Potential therapy effectiveness, baseline symptom severity, and the association of

post-event factors in homicidally bereaved adolescent PTSD patients

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Abstract

Bereavement through homicide is a rare yet very stressful life event for adolescents. Following the incident, between 16% and 36% develop posttraumatic stress disorder (PTSD). Although a commonly given treatment following trauma, little research has been conducted on trauma-focused cognitive behavioral therapy (TF-CBT) in adolescents. The present study investigates as one of the first of its kind potential effects of TF-CBT in adolescents diagnosed with PTSD, specifically suffering from homicide. Further, it explores the association of bereavement time and waiting time for a therapy spot with baseline symptom severity and with symptom reduction following treatment. Self-reported data of 165 treatment-seeking adolescents were included in the analysis. Symptom severity was measured with the Children's Revised Impact of Event Scale. A paired *t*-test has been used to measure potential effectiveness of TF-CBT. Multiple regression models have been conducted to model the association of the post-event factors. Symptom severity following treatment was significantly lower compared to the onset of therapy ($p < .001$). The regression models account for 1.5% ($p > .05$) and 0.9% *($p > .05$)* of variance of baseline symptom severity and symptom reduction following treatment, respectively. Limitations, strengths, and implications for future studies are being discussed.

Keywords: bereavement, posttraumatic stress disorder, homicide, adolescent, trauma-focused cognitive behavioral therapy, bereavement interventions

Introduction

Reactions to traumatic events have been subject to research for many decades. Dating back as early as the American Civil War, physicians observed veterans' psychological manifestations following traumatic events (Da Costa, 1871; cf. Iribarren et al., 2005). Reacting to these events differs significantly between individuals as there is no "one way" of dealing with them. Posttraumatic stress disorder (PTSD) is among the most commonly studied reactions after traumatic events (Trickey et al., 2012). When PTSD was first included as a syndrome in the Diagnostic and Statistical Manual of Mental Disorders (3rd ed.; DSM-3; American Psychiatric Association [APA], 1980), it primarily served the purpose of analyzing abnormal reactions of war veterans (Kaminer et al., 2005). As such, PTSD was investigated as a disorder occurring in traumatized adults. However, in the years following, increased interest in the study of traumatic stress in civilians gained momentum, and research on children and adolescents grew.

Traumatic events impose unusual stress on the affected person. The probability of developing PTSD following exposure varies greatly across types of events (Alisic et al., 2014) with events of interpersonal nature showing the highest (e.g., APA, 2013). Homicide, defined by the World Health Organization (WHO) as a fatal injury inflicted by another person to injure or kill (WHO, 2017), is a severe example of an event of interpersonal nature which can cause PTSD in both witnesses and otherwise affected individuals (e.g., losing a family member; Alisic et al., 2015). Research suggests that people suffering from death by homicide are at nearly doubled risk for developing PTSD, compared to victims of other kinds of violence (Boelen et al., 2016; Zinzow et al., 2011). Despite the increased risk for the development of clinically significant posttraumatic stress symptoms, this still occurs only in 16% to 36% of cases (Alisic et al., 2014; Fletcher, 2003). Besides PTSD, the most common syndromes are major depressive disorder (MDD) and prolonged grief disorder (Prigerson et al., 2009). In most cases, however, people react to homicidal bereavement on a cognitive, emotional, physiological, and social level in the first few months after the incident but recover from this over time without professional help (APA, 2013).

DSM-5 Diagnosis

According to the DSM-5, to make a PTSD diagnosis, symptoms have to have their onset within the first six months after a traumatic incident and need to last for more than a month. They occur in the areas of intrusion (e.g., flashbacks, nightmares), avoidance (e.g., avoiding external reminders like places or people associated with the incident), alterations in cognitions and mood (e.g., negatively altered beliefs about oneself, inability to express positive emotions), and arousal (e.g., hypervigilance, concentration problems). It must be ruled out that these symptoms are caused by other medical conditions or substances (e.g., alcohol) and must cause clinically significant distress or impairment. Regarding comorbidity, 90% of PTSD patients have at least one-lifetime comorbid mental disorder (Kessler et al., 1995). Most commonly, adolescents develop substance use disorder or MDD (Adams et al., 2015; Tang et al., 2018). Next to increased comorbidity, other consequences of PTSD in adolescents include impairment in social, developmental, educational, physical, and occupational domains, as well as an elevated risk for suicide (APA, 2013).

