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Primary Care Interventions to Prevent or Treat Traumatic Stress in Childhood: A Systematic Review

Anna Flynn, MHS[1], **Kate E. Fothergill, PhD**[2,*], **Holly C. Wilcox, PhD**[1,3], **Elizabeth Coleclough, MPH**[2], **Russell Horwitz, MD**[3], **Anne Ruble, MD**[3], **Matthew D. Burkey, MD**[3], and **Lawrence Wissow, MD**[2,3]

Kate E. Fothergill: kfother1@jhu.edu; Holly C. Wilcox: hwilcox1@jhmi.edu; Elizabeth Coleclough: ecolecl1@jhu.edu; Russell Horwitz: rhorwitz@jhmi.edu; Anne Ruble: aruble@jhmi.edu; Matthew D. Burkey: mburkey1@jhmi.edu; Lawrence Wissow: lwissow@jhmi.edu

[1]Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, 624 N. Broadway, Baltimore, MD, 21205, USA

[2]Department of Health Behavior and Society, Johns Hopkins Bloomberg School of Public Health, 624 N. Broadway, Baltimore, MD, 21205, USA

[3]Department of Psychiatry & Behavioral Sciences, Johns Hopkins University School of Medicine, 600 N. Wolfe Street, Baltimore, 21205, MD, USA

Abstract

Background—Primary care interventions addressing child traumatic stress exist but their range and effectiveness is unclear.

Objectives—To systematically assess the evidence base for prevention and treatment of child traumatic stress in primary care settings.

Data Sources—PubMed, Embase, PsycINFO, Scopus, Academic Search Complete, CINAHL, Web of Science, Cochrane Library, the National Registry of Evidence-based Programs and Practices, the National Child Traumatic Stress Network website, Google search.

Study Eligibility Criteria, Participants, and Interventions—Studies were eligible for inclusion if they described the results of intervention studies in a primary care setting addressing child traumatic stress. Study participants could include primary care providers, pediatric patients, and their parents or other caregivers.

Study Appraisal and Synthesis Methods—Each study was assessed for inclusion and each included study was assessed for risk of bias by two reviewers.

Correspondence concerning this article should be addressed to Anna Flynn, MHS, Johns Hopkins University, 624 N. Broadway Room 896, Baltimore, MD 21205; aflynn3@jhu.edu; phone: 571-214-5827.

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Results—We found 12 articles describing 10 different studies that met the inclusion criteria. The intervention approaches taken in the studies were diverse and included the implementation of screening programs/tools, training clinicians to recognize and discuss psychosocial issues with patients and their families, and providing primary care professionals with community resource lists. Nine out of 10 studies included in the review reported favorable results.

Limitations—Studies included in the review had relatively short follow-up periods and the diversity of studies identified precluded the possibility of conducting a meta-analysis.

Conclusions and Implications of Key Findings—Findings suggest that interventions in pediatric primary care settings are feasible and can favorably impact clinical practices and families' outcomes.

MeSH Key Words

Stress Disorders; Post-Traumatic; Child; Infant; Infant; Newborn; Child; Preschool; Adolescent; Primary Health Care; Secondary Prevention; Tertiary Prevention; Primary Prevention

Introduction

Social scientists have long pointed out that humans' social environment has a profound and sustained impact on emotional and physical health.[1] Neuroscientists have extended this work to propose that the brain is responsible for regulating the behavioral, autonomic, and immune responses to the social environment, particularly for perceptions of relative safety and threat.[2] An NIMH consensus panel suggested that there may be discrete brain circuits associated with both acute and chronic stressors.[3] The brain's response to threats can vary greatly by an individual's developmental status and beliefs about the causes of the threat and ability to survive or overcome them.[4] When threats are interpreted as significantly life-threatening or negatively life-changing, we often refer to them as traumatic and become concerned about both short and long-term impact on health.[5–16]

The National Child Traumatic Stress Network (NCTSN) separates these more serious threats into two main categories, acute and chronic. Acute traumatic events include witnessing violence, facing imminent threats of injury, or experiencing violation of personal physical integrity (e.g., school shootings, sudden or violent loss of loved one, sexual assault). Chronic traumatic situations occur repeatedly over long periods of time (e.g., living with abusive parents or in poverty). Using these and similar definitions, general population studies have found that more than two-thirds of children and adolescents report past or present exposure to at least one form of trauma.[7,8,9]

Response to stressors is highly variable and can be immediate or delayed. Predictors include both personal characteristics such as temperament and environmental characteristics such as social support.[4] There is evidence that specific psychological interventions can help prevent or ameliorate the development of long-term consequences including post-traumatic stress disorder,[16] which is associated with myriad mental and physical problems in adults.[17] The American Academy of Pediatrics (AAP) advocates that pediatricians do more to address trauma, not only because of the developmental and behavioral support offered by primary care providers (PCPs), but also because of their ability to identify and treat early physiologic

markers that may be associated with adverse physiologic responses (e.g., abnormal weight, blood pressure, and glucose and lipid metabolism).[18]

By building longitudinal and broadly-based relationships with families, PCPs can become part of an ongoing support system and serve as a point of entry and coordination for additional services.[19,20] Primary care practices have long made referrals for emotional and behavioral problems, but it is only recently that PCPs have begun to consider the extent to which they can help to identify and address trauma-related physical and psychological problems. Given that the 2010 Patient Protection and Affordable Care Act requires coverage of screening for depression and that Medicaid's Early and Periodic Screening, Diagnosis, and Testing requires children to be screened for mental health problems,[21] the use of screening interventions within the pediatric medical home is likely to increase over time.

