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REVIEW PAPER

Multi-tiered Approaches to Trauma-Informed Care in Schools: A Systematic Review

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Abstract

Childhood trauma can adversely impact academic performance, classroom behaviour, and student relationships. Research has gradually explored integrated approaches to care for traumatised students in schools. Increasingly, research has pointed to implementation of multi-tiered programs to trauma-informed care for traumatised students in schools. However, evaluations of these programs are limited and no systematic review of the existing evidence has been conducted. The aim of this research was to be the first systematic review to explore evidence on multi-tiered, trauma-informed approaches to address trauma in schools. Results of this systematic review yielded 13 published and unpublished studies. Findings indicated that further research, guided by empirical evidence of the effectiveness of multi-tiered and trauma-sensitive approaches in schools, is required. Recommendations for research in the area of trauma-sensitive, multi-tiered care in schools are provided.

Keywords Trauma · Post-traumatic stress disorder · Multi-tiered · Trauma-informed · School

Introduction

The relationship between trauma exposure and impaired school-related functioning, including behavioural issues, social and emotional concerns, and academic impairment, is well established. Trauma exposure in childhood is associated with lower academic achievement and test scores, lower IQ scores and impaired working memory, and delayed language and vocabulary (Perfect, Turley, Carlson, Yohanna, & Saint Giles, 2016). Traumatised students exhibit poorer attention, disruptive behaviours, aggression, hyperactivity and impulsivity, defiance, and school suspensions, absences and grade retention, as well as depression, anxiety, withdrawal, and low self-esteem (Perfect et al., 2016). Research has also found traumatised children with post-traumatic stress disorder (PTSD) show greater school-related impairment compared to trauma-exposed children without PTSD (Weems et al., 2013). However, while research continues to demonstrate a link between school-related outcomes and trauma, the limited literature has explored the experiences of school staff and teachers in relation to traumatised children. Several studies have concluded that trauma-informed practices be implemented in schools to increase support for school staff, improve responses to traumatised children, and reduce behavioural and academic problems of students (e.g. Alisic, 2012; Alisic, Bus, Dulack, Pennings, & Splinter, 2012; Mendelson, Tandon, O'Brennan, Leaf, & Ialongo, 2015).

Studies with school teachers and students have found teachers' experience uncertainty, lack competence, and have limited training and policy knowledge in relation to childhood trauma (Alisic, 2012; Alisic et al., 2012; Dyregrov, 2009; Dyregrov, Bie Wikander, & Vigerust, 1999; Kenny, 2001, 2004; Papadatou, Metallinou, Hatzichristou, & Pavlidi, 2002). Trauma-related confidence has been shown to relate to greater teaching experience, exposure to trauma-focused training, and involvement with traumatised children (Alisic et al., 2012). Other studies have documented secondary PTSD symptoms among school staff exposed to student trauma (Berger, Abu-Raiya, & Benatov, 2016; Bride, 2007; Smith Hatcher, Bride, Oh, Moultrie King, & Catrett, 2011). Following the 2011 Canterbury earthquake in New Zealand, Berger and Abu-Raiya et al. (2016) reported positive implications of a universal, school-based, resilience program in reducing teacher PTSD and secondary trauma, increasing self-efficacy and optimism, and improving coping of teachers. A universal, school-based, trauma-informed program for disadvantaged students was also found to improve

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students' emotion regulation, social competence, academic performance, classroom behaviour, and authority acceptance (Mendelson et al., 2015).

An increasing number of studies have shown positive effects of school-based interventions for students with PTSD. The Cognitive Behavioural Intervention for Trauma in Schools (CBITS) and ERASE-Stress program have been reported to lower symptoms of PTSD and depression among students (Berger & Gelkopf, 2009; Jaycox et al., 2009). Teacher-mediated interventions have also had positive impacts on trauma-exposed children, including the Students Exposed to Trauma (SSET) program, adapted from the CBITS program (Jaycox et al., 2009), and programs developed in response to childhood exposure to war and disaster (Powell & Bui, 2016; Wolmer, Hamiel, Barchas, Slone, & Laor, 2011; Wolmer, Hamiel, & Laor, 2011). However, while a growing number of studies have shown the positive effects of school-based interventions related to trauma, little is known about integrated, multi-tiered systems of support to manage trauma in schools. Integration of trauma-sensitive programs within existing evidence-based frameworks is likely to increase the sustainability of school programs in response to student trauma (Chafouleas, Johnson, Overstreet, & Santos, 2016; Nadeem & Ringle, 2016).