Peculiarities of PTSD Treatment in Adolescents

The age of adolescence encompasses individuals between 10 to 24 years, as recent research suggests to exceed the previously set markers for adolescence of 10 to 19 years (WHO, 2006) due to new findings (e.g., biological maturing processes still taking place in the early 20s) and new standards of living (e.g., more extended education durations, later marriages; Sawyer et al., 2018).

Timely adequate interventions for adolescents diagnosed with PTSD may be of even greater importance than for adults for multiple reasons (Trickey et al., 2012; Alisic et al., 2014). Firstly, adolescents cannot verbalize, recognize, and regulate their emotions and cognitions as accurately as adults (Kaminer et al., 2005). This can affect their understanding of the traumatic situation and thus reduce insights into the rationale of the incident, which, in turn, can lead to an increase in symptom severity (Trickey et al., 2012). Further, the ability to successfully regulate one's emotions is strongly linked to the development of PTSD

(Shepherd & Wild, 2014; Chung & Chen, 2017), therefore a limitation of this ability may increase functional impairment and psychological strain (Salmon & Bryant, 2002).

Secondly, adolescents are more dependent on their environment than adults are. In particular, they are dependent on their parents who serve as guides teaching about social norms and dealing with emotions (Eisenberg et al., 2009). The parents' emotional proximity and mental health influence adolescent's PTSD symptom severity by parents being a focal point of their social support (e.g., Goenjian et al., 2009; Heptinstall et al., 2004). In this regard, the loss of a caretaker represents a severe form of intrusion into one's environment by bereaving the individual of his/her focus person.

Thirdly, from a biological perspective, adolescents are at risk of suffering long-lasting effects in the brain's neurophysiological functioning (e.g., in the amygdala, prefrontal cortex, and hippocampus; Perry, 2002; Teicher et al., 2016), increased overall fear-reactivity (Bremner, 2006), and emotion and behavior regulation problems (Nooner et al., 2012). This is due to the disruption of biological maturation processes which, if untreated, leads to more severe forms of symptomology and persist throughout life (Frodl & O'Keane, 2013).

Treatment for Adolescent PTSD Patients

Currently, there are a few well-researched treatments for PTSD in adolescents. Most commonly, trauma-focused psychotherapies, such as trauma-focused cognitive behavioral therapy (TF-CBT), are recommended by clinical guidelines (e.g., National Institute for Health and Care Excellence [NICE], 2018). TF-CBT can be given in both individual and group settings and typically consists of six to twelve sessions. It involves processing traumatic memories, psychoeducation on dealing with trauma-related emotions, and regulating avoidance behavior and cognitions. It aims to elevate the patient's ability to manage future arousals and flashbacks on their own by including safety strategies (NICE, 2018).

Although evidence-based interventions on pharmacological treatment exist and have shown small effects in symptom reduction (Maccani et al., 2012), the prevailing evidence suggests that using trauma-focused psychotherapy over medication in adolescent PTSD patients is more effective. In cases where the course of the disorder requires further assistance

(e.g., in dealing with severe comorbidity), the cautious use of medications may be considered (Keeshin & Strawn, 2014).

Despite a great number of efficacy studies of TF-CBT, little research has been conducted on its effects on the subgroup of adolescents following trauma, in particular in trauma caused by homicide. The present study investigates the efficacy of TF-CBT in homicidally bereaved adolescent PTSD patients.