The challenge lies in determining which interventions are feasible, sustainable, and effective for use in the pediatric primary care setting. Pediatric providers face a number of challenges to providing more mental health services, such as limited training on how to address the psychosocial concerns of their patients.[21] The goal of this systematic review was to examine the existing evidence base on preventing and addressing traumatic stress exposure in pediatric primary care to better understand what is effective in this setting. Specifically, we aimed to identify the types of interventions that have been implemented and assess their impact on a variety of outcomes including provider behavior and, where studied, clinical outcomes.

Methods

Database Search

We searched the following databases: PubMed, Embase, PsycINFO, Scopus, Academic Search Complete, CINAHL, Web of Science, and the Cochrane Library. In addition, we searched the National Registry of Evidence-based Programs and Practices, the National Child Traumatic Stress Network website, and conducted a general web search using Google. The database search strategy was formulated around terms for "child" AND "abuse or trauma or violence or mass casualty or bereavement" AND "mental health" AND "primary care" (Figure 1). The earliest publication date was open while the search ended on December 31, 2013. Search results were exported from each database, and imported into RefWorks for de-duplication and review. Reference sections of included articles were searched, in addition, to identify articles published from January 1990 – December 2013.

Selection of Articles

The review was limited to peer-reviewed, original research articles in English. To be eligible for inclusion in the review, studies had to describe an intervention for the prevention of circumstances in which a child might experience traumatic stress, or for the treatment of child traumatic stress, and be carried out in a pediatric primary care setting. Studies carried out in specialty settings (e.g., emergency room, pediatric orthopedics) were excluded because we were interested specifically in interventions carried out in routine primary care. We also excluded studies of adult survivors of abuse and studies conducted in practice

settings dissimilar to those encountered in the United States such as in developing countries. Included studies describe efficacy, effectiveness, or efficiency studies (there was no requirement that there be a control group or that group allocation be randomized); case reports, opinions, and reviews were excluded.

Each study was assessed for inclusion by two authors in a stepwise fashion, first by reading the title, then by reviewing the abstract, and finally by reviewing the full text of each study article as necessary. This was carried out first in independent assessments and then findings were compared and consensus was achieved on which studies to include in the next step. Data were extracted from included studies independently by two authors using a data extraction tool designed by the lead author. Variables for which data were sought are listed in Figure 2. Each of the studies included in the review was assessed for potential bias according to the Cochrane "Risk of Bias Tool"[22] by two reviewers. We assessed selection bias (sequence generation, allocation concealment), performance bias (subject and staff blinding), detection bias (outcome assessment blinding), attrition bias (incomplete outcome data), and reporting bias (selective reporting) for the randomized controlled trials and attrition and reporting bias for observational studies. Possible ratings for each domain were "low," "high," or "unclear."

Results

After removing duplicates, 1,711 articles were identified through database searches, and an additional 24 articles were identified by hand-searching the references of included full-text articles and review articles (Figure 3). We eliminated 1,675 records in the title and abstract reviews because they were 1) not relevant to the review topic, 2) focused on ascertaining prevalence of various disorders and exposures rather than on intervention evaluation, 3) focused on adults, or 4) carried out in a specialty setting. Thirty-six full-text articles were reviewed for eligibility. Twenty-four of the full-text articles were excluded because they did not describe intervention studies, did not report intervention outcomes, were conducted in settings too dissimilar to the United States, were not carried out in a primary care setting, or were focused on developmental rather than trauma screening. Twelve articles reporting the results of 10 separate studies were included the final review (Table 1).

Studies included in the review fell into three categories: 1) those in which outcomes were reported among health professionals (5 studies), 2) those in which outcomes were reported among parents and/or children (3 studies), and 3) those in which outcomes were reported among both health professionals and parents or children (2 studies). Out of 10 studies, 6 were randomized controlled trials,[23,24,25,26,27,28,29,30] and 4 were observational studies.[31,32,33,34]

Populations

The 10 included studies were carried out in diverse settings, including outpatient pediatric clinics of large urban teaching hospitals,[31,32,29] pediatric primary care practices,[23,25,26,27,33] primary care public health clinics,[30] and Women, Infants & Children clinics.[30] Seven studies targeted providers. Four of these were conducted among resident physicians,[31,32,29,25,26,27] three were conducted among various health professionals working

at primary care sites,[23,34,30] and one was conducted among practicing pediatricians.[33] Five studies targeted children, two based on parent's/mother's report of child behavior (parents of children ages 7–15[23] and mothers of children ages 18 months to 18 years[30]) and three based on parent's report and medical chart review (children ages 0–5 years old[24,26] and children ages 2 months to 10 years[29]).

Interventions

There was a wide range of intervention types across the studies included in the review (Table 2). In most cases, interventions had multiple components so it was not possible to isolate the effects of individual components. In four studies, clinicians were taught to use a particular model/program or screening questionnaire with follow-up based on parent or caregiver responses. These included the Safe Environment for Every Kid (SEEK) Parent Screening Questionnaire (PSQ),[24,25,26,27,28] the Pediatric Symptom Checklist (PSC),[23] and the WE CARE family psychosocial screening tool.[29] The SEEK version of the PSQ (for parents of children ages 0–5 years) has an emphasis on safety (number for poison control, fire alarms, gun in home), domestic violence exposure, parental/caregiver drug abuse, maternal depression, and major parental stress.[24] The PSC is a psychosocial screen designed to facilitate the recognition of cognitive, emotional, and behavioral problems among children and teens with items pertaining to symptoms of internalizing, externalizing, and attentional disorders/behaviors.[23] The WE CARE tool assesses parental drug use, parental depression, domestic violence exposure, child abuse, housing situation, education and employment among parents of children ages 2 months to 10 years.[29] Following screening, various procedures were followed to address identified problems. Typically, clinicians were trained to discuss the results of screening with parents. Other intervention elements were implemented as well, including referrals to parenting programs such as Positive Parenting, a telephone-based parenting curriculum[23] and referral to a social worker.[24] In one study,[30] the intervention consisted of giving out a wallet-size referral card and making nurse case-management sessions available to parents.