Several multi-tiered 'triangle' or 'pyramid' prevention frameworks have been proposed for school mental health promotion. The School-wide Positive Behaviour Support (SWPBS; also known as school-wide PBS, positive behavioural interventions and supports [PBIS], and multi-tiered systems of support [MTSS]) framework is an evidence-based, three-tiered model of intervention, including Tier 1 for universal support of all students regardless of emotional or behavioural concerns (e.g. community-wide disaster exposure); Tier 2 for intensive secondary support with groups of students at risk or showing early signs of emotional or behavioural issues (e.g. directly witnessing or experiencing trauma); and Tier 3 for tertiary, intensive, and individualised intervention for students with significant emotional or behavioural problems (e.g. PTSD as a result of trauma exposure; Sugai & Horner, 2006; Weist et al., 2018). This three-tiered approach is also represented in other frameworks, including the response to intervention (RTI) model (IDEA, 2004), the Public Health Model for Mental Illness and Risk Behaviours (Mrazek & Haggerty, 1994), and, more recently, trauma-informed approaches for rural and disadvantaged students (Hansel et al., 2010; Stokes & Turnbull, 2016). However, better alignment of trauma-informed models within existing multi-levelled, school-based support systems has been suggested to increase delivery and fidelity of trauma-sensitive policies and practices in schools (Chafouleas et al., 2016; Phifer & Hull, 2016; Plumb, Bush, & Kersevich, 2016; McDermott & Cobham, 2014; Reinbergs & Fefer, 2018; Weist et al., 2018).

The aim of this systematic review was to evaluate the evidence and address the strengths and limitations of research regarding multi-tiered, trauma-informed interventions in schools. In particular, this review aims to highlight the growing literature concerning the practice of trauma-sensitive, multi-tiered treatment of students in schools, evaluate the design and methods used in evaluating these models, and provide recommendations for improved trauma-based research and program implementation in schools. Although case studies, literature and systematic reviews have been conducted (e.g. Fu & Underwood, 2015; Phifer & Hull, 2016; Price et al., 2012; Rolfsnes & Idsoe, 2011; Weist et al., 2018), this review will focus on evaluating the evidence on alignment of these approaches in schools. This review is timely based on recent suggestions for better clarification around methods for integrating trauma and positive behaviour approaches in schools (Zakszeski, Ventresco, & Jaffe, 2017). Greater understanding of alignment between trauma-informed approaches and tiered school-based intervention and support programs is anticipated to increase research for greater adoption of these approaches in schools. This will likely improve staff knowledge and confidence regarding trauma, increase the overall efficiency of schools in accommodating traumatised students, enhance students' school engagement and academic achievement, and improve post-traumatic growth and recovery of trauma-impacted students.

Method

Search Strategy

The PRISMA protocol, Cochrane handbook and JBI scoping reviewers manual were used to inform this review. Six electronic databases (i.e. PsycINFO, Ovid MEDLINE, ERIC, A+Education, Web of Science conference proceedings citation index—Science, and ProQuest Dissertations and Theses Global) were used to search for the published and unpublished literature (i.e. conference proceedings and theses), written in English only, and using search terms such as *trauma, disaster, violence, post-traumatic stress disorder, PTSD, multi-tiered, trauma-informed, positive behaviour support, PBS, response to intervention, RTI, and school.* The inclusion of the published and unpublished literature, including theses and conference proceedings, was decided because this is a relatively new area of research. Because of this, no exclusions were also placed on the year of publication for perspective articles, and other published and unpublished materials. Inclusion of studies was those which referred to and provided evidence of a multi-levelled approach to trauma-sensitive care in schools, including intervention across teachers, parents and/or students. Therefore, articles referring to intervention within one tier of a multi-tiered

model, such as evaluation of an indicated intervention for children identified with PTSD, were excluded from this review (e.g. Cohen et al., 2009; Jaycox et al., 2009). These programs have been reviewed extensively in the past (see, for example, Chafouleas, Koriakin, Roundfield, & Overstreet, 2019; Rolfsnes & Idsoe, 2011). Articles using qualitative and quantitative approaches, or a mixed methodology, were included to capture all the available literature in the area, as well as the literature across all levels of schooling from preschool to secondary school. Research conducted across specialist school settings (e.g. residential treatment centres) were excluded due to the Tier 3 treatment needs of these populations (e.g. one-on-one lessons and support; Day et al., 2015).

The search was conducted from March 2018 through May 2018. The search strategy procedure and outcomes are presented in Fig. 1. The initial search yielded 1018 results. Of the 1018 results, 265 were excluded as duplicates. All remaining 753 results underwent screening by title, with 408 excluded and 345 retained for screening by abstract. Excluded articles related to school violence and disruptive behaviour prevention, and other articles with no association to trauma. Screening by abstract revealed a further 171 records to be removed and 174 to be retained for screening by full text. Full-text records were then reviewed to reveal 10 results to be retained. The final excluded articles only evaluated one tier of school trauma interventions, or referenced other externalising and internalising disorders with no association made to trauma. These results were then subject to cited reference screening which yielded no records, and a Google Scholar search was conducted to identify an additional three records.