Factors associated with the Severity and Persistence of PTSD Symptoms

Contemporarily, the association of certain factors on symptom severity and the treatment outcome for adolescent PTSD patients are not yet fully understood. A growing body of evidence indicates that various factors are responsible for its occurrence and persistence (e.g., Yehuda et al., 2015). Broadly, factors can be categorized into three groups: pre-, peri-, and post-event factors. Pre-event factors include amongst others having a history of mental health disorders, personality traits (e.g., neuroticism), and prior life events, and generate small to medium effect sizes in variance of PTSD symptom severity and persistence of symptoms (Cox et al., 2008; Trickey et al., 2012). Peri-event factors describe the incident and the individual's perception of it. They include perceived life threat, emotional proximity to the perpetrator, and type of trauma (e.g., natural or interpersonal), and account in general to medium to large effect sizes (Trickey et al., 2012; Perrin et al., 2000). Post-event factors encompass aspects of the time after the traumatic event such as social support, family functioning, and thought suppression (Otto et al., 2007; Dalgleish et al., 2005). In general, this group shows medium to large effect sizes and is of substantial importance for adolescent patients (Trickey et al., 2012). Even more so in homicidally bereaved adolescents due to the shattering of assumptions about the world and other people following the incident. Beliefs regarding safety and trust are questioned and changed which affects societal functioning and often leads to maladaptive cognitions (Freyd, 1996; Janoff-Bulmann, 1992; Tolin & Foa, 2006). Further, a homicide often poses many challenges on the individual. For example, interpersonal events (such as homicides) are more often chronic or reoccurring in nature (compared to other types of potentially traumatic events; Alisic et al., 2015). In cases where the

perpetrator was a family member the effects may be even worse due to an increased probability of family instability and greater loss of trust (Alisic et al., 2015).

However, despite the eminent effects of post-event factors, and the increased importance they play in homicidally bereaved adolescents, little research has investigated their association with symptom severity before treatment. Further, no research was found investigating the association between specific post-event factors and therapy outcome. The present study builds on these gaps in literature and investigates the association of specific post-event factors and baseline symptom severity, as well as with symptom severity following treatment.

Present study's Post-event Factors

Bereavement time may serve as an indicator for a longer and more complex investigative process and thus be a contributing factor to the decrease of symptoms. In a majority of cases, symptom severity declines over time (Rosen et al., 2019). However, in a minority of cases, if left untreated, it can worsen the situation and make it harder for therapy to render symptom reduction (APA, 2013). This negative effect seems to be even stronger in interpersonal trauma (Ehring & Quack, 2010). Therefore, examining the association between bereavement time and symptom severity, as well as therapy outcome, on PTSD patients who suffered from homicide may alter different effects compared to the general adolescent PTSD population. In the present study it is hypothesized that shorter bereavement time leads to lower baseline symptom severity and greater symptom reduction following treatment.

Extensive waiting time for a therapy spot can negatively impact the treatment outcome. This is well-researched on general medical services, but little is known about its consequences on mental health patients (Reichert & Jacobs, 2018), even less so on PTSD patients. However, Westin and colleagues (2014) showed that longer waiting times might negatively influence psychotherapy engagement in youth and increase their dropout rates. Adolescents, who suffer greatly from the consequences and symptoms after the trauma (e.g., reoccurring flashbacks), and who have to wait long for a therapy spot, might interpret this as a lack of support and understand this as an attitude-congruent confirmation of their mistrust in

other people. The current study will investigate whether shorter waiting time leads to lower baseline symptom severity and greater symptom reduction following treatment.

Research Questions and Hypotheses

The present work examines two research questions. 1) Is TF-CBT potentially effective in homicidally bereaved adolescents? 2) Are post-event factors associated with baseline symptom severity as well as change of symptoms following treatment? Derived from them, the following three hypotheses are being investigated. 1) TF-CBT is potentially effective in homicidally bereaved adolescents. 2) A shorter bereavement time and waiting time are associated with lower baseline symptom severity. 3) A shorter bereavement time and waiting time are associated with greater symptom reduction following treatment.

Findings from this research shed light on the small subtopic of adolescents with PTSD following bereavement on which very little research and literature exists. Regarding potential treatment effectivity of TF-CBT with these patients there are, to the knowledge of the author, no studies conducted yet. Further, it can contribute to understanding post-event factors associated with PTSD symptom severity and reduction of symptoms following treatment and thus give rise to improvement in social services and treatments offered to victims.

Method

Study Design

The present study used retrospective routine outcome monitoring data, which is a type of data collection more commonly used for therapy evaluation than for research purposes. By filling out questionnaires at the beginning and during the course of therapy, patients give feedback to the clinicians on the results and they are thus able to modify the therapy plan if necessary.

