C., Karunakara, U. (2004). A Comparison of Narrative Exposure Therapy, Supportive Therapy and Psychoeducation for treating Posttraumatic Stress in an African Refugee Settlement. *Journal of Consulting and Clinical Psychology, 72*(4), 579-587.
- Nevo, G.A., & Manassis, K. (2011). An Adaptation of Prolonged Exposure Therapy for Pediatric Single Incident Trauma: A Case Series. *Journal of the Canadian Academy of Child and Adolescent Psychiatry, 20* (2), 127-133.
- Nixon, R.D.V., Sterk, J., & Pearce, A. (2012). A Randomized Trial of Cognitive Behavioural Therapy and Cognitive Therapy for Children with Posttraumatic Stress Disorder Following Single-Incident Trauma. *Journal of Abnormal Child Psychology, 40*, 327-337.
- Nixon, R.D.V., Sterk, J., Pearce, A., & Weber, N. (2017). A Randomized Trial of Cognitive Behavior Therapy for Children with Posttraumatic Stress Following Single-Incident Trauma: Predictors and Outcome at 1-Year Follow-Up. *Psychological Trauma: Theory, Research, Practice and Policy, 9* (4), 471-478.
- O'Dougherty Wright, M., Crawford, E., Del Castillo, D. (2009). Childhood emotional maltreatment and later psychological distress among college students: The mediating role of maladaptive schemas. *Child Abuse and Neglect, 33* (1), 59-68.
- Oflaz, F., Hatipoglu, S., & Aydin, H. (2008). Effectiveness of psychoeducation intervention on post-traumatic stress disorder and coping styles of earthquake survivors. *Journal Clinical Nursing, 17* (5), 677-687.
- Payne, M. (2006). *Narrative therapy* (2nd Ed.). London, England: Sage.

- Paunovic, N., & Ost, L. (2001). Cognitive-behaviour therapy vs exposure therapy in the treatment of PTSD in refugees. *Behaviour Research and Therapy*, *39*, 1183-1197.
- Perrin, S., Meiser-Stedman, R., & Smith, P. (2005). The Children's Revised Impact of Event Scale (CRIES): validity as a screening instrument for PTSD. *Behavioural and Cognitive Psychotherapy*, *33* (4), 487-498.
- Pfefferbaum, A., Mathalon, D.H., Sullivan, E.V., Rawles, J.M., Zipursky, R.B., & Lim, K.O. (1994). A quantitative magnetic resonance imaging study of changes in brain morphology from infancy to late adulthood. *Journal of the American Medical Association Neurology*, *51*(9), 874-887.
- Pfeiffer, E., Sachser, C., Rohlmann, F., & Goldbeck, L. (2018). Effectiveness of a trauma-focused group intervention for young refugees: a randomized controlled trial. *The Journal of Child Psychology and Psychiatry*, *59* (11), 1171-1179.
- Pityaratstian, N., Piyasil, V., Ketumarn, P., Sitdhiraksa, N., Ularntinon, S., & Pariwatcharakul, P. (2015). Randomized Controlled Trial of Group Cognitive Behavioural Therapy for Post-Traumatic Stress Disorder in Children and Adolescents Exposed to Tsunami in Thailand. *Behavioural and Cognitive Psychotherapy*, *43*, 549-561.
- Ricks, L., Kitchens, S., Goodrich, T., & Hancock, E. (2014). My story: The Use of Narrative Therapy in Individual and Group Counseling. *Journal of Creativity in Mental Health*, *9*, 99-110.
- Rodenburg, R., Benjamin, A., De Roos, C., Meijer, A.M., & Stams, G.J. (2009). Efficacy of EMDR in children: A meta-analysis. *Clinical Psychology Review*, *29*, 599-606.

- Rosner, R., Rimane, E., Frick, U., Gutermann, J., Hagl, M., Renneberg, B., ... Steil, R. (2019). Effect of Developmentally Adapted Cognitive Processing Therapy for Youth with Symptoms of Posttraumatic Stress Disorder after Childhood Sexual and Physical Abuse: A Randomized Clinical Trial. *Journal of the American Medical Association Psychiatry*, 76 (5), 484-491.
- Rossouw, J., Yadin, E., Alexander, D., Mbanga, I., Jacobs, T., & Seedat, S. (2016). A pilot and feasibility randomized controlled study of Prolonged Exposure Treatment and Supportive counselling for post-traumatic stress disorder in adolescents: a third world, task-shifting, community-based sample. *Trials*, 17, 548. Doi 10.1186/s13063-016-1677-6.
- Rossouw, J., Yadin, E., Alexander, D., & Seedat, S. (2018). Prolonged exposure therapy and supportive counselling for post-traumatic stress disorder in adolescents: task-shifting randomized controlled trial. *BMC Psychiatry*, 213, 587- 594.
- Sarkadi, A., Adahl, K., Stenvall, E., Ssegonja, R., Batti, H., Gavra, P., Fängström, K., & Salari, R. (2018). Teaching Recovery Techniques: evaluation of a group intervention for unaccompanied refugee minors with symptoms of PTSD in Sweden. *European Child and Adolescent Psychiatry*, 27 (4), 467- 479.
- Scheeringa, M.S., Weems, C.F., Cohen, J.A., Amaya-Jackson, L., & Guthrie, D. (2011). Trauma-focused cognitive-behavioral therapy for posttraumatic stress disorder in three through six year-old children: A randomized clinical trial. *Journal of Child Psychology and Psychiatry*, 52 (8), 853-860.
- Schottelkorb, A.A., Doulmas, D.M., Garcia, R. (2012). Treatment for Childhood Refugee Trauma: A Randomized, Controlled Trial. *International Journal of Play Therapy*, 21 (2), 57-73.

- Shapiro, F. (2001). *Eye movement desensitisation and reprocessing (EMDR): basic principles, protocols and procedures*. 2nd ed. New York, NY: The Guilford Press.
- Shedler, J. (2010). The Efficacy of Psychodynamic psychotherapy. *American Psychologist Journal*, 65, 98-109.
- Sibbald, B., & Roland, M. (1998). Understanding controlled trials: Why are randomised controlled trials important? *British Medical Journal*, 316, 201.
- Singh, S. (2017). How to Conduct and Interpret Systematic Reviews and Meta-Analyses. *Clinical and Translational Gastroenterology*, 8 (5), e93.
- Sroufe, L.A., Carlson, E.A., Levy, A.K., & Egeland, B. (1999). Implications of attachment theory for developmental psychopathology. *Development and Psychopathology*, 11, 1-13.
- Steinberg, L. (2014). *Age of opportunity: Lessons from the new science of adolescence*. Boston, MA: Houghton Mifflin Harcourt.
- Styron, T., & Janoff-Bulman, R. (1997). Childhood attachment and abuse: Long-term effects on adult attachment, depression and conflict resolution. *Child Abuse and Neglect*, 21 (10), 1015-1023.
- Valentine, J.C., Pigott, T.D., & Rothstein, H.R. (2010). How Many studies do you need? A primer on Statistical Power for Meta-Analysis. *Journal of Educational and Behavioural Statistics*, 35 (2), 215-247.