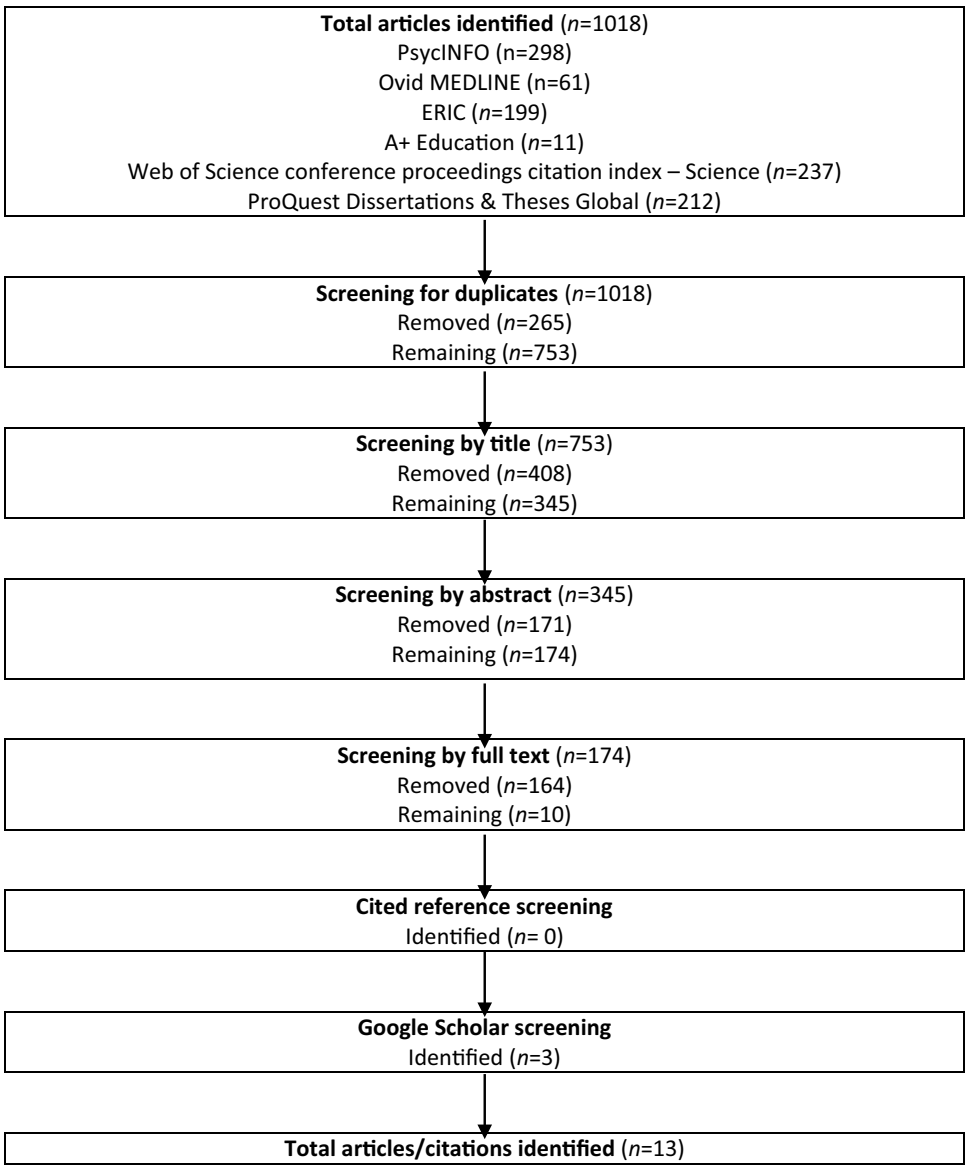

Fig. 1 Search strategy and outcomes

Studies excluded were those that dealt exclusively with school violence intervention, behaviour management practices, and other internalising and externalising problems (e.g. community violence and school bullying; Runge, Knoster, Moerer, Breinich, & Palmiero, 2017), as well as articles that described programs and their implementation, but did not evaluate the outcomes of these programs (e.g. McDermott & Cobham, 2014; Saltzman, Layne, Steinberg, Arslanagic, & Pynoos, 2003).

Data Extraction and Coding

Records were extracted by the author and coded according to the PICOS categories and additional variables, including (a) country where the study was conducted; (b) participant numbers and demographics; (c) type of trauma experienced (e.g. disaster, war, violence); (d) study design and measures; (e) type of intervention implemented; (f) tier levels included; (g) outcomes of the research; and (h) study limitations. Details of the identified studies are included in Table 1.