Participants

As part of a bigger study including 1106 bereaved individuals, they were contacted by homicide support agencies and directed to ASSIST Trauma Care UK, a non-profit organization which offers specialist therapy and support to individuals and families affected by post-traumatic stress in England and Wales. Of these 1106 patients, 193 of them were adolescents. Data collection took place between January 2011 and December 2017. The final

sample used in the present study contains 165 adolescent patient who were between 10 and 24 years of age at referral and experienced bereavement through homicide. Patients were excluded when they had missing or invalid data points (e.g., no recorded symptom screening at onset of therapy, negative waiting time).

Ethical Standards

This research project does not belong to the regimen of the Dutch Act on Medical Research Involving Human Subjects and thus needs no approval of a medical ethics committee. It was approved by the Ethics Committee of the Faculty of Social and Behavioral Sciences of Utrecht University and is filed under number 20-228. Further, patients were informed about the nature of the study and consent to partake in research was obtained at the beginning of treatment.

Procedure

Questionnaires measuring PTSD symptoms were administered at intake. Information on demographics, the homicide, and post-event factors were either documented at intake or at a later stage of therapy. The second questionnaire was given either at the final session or towards the end of therapy.

Study Measures

PTSD Questionnaires

The Children's Revised Impact of Event Scale (CRIES-8) is a brief self-report questionnaire designed to screen for the risk of PTSD. Derived originally from the 15-item Impact of Event Scale (IES; Horowitz et al., 1979), it is adapted for the use with children and adolescents, consisting of eight items and avoiding ambiguous language. A longer version, the CRIES-13, consists of five additional items added to evaluate arousal. Both versions have good construct validity, reliability, and stable factor structure (Smith et al., 2003). The eight items of the CRIES-8 are measured with Likert-scaled items on a four-point scale. Participants could answer each question with "Not at all" (0), "Rarely" (1), "Sometimes" (3), "Often" (5). Adding the scored points of both dimensions results in a symptom score range of 0 to 40.

A score of 17 and higher serves as an indication for risk of PTSD with minimal rate of false negatives and maximal rate of sensitivity (Perrin et al., 2005).

Participants received either the CRIES-8, CRIES-13, or IES. The former was given to patients between 10 and 14 years of age (mostly 10- and 11-year olds). Participants between 10 and 17 years of age received the CRIES-13 (mostly 10- to 16-year olds) and the IES was given to 12- to 24-year olds (mostly to 17 to 24-year olds).

Each of these questionnaires contains the same eight items constituting the CRIES-8. In the present study, only these eight items were considered.

Predictors

Bereavement time was measured by calculating the days between the homicide and the first therapy session. Waiting time was measured by calculating the days between the referral and first therapy session.

Statistical Analysis

Data were analyzed using SPSS (version 25.0). For the first hypothesis, a paired *t*-test was calculated in order to determine statistical importance of mean differences of symptom severity at baseline and towards the end of therapy.

For investigation of the second hypothesis, a multiple regression model has been calculated. The model predicts baseline symptom severity with the post-event predictor variables (bereavement time and waiting time).

For the third hypothesis, the association of the post-event factors and potential effectiveness of TF-CBT has been modeled with another multiple regression model. The dependent variable (DV) is measured as change of symptom severity which is operationalized as the difference of self-reported symptom severity at baseline and towards the end of therapy.

G-Power analyses have been computed for the required sample sizes. For the paired *t*-test, an effect size of d_z = .5 with α = .05, Power = .95 and two tails require a sample size of *n* = 45. The data has also been tested for normally distributed residuals as prerequisite for the calculation.

For the regression models, an effect size of $f^2 = .2$ with $α = .05$ and Power $= .95$ and a total of three predictors require a sample size of $n = 56$. The following assumptions for multiple regression have been tested in order to assess the validity of the models: linear association between independent variables (IVs) and DV, absence of multicollinearity between the IVs, independence of residuals, homoscedasticity, normally distributed residuals, and absence of influential cases biasing the model.