Some studies involved training clinicians on how to recognize and address various issues (without the use of a screener) including child maltreatment, domestic violence, and psychosocial risk factors.[31,32,34] Other intervention elements included having resident physicians spend a rotation with ambulatory clinic and psychiatry faculty and visit community agencies to learn about biosocial and developmental problems,[31] providing clinicians with a list of local resources to improve their capacity to make referrals,[32] placing posters related to domestic violence prevention throughout a primary care site,[32] conducting role play sessions to improve communication with patients,[32] training providers on how to work cooperatively with a social worker,[28] and providing clinicians with a manual on psychosocial issues.[33,34]

Outcomes: Primary care providers

Table 4 reports the principal provider outcomes for each study. As a group, the studies found increased rates of screening and increased clinician confidence to carry out screening. Three studies reported changes in percentage of patients receiving screening. In one, screening rates for parent exposure to domestic violence increased from 21% pre-intervention to 46%

after implementation of an education program on domestic violence.[32] Two years after implementation of the SEEK model among health professionals, intervention group providers screened significantly more patients than did providers in the control group.[25] After implementation of the SEEK model (provider training, screener use, coordination with social workers, handouts) among pediatric residents working in a primary care clinic, screening increased from 16% to 88% in the intervention group compared to almost no change in the control group.[28]

Six studies found improvements in self-assessments by clinicians. In one study, a rotation for residents resulted in increased perceived competence and more positive attitudes towards patients with psychosocial problems.[31] Other findings included increased intentions to screen, improved comfort with screening, increased perceived usefulness of particular screening tools or handbooks, and increased awareness of community resources for patients.

Outcomes: Parents/children

Principal patient outcomes for each study are reported in Table 4. Five studies reported outcomes among parents and children, four of which provided evidence of reductions in risk or occurrence of trauma or increases in referrals to community resources. Two studies compared Child Behavior Checklist (CBCL) scores between intervention and control groups.[23,30] In one of these, there was no significant difference in CBCL scores between children in the intervention group (family received nurse case-management after identification of exposure to maternal abuse) and the control group at 24 months after baseline.[30] In the other study, significant improvement in CBCL scores for the intervention group (screening) compared to control groups was found for aggressive and delinquent behavior and attention problems but not anxiety/depression 9 months after baseline assessment.[23] The two other studies finding a reduction in risk used the SEEK model as the intervention and child maltreatment as the outcome. In both low- and high-risk populations, the SEEK intervention group had lower rates of maltreatment by parents one year or more after baseline.[24,26] These four studies were all randomized controlled trials.

Another study reporting outcomes among parents and children measured the occurrence of referral by clinical social workers through medical chart review; parents in the intervention group received more referrals than those in the control group.[29] Other outcomes measured in studies among parents and children included instances of possible medical neglect, less harsh punishment reported by parents, unmet desires on the part of parents for discussion with the clinician, percent of parents reporting that their child needed to be hit or spanked, and fewer injuries resulting from physical fights with peers.

Study Quality

The 10 studies included in this review varied in terms of quality. Over half of the studies were randomized controlled trials. Research staff were blinded to allocation of subjects in only one study[23] though this is understandable given the nature of the interventions; allocation concealment would have been impossible in many instances. Staff assessing outcomes from medical records were blinded in only two studies.[23,29] Those studies for which methods of dealing with missing data were reported dropped subjects with missing

outcomes data from the analysis.[30,32] We assessed each of the studies specifically for potential for various forms of bias (see Table 3). Risk of bias was generally low overall though there were some exceptions. In particular, subject/staff blinding, outcome assessment blinding, and incomplete outcome reporting were areas of concern in a number of studies in that our ratings were either high or unclear. The four randomized trials reporting clinical outcomes (e.g. CBCL scores, child maltreatment as measured in the SEEK studies) were of mixed quality, with the two SEEK studies having low or unclear risk of bias and the two studies reporting CBCL scores having relatively high risk of bias (see Table 3).

Discussion

There is a growing interest in integrating the prevention and management of trauma-related problems into pediatric primary care visits, yet very little is known about effective approaches to address trauma in this setting. According to an AAP policy statement, “the reduction of toxic stress in young children ought to be a high priority for medicine as a whole and for pediatrics in particular.”[35] This paper reviewed the literature on evidence-based trauma interventions in pediatric primary care to improve our knowledge of different types of interventions and their effectiveness.

We identified ten studies implementing interventions in primary care settings to prevent or mitigate the impact of childhood traumatic stress. Over half (six) used randomized designs, and four were non-randomized intervention studies. Seven of the interventions targeted medical providers (including pediatric residents) and five targeted parents and children. The interventions combined included approximately 4000 health care providers. The interventions focused on training (to increase PCP’s knowledge, attitudes, confidence and competence), screening, linkage to social workers, nurse case management, and education materials (e.g., a handbook) and resource booklets for both doctors and families.