Results

Three-Tier Programs

Ten studies were identified as including three levels of intervention for trauma in schools (Cicchetti, 2017; Dorado, Martinez, McArthur, & Leibovitz, 2016; Garfin et al., 2014; Hansel et al., 2010; Hurley, Saini, Warren, & Carberry, 2013; Layne et al., 2008; McConnico, Boynton-Jarrett, Bailey, & Nandi, 2016; Perry & Daniels, 2016; Shamblin, Graham, & Bianco, 2016; Stokes & Turnbull, 2016). These programs varied in their application and evaluation of the tiers (e.g. Layne et al., 2008 evaluating only two of the three tiers) and included training and/or consultation for school staff and parents, social-emotional curriculum with all students and group-based intervention with at-risk students. Layne et al. (2008) conducted the only randomised control trial (RCT), while seven studies involved pre- and post-evaluation design, one a qualitative evaluation (Hurley et al., 2013), and one presented a post-program investigation (Cicchetti, 2017). There was clear variation in the use of validated and descriptive assessment tools, including school attendance and performance data (e.g. Dorado et al., 2016; Stokes & Turnbull, 2016), and staff and student attitudes and knowledge questionnaires (e.g. Student Attitude to School Survey; Teacher Opinion Scale). The University of California Los Angeles Post-Traumatic Stress Disorder Reaction Index for the Diagnostic and Statistical Manual of Mental Disorders IV (UCLA PTSD Index) was used to assess student PTSD in four of the identified studies. Two of the three-tiered models focused on processes underlying a trauma-informed approach rather than traditional whole-school behaviour management tiers, including relationship building and attachment, emotional and behavioural regulation, and post-trauma resilience and growth (Hansel et al., 2010; Stokes & Turnbull, 2016).

Four-Tier Programs

Three studies were identified as including intervention across four tiers of a trauma-sensitive model (Ellis et al., 2013; Holmes, Levy, Smith, Pinne, & Neese, 2015; Saint Gilles, 2016). These models included community and parent engagement, emotional/behavioural intervention for students, identification of students, and referral of students to mental health services. Two of these programs (Holmes et al., 2015; Saint Gilles, 2016) also involved weekly monitoring of the model with school staff for greater fidelity; however, this was not identified as a form of intervention (e.g. follow-up with school staff). Similar to the three-tiered programs, evaluation of aspects of the four-tiered models was limited (e.g. Saint Gilles, 2016). Some variation but also similarities was observed in the design and measures used to evaluate the programs, such as use of war-related measures and the UCLA PTSD Index by Ellis et al. (2013), and measures of children's internalising and externalising symptoms (e.g. Behaviour Assessment Scale for Children Second Edition [BASC-2] and the Achenbach System of Empirically Based Assessment [ASEBA]) used by Holmes et al. (2015) and Saint Gilles (2016).

Discussion

This systematic review evaluated the literature on multi-levelled, trauma-sensitive interventions in schools. The review identified 13 studies implementing three or more tiers of school-based support and training for childhood trauma. Many assessed components but not complete tiered systems in response to trauma, including qualitative and teacher-report data of student outcomes, and pilot evaluations. Many additional studies were excluded from this review because of the lack of specific evaluation of screening processes with students (e.g. Cohen et al., 2009) and training programs with staff. Studies involving screening may be viewed as multi-tiered, with universal screening constituting Tier 1 and targeted intervention with at-risk students constituting Tier 2. Unfortunately, school resources to screen and the limitations of measures to identify at-risk students require further consideration (see Gonzalez, Monzon, Solis, Jaycox, & Langley, 2015; Woodbridge et al., 2015).

Studies reported positive improvements in student academic achievement and behaviour (Holmes et al., 2015; McConnico et al., 2016; Saint Gilles, 2016; Stokes &

Table 1 Studies obtained from the systematic search on multi-tiered, trauma-focused interventions in schools

Citation	Country	Participants	Design	Intervention	Tier levels	Results	Strengths	Limitations
Cicchetti (2017)	USA	Students, school staff and hospital staff	Post-evaluation design	CBITS and bounce back	Three tiers: (1) training and supervision for staff, development of multidisciplinary teams, and implementation of trauma-informed practices; (2) CBITS and Bounce Back with students; and (3) connecting schools with behavioural health team with mental health providers	Schools with behavioural health teams identified and treated more students in Tier 2, and students engaged more with in-school and community-based services	Emphasis on internal school mental health collaboration and teams	Clinical perspective with limited information to assess program and outcome measures
Dorado et al. (2016)	USA	1243 students in the first year from four elementary schools; 47% female and 53% male; 38% African-American, 34% Hispanic or Latino, and 28% other; 175 teachers, administrators and school welfare staff	Retrospective pre–post-evaluation; HEARTS program evaluation survey; pre and post discipline referrals and suspensions; CANS scale pre, during and following intervention	UCSF Healthy Environments and Response to Trauma in Schools (HEARTS) based on the Attachment, Self-regulation and Competency (ARC) framework	Three tiers: (1) training for staff, parents and students; (2) small group wellness and training intervention for staff and at-risk students; and (3) crisis support for trauma-impacted teachers, families and students	Increased staff knowledge about trauma, trauma impacts and use of trauma-sensitive practices. Increased student learning, on-task behaviour and attendance, and decreased discipline referrals and suspensions. Improvements in CANS subscales of adjustment, regulation, intrusion, attachment and dissociation	Complete multi-tiered model of training and support presented for students, teachers and parents across three tiers	Use of retrospective pre- and post-evaluation. Little information on different levels of school staff (e.g. teachers compared to school counsellors)

Table 1 (continued)