Results

Descriptive Statistics

Descriptive data of sociodemographic, post-event factors, and therapy are presented in Table 1. Of the original 193 patients in the data set, 28 were excluded due to missing data points in the first questionnaires ($n = 9$), the second questionnaire ($n = 12$), or a negative ($n = 6$) or missing ($n = 2$) amount of days waiting for a therapy spot. A total of $N = 165$ patients have been included in our calculations. On average, patients reported a mean baseline symptom severity score of 26.65 ($SD = 7.91$). A total of 140 (84.8%) participants met the PTSD criterion of the CRIES-8 (Perrin et al., 2005) at the beginning of therapy. Towards the end of therapy, mean score was 13.27 ($SD = 7.16$). The average change in symptom severity was 13.38 ($SD = 8.91$).

Mean age was 18.13 ($SD = 4.19$; range $= 10–24$), 105 (63.3%) identified as female. The deceased came from the primary family in 131 patients, in 16 patients from the extended family (including in-laws), nine were romantic (ex) partners, eight were friends of the patient, and one patient responded with other/unknown.

The perpetrator was in 19 cases from the primary family, in 15 from the extended family, in 19 a romantic (ex) partner, in one case a friend, and in 111 cases other/unknown.

Mean bereavement time was 366.36 days ($SD = 604.63$; range $= 22–5,937$). Waiting time was 30.43 days on average ($SD = 55.33$; range $= 0–482$).

Assumptions

Paired T*-Test*

The prerequisite of paired *t*-test of dependent samples, normally distributed data points, can be visually investigated with a histogram. There, it can be obtained very clearly

that the frequency of occurrence per value in the dataset resembles normal distribution. The first dataset, baseline symptom severity, shows very slightly a left side skewness. This does not, however, negate the overall resemblance of normal distribution. Both datasets lack any outliers.

Multiple Linear Regression

Linear Association Between IVs and DV. Computed scatterplots indicated that this assumption has been violated in parts. Drawing scatterplots for each IV and each hypothesis showed that an association can be seen by the distribution of dots in each graph. Based on visual inspection, it appears to be a low relation between the IVs and both DVs. For both models, all IVs correlate low and not significantly with the DVs (first model: bereavement time: $r = -.115$, n.s.; waiting time: $r = .023$, n.s.; second model: bereavement time: $r = -.097$, n.s.; waiting time: $r = -.013$, n.s.). However, it is relevant to note that the plot does not show any signs of other forms of association (e.g., non-linear), which could have been adjusted with certain mathematical operations. Instead, it indicates an overall low relation between the two metric IVs and both DVs. This is also supported by looking at the Pearson correlations between IVs and DVs being low and not significant.

Absence of Multicollinearity. This assumption tests for correlations between the IVs. High correlations may weaken the strength of the model. Analyses of collinearity statistics show that this assumption was not violated, with variance inflation scores (VIF) being well below 10, and tolerance scores above .2 (VIF = 1.02; Tolerance = .98). Another way of testing this assumption is by looking at the Pearson correlation between predictors, which was low and not significant ($r = .136$).

Independence of Residuals. The independence of residuals of the DV can be calculated with the Durbin-Watson statistic. Values close to 2 indicate independence of residuals. The calculations suggest that the assumption has been met, as the obtained values were close to 2 (first model: Durbin-Watson = 1.75; second model: Durbin-Watson = 1.85).

Homoscedasticity. The variation of the residuals should aim at being similar throughout each point of the model. Therefore, the scatterplot of standardized residuals vs

standardized predicted values should follow the shape of a random distribution. However, the plots showed some signs of funneling, suggesting the assumption of homoscedasticity may have been violated in parts. In both models, residuals clustered more densely around the mean value compared to the periphery indicating rather heteroscedasticity meaning that the regression coefficients have distorted variances. This contorts their standard error values and thereby the confidence intervals, too. Nevertheless, the predicted *B*-coefficients remain intact, which allows the model to still make statistically significant predictions (Stein et al., 2011).

Normally distributed residuals. The models' P-P plots suggest that the assumption of normality of the residuals (of the DVs) has been met. In general, both models predict them well with only a few residuals laying slightly off the diagonal towards the center.

Absence of influential cases biasing the model. Estimates of the possible dispro-portionate influence of outliers on the model, which may make it less representative, are indicated by Cook's Distance value > 1. Given that all values were < 1 (all < .28), it suggests that no individual cases were unduly influencing the model and thus the assumption has been met.