Authors of nine of the ten studies concluded that the interventions studied had a positive impact on their intended outcomes. The findings suggest that training/education and screening interventions in primary care settings can enhance a range of provider skills and increase provider knowledge and perceived competence. Reductions in adverse child outcomes such as child physical abuse and maltreatment (as assessed by parental and Child Protective Services report), domestic violence exposure, delinquent behavior, aggression, and injury were achieved by a majority of the interventions that measured these outcomes. The interventions also increased discussions about psychosocial issues during clinic visits and improved referral rates. In particular, in three out of four studies reporting clinical outcomes among children, significant changes were seen in the intervention group in terms of child maltreatment outcomes and change in CBCL scores. However, in the study by McFarlane and colleagues there was no significant impact of nurse case management on CBCL scores in the intervention group compared to the control group. It may be that the use of abuse assessments for both groups positively affected outcomes for all participants.[30] It should be noted that iatrogenic effects of screening or the other interventions were not reported by any of the included studies.

These positive findings are tempered by the fact that, although they derive in part from four randomized trials, only one of the interventions (the SEEK model) has been replicated, and follow-up periods in some studies were very short. More research is needed on the long-term impact of these interventions on both parental and child outcomes. More also remains to be known about the feasibility and sustainability of the interventions in clinical practice settings. The SEEK[24,25,26,27,28] and other studies[23,29,30,31,32] used multicomponent, coordinated interventions that might not all be possible in some practices and service systems. Understandably, these initial studies were not implemented at a large enough scale to determine the individual effects or interactions of specific treatment components. Future research in this area should focus on replicating results, isolating the effects of individual intervention components, and reducing bias risk in study design by randomizing subjects to intervention and control groups and blinding study staff and patients to group allocation.

As noted by Dubowitz and colleagues.,[24] although the role of pediatrics has evolved to include recognizing and addressing psychosocial problems such as trauma exposure in families, there has been only a modest shift in practice to proactively identify and treat trauma exposure.[36,37,38,39] Part of this could be attributable to real and perceived barriers such as lack of time or training, lack of ease and efficiency in accessing community mental health resources, and discomfort addressing sensitive issues. The studies in this review were able to address many of these barriers. For example, to reduce screening time, Garg, et al.[29] and Dubowitz, et al.[24] administered the screen in the waiting room before the visit. These authors found that their programs did not add time to visits or added only 1–2 minutes.[26,29] However, it is not known whether the discussion of family psychosocial problems may have displaced other recommended anticipatory guidance topics during the visit and healthcare providers who adopt screening programs should be mindful of this. Clinicians have cited lack of insurance reimbursement as a barrier to the incorporation of evidence-based strategies into the pediatric medical home.[40] However, Lane and colleagues found that the SEEK cost about $5 per family but estimated that the dissemination of the model to 100,000 families could save $37 million in medical, mental health, and social services costs, which is highly relevant to both healthcare providers and policy makers.[41]

These findings should be discussed in the context of several limitations. The risk of publication bias is high as only one of the included studies had negative findings. We included only studies in the English language. The heterogeneity in screeners used, outcomes assessed, and age range targeted across the included studies precluded a meta-analysis. We are not aware of whether the interventions were sustained, and long-term impact (over three years) was not studied. A broad range of populations is represented by the studies included in this review, including both high and low income families, public and private hospital or clinic settings, and a diversity of geographical locations throughout the United States and other countries. While this indicates that approaches to preventing and treating child traumatic stress in primary care settings can be effective in a variety of settings, it should be noted that each individual study included in our review is generalizable only so far as the results are applied to populations similar to those studied. In addition, the training and qualifications of those delivering interventions was quite diverse across those studies that reported such information, including psychologists, social workers, pediatricians, pediatric residents, doctors, nurses, counsellors, occupational therapists, and

case managers. Despite these limitations, this review fills a major gap in the literature. The group of included studies collectively demonstrates that interventions to prevent and treat child traumatic stress are feasible and can have a favorable impact on health professionals' clinical practices and families' outcomes.

The current evidence suggests that primary care may be well suited to implementing interventions related to prevention, detection, and early intervention of trauma-related problems. Our review highlights the impact and effectiveness of primary care-based trauma interventions. Issues of cost-effectiveness and sustainability of the interventions reviewed remain to be studied in depth.

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What this Systematic Review Adds

- Identification of interventions for child traumatic stress in primary care
- Assessment of quality of studies of child traumatic stress interventions inprimary care
- Promising evidence supporting further implementation and testing of interventions for child traumatic stress in primary care settings

How to Use this Systematic Review

- Become familiar with the range of interventions addressing child traumatic stress in primary care settings
- Consider implementing and further testing interventions for child traumatic stress in primary care