Citation	Country	Participants	Design	Intervention	Tier levels	Results	Strengths	Limitations
Ellis et al. (2013)	USA	30 middle school refugee youth in English language learner class; 19 male and 11 female; 18 Somali and 12 Somali Bantu ethnicity	Pilot follow-up study; WTSS; PWA—Somali version; UCLA PTSD Index; DSRS; EDD; sense of belonging; acculturative hassles; Tier 3 program fidelity monitored through weekly clinician meetings	Supporting the Health of Immigrant Families and Adolescents (SHIFA)	Four tiers: (1) community engagement and parent outreach; (2) emotional management and resilience building intervention for students; and (3) and (4) identification of students and intensive services and mental health treatment (using TST)	Improved mental health and resources across all levels. Stabilisation of resources. Improved symptoms of depression and PTSD for Tier 2, 3 and 4 participants. Greater PTSD symptom improvement for Tier 3 or higher participants. Tier 2 reported lower depression than other tiers. Decrease in resource hardship across all tiers	Pre- and post- evaluation of student outcomes across multiple tiers	Limited evaluation on Tier 1 of the program. Focus on a small sample of refugee students. No evaluation of staff and parent outcomes
Garfin et al. (2014)	Chile	119 randomly selected second grade students from nine schools impacted by earthquake.	Pre- and post-evaluation study; TOCA-RR; PSC-CL; UCLA PTSD Index; measures of caregiver–child conflict, caregiver availability and ongoing earthquake worry	Skills for life (SFL)	Three tiers: (1) skills building training for children, teachers and parents; (2) group intervention for at-risk students, and their teachers and parents; and (3) referral of children with severe risk to external services	Lower PTSD and ongoing earthquake worry for children in indicated compared to Tier 1 intervention. At-risk children at universal and indicated Tiers did not reported greater PTSD symptoms than children not at-risk. Children in indicated programs reported less earthquake-related worry after controlling for other factors	Complete multi-tiered model of training and support presented for students, teachers and parents across two tiers	Limited distinction between Tier 2 and Tier 3. No evaluation of teacher and parent outcomes

Table 1 (continued)

Citation	Country	Participants	Design	Intervention	Tier levels	Results	Strengths	Limitations
Hansel et al. (2010)	USA	115 students receiving therapeutic intervention; 52.2% males and 47.8% females; students exposed to traumatic events	Pre- and post-intervention study; UCLA PTSD Index; TSCC	Rural school-based trauma treatment program implemented by the Louisiana Rural Trauma Services Centre	Three tiers: (1) relationship building; (2) trauma education and consultation for school staff and the community; and (3) trauma therapeutic services for youth (TF-CBT)	Reduced student trauma symptoms, including lowered overall PTSD, intrusion, avoidance/numbing and arousal, and lowered anxiety, depression and post-traumatic stress	Evaluation of classroom strategies to care for trauma-impacted students consistent with Stokes and Turnbull (2016)	Limited or no evaluation of teacher and parent outcomes
Holmes et al. (2015)	USA	81 preschool children referred for HSTS services; 64% male; 39% African-American, 15% non-Latino white, and 46% other or not specified	Pre- and post-program evaluation; CTES, ASEBA; CLASS	Head Start Trauma Smart (HSTS) based on the ARC model, TF-CBT, and early childhood mental health consultation	Four tiers: (1) training for school staff; (2) individualised trauma-focused intervention; (3) classroom consultation between mental health providers and teachers; and (4) staff peer mentoring	Improvements in teacher-reported student concentration, classroom behaviour and externalising symptoms, and parent-reported improvements in student externalising and internalising symptoms. Reported parent and teacher program satisfaction	Complete multi-tiered model of training and support presented for students, teachers and parents across multiple tier	Limited specific evaluation of Tier 1, 3 and 4 outcomes, including outcomes for parents and teachers

Table 1 (continued)

Citation	Country	Participants	Design	Intervention	Tier levels	Results	Strengths	Limitations
Hurley et al. (2013)	USA	25 early childhood educators, early childhood special educators, and Head Start teachers and administrators living in refugee resettlement communities	Qualitative study using semi-structured interviews	Response to intervention (RTI) pyramid model	Three tiers: (1) bonds and support provided to all children; (2) social and emotional strategies implemented for children in need of additional support; and (3) intensive behavioural intervention for children with significant and persistent behavioural difficulties	Qualitative themes: (1) preschool children's experience of violence, communication challenges and cultural misunderstanding leading to challenging school behaviour; (2) cultural issues, barriers and approaches (including relationships and structure) related to implementing elements of the model; and (3) responding to the needs and strengths of all students	Based on the response to intervention multi-tiered model for student intervention and support	Evaluation of the model only from the perspective of educators. The model does not include training and support of staff and parents. Qualitative only design
Layne et al. (2008)	Bosnia	127 war-exposed, bereaved and post-war impacted adolescents attending 10 schools in Bosnia; primarily Muslim students (63% female)	RCT using pre- and post-treatment, and 4-month follow-up; UCLA PTSD Index; DSRS; UCLA Grief Inventory	Evaluation of the TGCT intervention	Three tiers: (1) classroom education and coping skills intervention; and (2) trauma- and grief-focused group treatment (e.g. TGCT). Intervention also included school staff training and supervision in program implementation	Reduced PTSD and depression symptoms in both treatment and comparison groups, reduced depression and maladaptive grief reactions for treatment condition only, and improved PTSD and depressive symptoms at 4-month follow-up for treatment and comparison group	RCT of student outcomes	No evaluation of teacher and parent outcomes. Evaluation of two of the three tiers