Main Hypotheses

Regarding the first hypothesis, the differences between the first (*M* = 26.65; *SD* = *7.91)* and second measure (*M* = 13.27; *SD* = 7.16) are statistically significant (*t*(165) = 19.3, *p* < .001).

Regarding the second hypothesis, the regression model has an explanatory value of 1.5% of the total variance (R^2 = .015; *p* = .299).

For the third hypothesis, the model explains 0.9% of the total variance (R^2 = .009; *p* = .466).

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Discussion

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The present study investigated the potential effectiveness of TF-CBT on homicidally bereaved adolescents and the potential effects of post-event factors (bereavement time and waiting time) influencing baseline symptom severity and symptom reduction following

treatment. For the first hypothesis, a paired *t*-test has been computed to measure changes in symptom severity. For the second, a multiple regression model was calculated to model the association of the post-event factors on baseline symptom severity. Similarly, for the third hypothesis, a multiple regression model was calculated to model the association of these post-event factors on symptom reduction following treatment. In total, 165 adolescents were included. The highly statistically significant decrease of symptom severity following treatment suggests potential effectiveness of TF-CBT in adolescents. A shorter bereavement time and waiting time did not show to be associated with lower baseline symptom severity or greater symptom reduction following treatment.

Baseline PTSD symptom severity was high, which adds to the growing body of literature outlining the strong pernicious effects of homicide on the mental health of treatment seeking individuals (van Denderen et al., 2015).

Shorter bereavement time did not show to be a significant predictor of low baseline symptom severity or greater symptom reduction following treatment. One possible explanation is the variability of PTSD symptom courses in individuals. In the past, researchers thought that PTSD has a linear symptomology course following a traumatic event (Bryant, 2019), whereas more recent research challenged this view by demonstrating that symptom severity varies over time (Bryant et al., 2013). Evidence suggests four types of symptomology courses: a resilient class with generally low symptoms, a recovery class marked by initially high symptoms following gradual remission, a class with delayed reaction having initially low symptom severity but increase over time, and a class of chronic symptomology with consistently high PTSD symptom severity (Galatzer-Levy et al., 2018; Bonanno et al., 2008; DeRoon-Cassini et al., 2010; cf. Bryant, 2019). Our hypothesis, that shorter bereavement time leads to lower baseline symptom severity, addresses the first and third group, the resilient and delayed reaction classes, while not accounting for the other two. Similarly, the second hypothesis, that shorter bereavement time is associated with greater symptom reduction following treatment, describes only the second group, the recovery class. Given that the present sample did not make this differentiation between these classes, it can only be stated

that our data suggest that bereavement time does not have an overall effect on all adolescent PTSD patients following homicidal bereavement. A field of future research may lie in conducting prospective longitudinal studies investigating potential effects of bereavement time on an individual level. Further, focus on studies investigating the prevalence of these different groups in homicidally bereaved individuals may offer new insights into the peculiarity of PTSD following bereavement after homicide.

Shorter waiting time for a therapy spot did also not show to be a significant predictor for both lower baseline symptom severity and greater symptom reduction following treatment. Although no explicit literature was found investigating this relation on adolescent PTSD patients, research suggests that longer waiting time can increase symptom severity and lower reduction of symptoms following treatment on adolescent mental health patients. The former can be explained through mediators that influence symptom severity and which are influenced by waiting time. For example, increased distress and social dysfunction at home and at school (Brown et al., 2002) and an increased risk of decompensation and suicide (Williams et al., 2008) are linked to longer waiting time. Regarding symptom reduction following treatment, on the other hand, longer waiting time may have an effect through decreasing therapy engagement (Westin et al., 2014) while increasing rates of non-attendance (Gallucci et al., 2005). One possible explanation for why no waiting time effects were found in the present sample is the fact that the general waiting time was comparatively very low. The average waiting time was below the aspired mean of programs that aim at setting standard waiting times for mental health services. For example, a program initiated by the National Health Service (NHS; 2015) set its goal for waiting time for patients with disorders characterized by a high level of functional impairment or acute need for action (e.g., early psychosis interventions or eating disorders in youth) higher than the mean of the present sample. For waiting time to produce a significant effect on symptom severity and symptom reduction following treatment, it may need more extended periods than the NHS's set threshold. Future research may take this into account and analyze a greater range of waiting time durations.