Child	(“child”[MH] OR “child”[tw] OR “children”[tw] OR “infant”[MH] OR “infant”[tw] OR “infants”[tw] OR “adolescent”[MH] OR “adolescent”[tw] OR “adolescents”[tw] OR “baby”[tw] OR “babies”[tw] OR “toddler”[tw] OR “toddlers”[tw] OR “teenager”[tw] OR “teenagers”[tw] OR “teen”[tw] OR “teens”[tw] OR “newborn”[tw] OR “newborns”[tw] OR “preteen”[tw] OR “preteens”[tw] OR “youth”[tw]) AND
Abuse/Trauma	(“child abuse”[MH] OR “child abuse, sexual”[MH] OR “child abuse”[tw] OR “sexual abuse”[tw] OR “battered child syndrome”[MH] OR “battered child syndrome”[tw] OR “neglect”[tw] OR “neglected”[tw] OR “maltreat” [tw] OR “maltreated”[tw] OR “maltreatment”[tw] OR “mistreat”[tw] OR “mistreated”[tw] OR “mistreatment”[tw] OR “molest“[tw] OR “molested”[tw] OR “molestation”[tw] OR “munchausen syndrome”[tw] OR “corporal punishment”[tw] OR “harsh parenting”[tw] OR “physical punishment”[tw] OR “traumatic injury”[tw] OR “ill-treat”[tw] OR “ill-treated”[tw] OR “ill-treatment”[tw] OR “victimize”[tw] OR “victimized”[tw] OR “victimization”[tw] OR “torture”[tw] OR “tortured”[tw] OR “terrorize”[tw] OR “terrorized”[tw] OR “cruel treatment”[tw] OR “harsh treatment”[tw] OR “violence”[MH] OR “violence”[tw] OR “violent”[tw] OR “domestic violence”[MH] OR “assault”[tw] OR “assaulted”[tw] OR “spouse abuse”[tw] OR “spousal abuse”[tw] OR “terrorism”[MH] OR “terrorism”[tw] OR “terrorist”[tw] OR “terrorize”[tw] OR “terrorized”[tw] OR “mass casualty”[tw] OR “mass casualties”[tw] OR “disasters”[MH] OR “disasters”[tw] OR “disaster”[tw] OR “earthquake”[tw] OR “earthquakes”[tw] OR “flood”[tw] OR “flooding”[tw] OR “floods”[tw] OR “hurricane”[tw] OR “hurricanes”[tw] OR “tropical storm”[tw] OR “tropical storms”[tw] OR “chemical spill”[tw] OR “chemical spills”[tw] OR “parental death”[MH] OR “parental death”[tw] OR “maternal death”[tw] OR “paternal death”[tw] OR “family death”[tw] OR “death in the family”[tw] OR “grief”[MH] OR “bereavement”[MH] OR “grief”[tw] OR “grieving”[tw] OR “bereavement”[tw] OR “mourning”[tw] OR “mourn”[tw] OR “parental separation”[tw] OR “separation from a parent”[tw] OR “caregiver separation”[tw] OR “separation from a caregiver”[tw] OR “maternal separation”[tw] OR “paternal separation”[tw]) AND
Mental Health	(“mental disorders”[MH] OR “mental disorder”[tw] OR “mental disorders”[tw] OR “depression”[tw] OR “depressive disorder”[tw] OR “depressive disorders”[tw] OR “stress disorders, traumatic”[MH] OR “stress disorders, post-traumatic”[MH] OR “stress, psychological”[MH] OR “stress disorder”[tw] OR “stress disorders”[tw] OR “traumatic stress”[tw] OR “traumatize”[tw] OR “traumatized”[tw] OR “traumatization”[tw] OR “anxiety disorder”[tw] OR “anxiety disorders”[tw] OR “post-traumatic stress disorder”[tw] OR “post-traumatic stress disorders”[tw] OR “posttraumatic stress disorder”[tw] OR “posttraumatic stress disorders”[tw] OR “ptsd”[tw] OR “panic disorder”[tw] OR “panic disorders”[tw] OR “psychosis”[tw] OR “suicide”[tw] OR “adhd”[tw] OR “attention-deficit hyperactivity”[tw] OR “eating disorder”[tw] OR “anorexia”[tw] OR “bulimia”[tw] OR “disordered eating”[tw] OR “personality disorder”[tw] OR “eating disorders”[tw] OR “personality disorders”[tw]) AND
Primary Care	(“primary health care”[MH] OR “primary health care”[tw] OR “primary care”[tw] OR “primary healthcare”[tw] OR “pediatrics”[MH] OR “pediatrics”[tw] OR “pediatric”[tw] OR “pediatricians”[tw] OR “pediatrician”[tw] OR “general practitioner”[tw] OR “general practitioners”[tw] OR “general practice”[tw] OR “general practices”[tw] OR “general medical practice”[tw] OR “general medical practices”[tw] OR “general medical practitioner”[tw] OR “general medical practitioners”[tw] OR “family practice”[MH] OR “family practice”[tw] OR “family practices”[tw] OR “pediatric primary care”[tw])

Figure 1.
PubMed search string

Intervention

- Study aims: description of study aims
- Intervention target: whom the intervention targeted (e.g. parents, physicians)
- Intervention description: detailed description of the intervention
- Study groups: number of study groups and description of control conditions

Methods

- Study design: description of study design (e.g. randomized controlled trial)
- Recruitment: description of methods for recruiting subjects
- Length of follow-up: amount of time between intervention and final follow-up

Bias Assessment

- Selection bias:
  - Sequence generation: how subjects were randomized to study groups
  - Allocation concealment: how allocation was concealed from subjects and staff
- Performance bias:
  - Subject and staff blinding: how subjects and staff were blinded to study group allocation
  - Outcome assessment blinding: how staff assessing outcomes were blinded to allocation
- Attrition bias:
  - Incomplete outcome data: how missing outcome data were handled in analyses and whether there were important imbalances in missing data between groups
- Reporting bias:
  - Selective reporting: whether all pre-specified outcomes were reported in pre-specified way

Participants

- Sample size: number of subjects included in the analysis
- Participation rate: percentage of eligible subjects included in the analysis
- Group size: numbers of subjects allocated to each study group
- Setting: description of study setting (e.g. hospital-based pediatric primary care center)
- Inclusion criteria: criteria for inclusion in the study
- Exclusion criteria: criteria for exclusion from the study
- Age of subjects: average age and age range of subjects included in the study
- Sex of subjects: percentage of male and female subjects
- Race/ethnicity: race/ethnicity by percentage of sample
- Country: country in which the study was carried out
- Year: year in which study was carried out

Results and Conclusions

- Outcome measures: description of each outcome measure collected
- Results: results of each outcome measure in terms of the differences between study groups
- Authors' conclusions: key conclusions of study authors

Figure 2.