Table 1 (continued)

Citation	Country	Participants	Design	Intervention	Tier levels	Results	Strengths	Limitations
McConnico et al. (2016)	USA	12 early childhood education teachers; 81% female; 68% aged 25–34 years; 250 kindergarten, first and second grade students	Pre- and post-pilot evaluation; CLASS; teacher self- perceived knowledge and confidence; teacher views of the program and student views of the strategies	Supportive trauma interventions for educators (STRIVE)	Three tiers: (1) training program for early childhood educators; (2) curriculum to promote self-esteem and efficacy among children; and (3) ongoing consultation and coaching for staff	Increased staff self-perceived knowledge of the impacts and effects of trauma in childhood. Little increase in self-perceived knowledge of available resources. Increased self-efficacy and confidence among staff. Endorsement of the importance of trauma-informed education for staff and the curriculum. Qualitative reports from staff that the program assisting student emotion regulation, prompted continued classroom engagement, reduced behavioural disruptions and promoted a positive classroom climate	Outcomes based on qualitative self-report from students and staff, and pre- and post-evaluation with staff	Qualitative evaluation of student outcomes and no evaluation with parents

Table 1 (continued)

Citation	Country	Participants	Design	Intervention	Tier levels	Results	Strengths	Limitations
Perry and Daniels (2016)	USA	School servicing 410 students from pre-kindergarten through 8th grade; 82% African-American, 13% Hispanic or Latino, and 5% white; 32 teachers and/or administrators; 77 clinical service students from 5th- and 6th-grade classrooms	Pilot study using pre- and post-measures; PD satisfaction survey; student-focused satisfaction survey; UCLA PTSD Index	Clifford beers clinic (CBC) professional development, care coordination and clinical service components	Three tiers: (1) education for staff and students; (2) and (3) identification and individual referral, or CBITS intervention for small groups of students, as well as continued teacher consultation	Staff reported training satisfaction, increased self-care, recognition of trauma, changed attitudes regarding trauma, and knowledge of classroom stress reduction strategies. Improved staff–family communication and parent advocacy for the program. Student reported increased recognition of stress and knowledge of help sources. Some reduction in PTSD symptoms in CBITS group	Evaluation of and improvement in teacher, student and parent outcomes and collaboration	Pilot study conducted in one school. Limited use of standardised measures of program outcomes
Saint Gilles (2016)	USA	Head Start preschool setting including agency-level participants ($n=5$), teachers ($n=10$) and children ($n=106$)	Experimental design, pre- and post-intervention evaluation; DCEAP2; BASC-2; STSES	Head start trauma smart (HSTS) program	Four tiers: (1) training for school staff; (2) individualised trauma-focused intervention; (3) classroom consultation between mental health providers and teachers; and (4) staff peer mentoring	No changes in teacher-reported confidence to manage secondary PTSD. Reduced internalising difficulties for children in the intervention compared to the comparison group	Included tiers focusing on teachers, students and other school personnel	Low reported program fidelity. Limited distinction between Tier 1 and Tier 3 and Tier 4 results

Table 1 (continued)

Citation	Country	Participants	Design	Intervention	Tier levels	Results	Strengths	Limitations
Shamblin et al. (2016)	USA	11 preschool classrooms across five elementary schools; 11 teachers teaching 217 students; 550 Head Start children in 28 classrooms; 28 teachers and home visitors	Pre- and Post-intervention study; TOS; PMHCS; DECA; ECMHC satisfaction survey	Partnership Program for Early Childhood Mental Health and Project LAUNCH based on the Early Childhood Mental Health Consultation (ECMHC)	Three tiers: (1) Training for staff and social-emotional curriculum with students; (2) individual parent–teacher and teacher consultation; and (3) assessment and TF-CBT, and parent–child interactive therapy intervention	Improved teacher self-perceived confidence and hopefulness to manage challenging behaviours, decrease in use of negative behaviour management strategies and classroom stress, decreased negative attributes of the learning setting, and increased teacher ratings of child resilience	Complete multi-tiered model of training and support presented for students, teachers and parents across three tiers	Limited evaluation of Tier 3 intervention and distinction between Tier 1 and Tier 2 staff training
Stokes and Turnbull (2016)	Australia	52 grade 5 to 8 students from one primary school, and one combined primary and secondary school; 28 teachers and school leaders	Pilot pre- and post-intervention study using focus groups with staff and students; SASS; academic and school suspension data	Berry Street Education Model (BSEM).	Three tiers: (1) repairing students regulatory abilities; (2) repairing students disrupted attachments; and (3) increasing students psychological coping to promote post-traumatic growth. Teacher and staff training implicit in the model	Improvements in self-perceived preparation of teachers, increased student self-regulation during transition, perceived peer and student–teacher relationship improvements, improved student academic achievement and concentration, changed classroom discipline and management practices	Evaluation of classroom strategies to care for trauma-impacted students consistent with Hansel et al. (2010)	No inclusion of parents in the model. Level of teacher training and consultation is unclear