Limitations and Strengths

There are some limitations of this study that should be taken into consideration. Firstly, the absence of a control group does not allow to make statements in respect to the effectiveness of TF-CBT compared to other treatments or recovery over time. Secondly, biases could have arisen as no data of mental health history or other traumatic experiences prior to the homicide were recorded. Thirdly, regarding the sample, females were slightly overrepresented in this data set. This is not uncommon in comparable clinical trials for multiple reasons. For example, women generally have a greater conviction that professional clinical help is of benefit to them (De Groot et al., 2009), higher levels of help-seeking behavior (Stead et al., 2010), and a general higher percentage of suffering from PTSD following traumatic events compared to males (e.g., APA, 2013). Overall, literature suggests that there are no gender differences in response to TF-CBT (Felmingham & Bryant, 2012) which indicates that the small overrepresentation of females in this sample does not impact the findings' validity and generalizability.

Further, a great majority of the sample answered "white" as their ethnic background. Despite underlying mechanisms not yet fully understood (López et al., 2017) and mixed findings (Contractor et al., 2015), research suggests that race plays a role in both symptom severity (Balsam et al., 2010; Marshall et al., 2009; Heilemann et al., 2005) and response to treatment for PTSD following traumatic events in adolescents (Milan et al., 2013; for review see Alcántara et al., 2013). The overrepresentation of one ethnic group poses a limitation to our findings' generalizability to other ethnic groups.

Concerning strengths of this study it needs to be stated foremostly that contemporarily very little research exists on the wellbeing of adolescents following the loss of a loved one to homicide. In particular, there is very scarce literature on adolescents suffering from PTSD following such incidents. Our data indicates potential effectiveness of TF-CBT adding to existent findings suggesting that TF-CBT may be offered as standard treatment to this population. Further, the present study is one of the first investigating the effects of post-event factors on this subgroup.

Another strength of the study lies in its well-validated questionnaire (CRIES-8). Despite being a brief questionnaire and lacking items measuring arousal, which marks a symptom criterion of PTSD, it has good internal and external validity, as well as does not differ in correctly identifying individuals with or without PTSD compared to its longer version (CRIES-13; Perrin et al., 2005).

Implications for Research and Practice

The present study's results suggest TF-CBT to be effective in reducing PTSD symptoms in treatment seeking homicidally bereaved adolescents. Contemporarily it being the most researched method for bereaved adolescents, TF-CBT may be offered as standard treatment of trauma following homicide. Future clinical studies using a control group and a longitudinal design are needed to replicate these findings so that efficacy and potential long-term consequences can be determined.

As argued above, using a prospective longitudinal study design for investigating effects of bereavement time may alter different results given interindividual differences of the effects of time on symptom severity. Also, including multiple time points of data collection will be useful in analyzing changes of symptoms.

Further, another field of future research lies in analyzing the peculiarity of PTSD due to homicide compared to general PTSD in adolescents. Here, investigating the effectiveness of specific elements of TF-CBT on homicidally bereaved PTSD patients may offer new insights. For example, psychoeducation on adaptive coping strategies might be of even greater importance in this subgroup due to potentially higher experiences of distress in the time after the incident (Alves-Costa et al., 2018). There, it might be of benefit to collect data with the CRIES-13 which included the arousal dimension because emotional regulatory functions, which are essential to coping, are linked to arousal symptom suffrage (Deckert et al., 2020).

To conclude, for the time being, our study was able to answer the research questions. Indications for potential effectiveness of TF-CBT offered to treatment seeking homicidally bereaved adolescents have been found. The post-event factors (bereavement time and waiting time) do not appear to be significantly associated with symptom severity or reduction of

symptoms following treatment which may be due to methodical limitations. Future research should implement multiple time collection points as well as differentiate interindividual differences in trauma processes. Lastly, the high symptom baseline as well as the overall reduction of symptoms underline the importance of offering specialized treatment to adolescents suffering from homicide.

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