Variables for which data were sought from studies included in the review

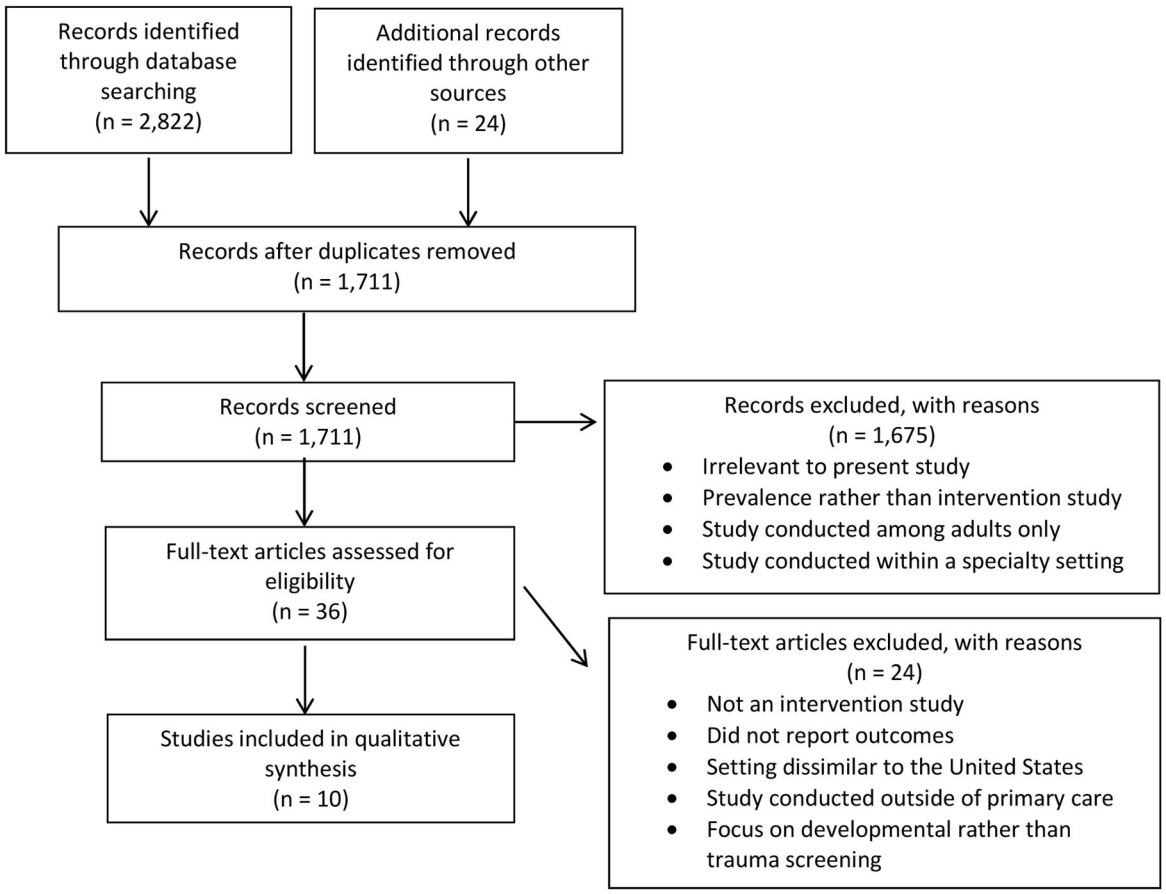

Figure 3.

Table 1

Intervention studies of child traumatic stress conducted in pediatric primary care settings, grouped by provider and patient (parents and/or children) outcomes