ASEBA Achenbach System of Empirically Based Assessment Second Edition, *BASC-2* Behaviour Assessment Scale for Children, *CANS* Child and Adolescent Needs and Strengths, *CBITS* Cognitive Behavioural Intervention for Trauma in Schools, *CLASS* Classroom Assessment Scoring System, *CTES* Childhood Trust Events Survey, *DECA* Devereux Early Child Assessment, *DECAP2* Devereux Early Childhood Assessment Preschool Program, *DSRS* Depression Self-Rating Scale, *EDD* Everyday Discrimination Scale, *PMHCS* Preschool Mental Health Climate Scale, *PSC-CL* Paediatric Symptom Checklist for Chile, *PWA* Post-War Adversities Scale, *SASS* Student Attitude to School Survey, *STSES* Secondary Trauma Self-Efficacy Scale, *TF-CBT* Trauma-focused Cognitive Behavioural Therapy, *TGCT* Trauma and Grief Component Therapy, *TOCA-RR* Teacher Observation of Classroom Behaviour Revised for Chile, *TOS* Teacher Opinion Scale, *TSCC* Trauma Symptoms Checklist for Children, *TST* Trauma Systems Therapy, *UCLA PTSD Index* University of California Los Angeles Post-Traumatic Stress Disorder Reaction Index for the Diagnostic and Statistical Manual of Mental Disorders IV, *WTSS* War Trauma Screening Scale

Turnbull, 2016) using qualitative methods and behaviour rating scales (e.g. ASEBA and BASC-2). Studies also indicated reduced depression and PTSD symptoms (Ellis et al., 2013; Hansel et al., 2010; Layne et al., 2008; using the Depression Self-Rating Scale [DSRS] and UCLA PTSD Index), and increased self-perceived knowledge and confidence of staff (Dorado et al., 2016; McConnico et al., 2016; Perry & Daniels, 2016; Shamblin et al., 2016), using mostly non-validated measures and qualitative methods. Research with greater use of validated and standardised assessment tools to measure staff and student outcomes is required.

However, in addition to screening processes, many studies did not assess teacher and parent outcomes (e.g. Holmes et al., 2015; Layne et al., 2008), and all excluding Cicchetti (2017) failed to examine community and external service collaborations. Studies also neglected to integrate findings within existing school-wide PBS and MTSS frameworks, as recommended in the literature (Chafouleas et al., 2016; Phifer & Hull, 2016; Plumb et al., 2016; McDermott & Cobham, 2014; Reinbergs & Fefer, 2018; Weist et al., 2018). This is likely because several of the identified studies evaluated teacher training and student outcomes within already at-risk populations, including children in out of home care, and children from refugee and war-affected backgrounds. These teachers and students are likely to operate within Tier 2 and Tier 3 intervention, rather than within traditional 'triangle' models. Further evaluation of Tier 1 universal 'preventative' intervention is warranted.

However, the strength of these studies is that they provide guidance for integration of multi-tiered trauma approaches into existing school multi-tiered frameworks. Staff training and/or consultation was mentioned by eleven studies, along with community engagement and awareness mention by four studies, training and support for parents by six articles, and student support and classroom curricula mentioned by all studies. Individual parent and student treatment, and group-based student support using the CBITS and Trauma-focused Cognitive Behavioural Therapy (TF-CBT) programs were also implemented and evaluated (Hansel et al., 2010; Perry & Daniels, 2016; Shamblin et al., 2016). Other programs such as Trauma and Grief Component Therapy (TGCT) also showed promise in terms of improved trauma outcomes (Layne et al., 2008).

There were several discrepancies across the programs regarding what constituted Tier 1 compared to Tier 2 and Tier 3 intervention. Alignment of the tiers within existing evidence-based approaches may help to improve the focus and outcomes of research. For example, for some of the programs, there is difficulty determining which aspects of the intervention constituted different tiers or levels of the models (e.g. Holmes et al., 2015; Perry & Daniels, 2016) and how school culture changed to adopt the trauma-informed approach.