Study	Subjects	Duration of follow-up	Aim of study	Study Design	Intervention Description	Control Condition Description	Principal Outcomes Measured	Conclusion of study
Provider Outcomes								
Berg et al 1983	2nd-year pediatric residents (n = 11) in the Phoenix Hospitals Affiliated Pediatric Program	1–2 years	To study an 8-week rotation to increase knowledge, attitudes, and competence for pediatric residents	Non-randomized controlled trial	Residents examined patients in various settings (ambulatory clinic, psychiatry settings), visited community agencies and had didactic sessions.	A group of 3rd year residents who did not participate in the rotation served as controls (not randomly selected).	Residents' attitudes, feelings of competence, factual knowledge	Rotation was successful in changing attitudes and knowledge
Berger et al 2002	Pediatric residents, continuity clinic faculty, and nurse practitioners (n = 82) at Children's Hospital of Pittsburgh	2 months	To study whether an intervention would result in provider changes in screening for domestic violence (DV), identifying DV, and awareness of resources to address DV.	Pre-test/post-test	Didactic session on DV; DV articles and local DV resources; DV posters throughout the clinic; an additional session with a role play about how to ask parents and adolescents about DV	N/A	Clinicians' knowledge, attitudes, and screening practices	It is possible to improve the frequency of routine DV screening among PCPs and pediatric staff.
Dubowitz et al 2011 Dubowitz et al 2012 Feigelman et al 2009	Health professionals at 18 University of Maryland-affiliated private pediatric practices (n=95)	1 year	To evaluate the effectiveness of the SEEK model in reducing child maltreatment in a suburban, middle income population	Cluster randomized controlled trial	The SEEK model consisted of primary care professionals training, the PSQ to screen parents for targeted risk factors, and a social worker to provide guidance, support, and referrals.	Practices assigned to the control condition received no training and provided standard care to subjects.	Attitudes, knowledge, feelings of competence, clinical practices	The SEEK model shows promise as a method of facilitating providers' adoption of screening and referral practices
Feigelman et al 2011	Resident physicians (n = 95) in primary care continuity clinics in a low-income urban area	18 months	To evaluate the impact of the SEEK training model in pediatric residents and the families they care for.	Cluster randomized controlled trial	Residents were trained to identify psychosocial risk factors, use the PSQ screen, and work collaboratively with a social worker.	Residents assigned to the control group received no training and were not given SEEK materials. They were provided access to a human services worker.	Attitudes, knowledge, feelings of comfort, feelings of competence, clinical practices, parental satisfaction	Training improved resident comfort and perceived competence; small improvements in knowledge among parents, no difference in physical punishment
Forbes et al 2010	Allied and primary care health practitioners (n = 342) working in bushfire zones in Australia	0 – 3 months	To study the impact of "Skills for Psychological Recovery" modules for use by allied and primary care practitioners	pre-test/post-test	Health care workers were trained to use the "Skills for Psychological Recovery" manualized program, suitable for single or multiple sessions.	N/A	Provider perceptions, evaluation of workshops, use of Skills for Pyschological Recovery program	The workshops were well-received; generalists may need more support to address trauma
Garg et al 2007	Pediatric residents (n = 45) in a large, urban hospital	1 month	To evaluate the feasibility and impact of an intervention to improve the management of family psychosocial topics at well-child care visits at a medical home for low-income children	Randomized controlled trial	Providers were trained on the WE CARE program, administration of the WE CARE screening tool, and given access to a community resource book.	Residents in the control group received no training but were given the WE CARE Family Resource Book.	Provider attitudes about WE CARE	The We Care model was shown to be feasible in pediatric primary care in terms of provider comfort and duration of the patient visit.

Study	Subjects	Duration of follow-up	Aim of study	Study Design	Intervention Description	Control Condition Description	Principal Outcomes Measured	Conclusion of study
Ishizaki et al 2005	Pediatricians (n = 418) practicing throughout Japan	1 year	To study the impact of disseminating a handbook for child psychosomatic disorders to pediatricians in Japan	Post-test	Providers were given a handbook with chapters on a wide range of mental health and behavioral issues.	N/A	Provider-reported handbook use, perceptions about usefulness, provider changes in thoughts and behaviors	Those with prior training used the handbook more but there was overall impact in PCP attitudes
Patient (parents and/or children) Outcomes								
Borowsky et al 2004	Children ages 7 – 15 and their parents (n = 224) attending pediatric outpatient clinics in Minneapolis and St. Paul	9 months	To evaluate the effectiveness of a primary care-based intervention directed at youths and their parents to reduce violence involvement and violence-related injuries	Randomized controlled trial	Children were screened with the PSC and the PCP was given the results to discuss with parents. The Positive Parenting program was available for parents.	PCPs were not given the results of the PSC for control group subjects.	Child and parent-reported CBCL scores (aggressive behavior), prevalence of bullying and being bullied	Psychosocial screening in primary care can result in decreases in injury and aggressive behaviors among children.
Dubowitz et al 2009	Parents of children ages 0 – 5 years (n = 558) attending a resident-led pediatric primary care clinic in an urban, low-income setting	3 – 4 years	To evaluate the effectiveness of the SEEK model in reducing child maltreatment in a high-risk population.	Randomized controlled trial	The SEEK model consisted of resident training, the PSQ to screen parents for targeted risk factors, and a social worker to provide guidance, support, and referrals.	Control group subjects received standard care.	Maltreatment rates determined by child protective services reports, child's medical chart, and the Parent-Child Conflict Tactics Scale	The SEEK model showed promise as a practical strategy in primary care for helping prevent child maltreatment.
Dubowitz et al 2011 Dubowitz et al 2012 Feigelman et al 2009	Mothers of children ages 0 – 5 years (n = 1,119) attending the practices	1 year	To evaluate the effectiveness of the SEEK model in reducing child maltreatment in a suburban, middle income population	Cluster randomized controlled trial	The SEEK model consisted of primary care professionals training, the PSQ to screen parents for targeted risk factors, and a social worker to provide guidance, support, and referrals.	Practices assigned to the control condition received no training and provided standard care to subjects.	Child maltreatment determined by the Parent-Child Conflict Tactics Scale, children's medical records, and child protective services reports	The SEEK model shows promise for preventing child maltreatment in a low-risk population
Garg et al 2007	Parents of children aged 2 months to 10 years (n = 200) attending the pediatric clinic	1 month	To evaluate the feasibility and impact of an intervention to improve the management of family psychosocial topics at well-child care visits at a medical home for low-income children	Randomized controlled trial	Providers were trained on the WE CARE program, administration of the WE CARE screening tool, and given access to a community resource book.	Residents in the control group received no training but were given the WE CARE Family Resource Book.	Rates of discussion and referral for family-level psychosocial problems at well-child care visits	The We Care model resulted in more discussion of psychosocial issues and more referrals during primary care visits
McFarlane et al 2005	Women with children between the ages of 18 months and 18 years (n = 233) attending Women, Infants, and Children clinics in a large, urban city	2 years	To evaluate whether a nurse case management program offered to abused mothers positively affects the behaviors of their children	Randomized controlled trial	The intervention group received abuse assessment, a wallet-size referral card, and nurse case management	The control group did not receive nurse case management but did receive abuse assessment and a wallet-size referral card.	Children's internal, external, and total behavioral problems	nurse case management did not improve CBCL scores