In terms of other weaknesses, while several of the articles reported positive impacts for students and staff, only one study was a RCT (Layne et al., 2008), with most providing pre- and post-follow-up data. The nature of these interventions, often in response to adverse events, means that RCTs may not be the most appropriate research design approach for ethical and practical reasons. Longitudinal quasi-experimental evaluations in which different tiers of the intervention are provided to staff and students should be considered. Many studies also failed to evaluate outcomes of teacher training and/or consultation, and further consideration of a multi-stakeholder perspective in implementation and evaluation of multi-tiered, trauma-sensitive approaches in schools is required. This is particularly in the light of research demonstrating teachers' experiences of helplessness and secondary trauma in relation to childhood trauma, popularity of teacher-mediated mental health programs in schools, and the impact of training on staff responses to trauma-impacted students (Alisic, 2012; Alisic et al., 2012; Berger, Carroll, Maybery, & Harrison, 2018; Dyregrov, 2009; Dyregrov et al., 1999). It is likely that several studies were excluded from the current review because the impacts of teacher training and consultation were not evaluated.

Implications

As indicated previously, one of the main limitations of research on multi-tiered models of trauma care in schools is the lack of inclusion and evaluation of school staff training within these frameworks. A meta-review found that six of the eleven post-natural disaster and conflict interventions were implemented by teachers, and therefore involved training and supervision of teachers (Fu & Underwood, 2015). Based on school-wide 'triangle' models and research in other areas (Simonsen et al., 2014), the following theoretical model (Fig. 2) is proposed to help guide evaluations with teachers and align teacher training within existing three-tiered models in schools. This model is also based on research regarding the training and consultation needs of staff (Dorado et al., 2016), and the differing expertise of teachers and school mental health staff (e.g. school counsellors) identified within this review (Holmes et al., 2015; McConnico et al., 2016; Perry & Daniels, 2016; Saint Gilles, 2016).

As shown in Fig. 2, three tiers are proposed for teacher intervention and evaluation, including Tier 1: universal training for all school staff regarding childhood trauma; Tier 2: consultation between teachers and school mental health staff; and Tier 3: consultation between school mental health staff and external professionals (e.g. psychologists, mental health clinicians). Tier 2 and Tier 3 acknowledge the consultative role of school mental health staff with teachers, and importance of external

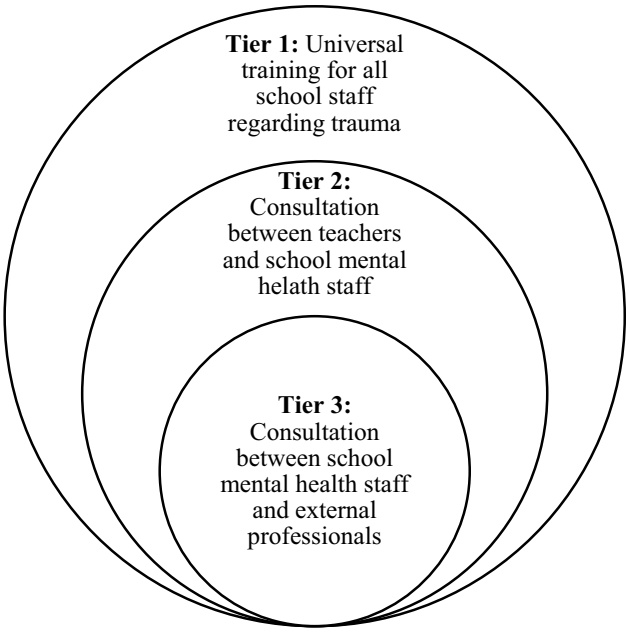

Fig. 2 Three-tiered trauma model for staff training and support in schools

community and clinician engagement identified within this review (Cicchetti, 2017; Ellis et al., 2013; Hansel et al., 2010). While the benefits of teacher training have been demonstrated briefly, evaluation of the effectiveness of tiered systems of staff training on staff and student outcomes and teaching practices is required.

Limitations

Although this study aimed to only include studies that used and evaluated multiple tiers of education and support for staff, students, and/or parents regarding trauma, it became apparent during the conduct of this review that several studies included but did not evaluate some tiers of training and support. Studies of teacher training and support in particular, as well as implementation of Tier 1 positive behaviour support practices, are required. There also needs to be greater consideration of the role of parents, other school personnel (e.g. school counsellors, school leadership teams), and external professionals (e.g. psychologists and community services) in delivery and evaluation of trauma-informed approaches. The model presented in Fig. 2 informs greater inclusion of school and external mental health providers. As research continues in this area, greater use of quasi-experimental designs with an un-randomised comparison group would be appropriate, as well as evaluation of program sustainability and fidelity using longitudinal processes.

Conclusion

Overall, research on multi-tiered frameworks in response to trauma is limited but growing. Greater consistency in research methods and interventions (potentially though alignment with school-wide PBS) could improve the evidence and potentially the uptake of trauma-informed approaches in schools. The studies presented in this review provide guidance and structure for selecting, implementing, and evaluating multi-tiered, school-based trauma programs in future.

Compliance with Ethical Standards

Conflict of interest The author declares that she has no conflict of interest.

Ethical Approval This article does not contain any studies with human participants or animals performed by the author.

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