Table 2

Types of Interventions Evaluated

Study	Screening Use	Didactic Training	Experiential Training	Social Worker	Link to community services	Telephone-based parenting program	Handbook	Nurse case management	Referral card/ Handout	Office posters
Berg et al 1983		X	X							
Berger et al 2002		X	X		X					X
Borowsky et al 2004	X					X				
Dubowitz et al 2009	X	X		X					X	
Dubowitz et al 2011 Dubowitz et al 2012 Feigelman et al 2009	X	X		X					X	
Feigelman et al 2011	X	X		X					X	
Forbes et al 2010		X					X		X	
Garg et al 2007	X	X			X				X	
Ishizaki et al 2005							X			
McFarlane et al 2005	X							X	X	
Total	6	7	2	3	2	1	2	1	6	1

Table 3

Bias Risk Assessment (Low = low risk of bias) in randomized trials

	Key outcomes measured	Sequence Generation	Allocation Concealment	Subject/Staff Blinding	Outcome Assessment Blinding	Incomplete Outcome Data	Selective Reporting
Randomized Controlled Trials							
Borowsky, et al. 2004	CBCL scores	Low	High	High	High	Low	Low
Dubowitz, et al. 2009	Child maltreatment	Low	Low	Unclear	Unclear	Unclear	Low
Dubowitz, et al. 2011	Child maltreatment	Low	Low	Low	Low	Low	Low
Feigelman, et al. 2011	Resident self-assessment	Low	Low	Low	High	Low	Low
Garg, et al. 2007	Psychosocial topics discussed, referrals	Low	Low	Unclear	Unclear	Unclear	Low
McFarlane, et al. 2005	CBCL scores	Low	Low	Low	High	High	Low
Observational Studies							
Berg, et al. 1983	Perceived feelings of competence, attitudes, factual knowledge	n/a	n/a	n/a	n/a	Low	Low
Berger, et al. 2002	Knowledge, attitudes, screening practices	n/a	n/a	n/a	n/a	Low	Low
Forbes, et al. 2010	Perceptions of protocol, provider confidence	n/a	n/a	n/a	n/a	Low	Low
Ishizaki, et al. 2005	Frequency of handbook use, perceptions, clinical behavior	n/a	n/a	n/a	n/a	Unclear	Low

Table 4

Principal study outcomes grouped by provider and patient (parents and/or children) outcomes

Study	Outcome 1	Outcome 2	Outcome 3
Provider Outcomes			
Berg et al 1983	Residents' attitudes towards retardation, enuresis, physical handicaps, Down's syndrome, bereavement, gynecology, deafness, and encopresis were significantly improved post-intervention ($p<0.05$).	Residents' feelings of competence in the areas of physical handicaps, gynecology, hyperactivity, learning disabilities, enuresis, deafness, and childhood depression were significantly improved post-intervention ($p<0.05$).	Residents' factual knowledge scores improved significantly post-intervention ($p<0.005$).
Berger et al 2002	Knowledge of mandated reporting did not change significantly post-intervention among staff or trainees but did improve among interns (percentage giving correct answer increased from 64% to 100%, $p<0.001$).	No change in attitudes about role of pediatrician in discussing domestic violence (DV), comfort with talking about DV with patients, or having enough time to screen for DV. Clinicians and staff were more likely to report being aware of resources for DV victims: mean difference of 0.72, 95% confidence interval (0.46, 0.98), $p<0.001$.	No change in screening practices among clinicians and staff who attended just 1 training session. Percentage of clinicians and staff who routinely screened increased from 21% to 46% among those who attended 2 training sessions: difference of −0.25, 95% CI (−0.43, −0.08), $p<0.005$.
Dubowitz et al 2011 Dubowitz et al 2012 Feigelman et al 2009	No difference between intervention and control groups on provider-reported knowledge, attitudes, practice behavior, and comfort discussing intimate partner violence and substance abuse with patients. Significant difference between groups on comfort level ($p<0.05$), perceived confidence ($p<0.01$), and comfort discussing depression ($p=0.051$) and stress ($p<0.05$) with patients.	Significant difference between intervention and control groups based on medical chart review in improvement in screening for depression ($p<0.0001$), intimate partner violence ($p<0.0001$), substance abuse ($p<0.0001$), and stress ($p<0.0001$).	No difference between groups based on observations of medical visits in improvement in screening for stress. Significant difference between groups in improvement in screening for depression ($p<0.0001$), intimate partner violence ($p=0.0002$), and substance abuse ($p=0.0002$)
Feigelman et al 2011	Significant difference between intervention and control group residents in improvement of self-assessment on depression ($p<0.01$), intimate partner violence ($p=0.03$), and stress ($p=0.04$). Significant difference between groups in the opposite direction in improvement of self-assessment on corporal punishment ($p=0.02$).	Significant difference between groups according to medical chart review in screening for maternal depression ($p<0.001$), intimate partner violence ($p<0.001$), parental substance abuse ($p<0.001$), corporal punishment ($p<0.001$), stress/social support ($p<0.001$), and food insecurity ($p<0.001$).	Parents of children seen by intervention group residents were significantly more satisfied with their child's doctor (score 17.4) than were control group parents (score 16.9)($p<0.01$) at first visit. No difference between groups at 6-month follow-up.
Forbes et al 2010	At baseline, 32% of providers agreed or strongly agreed that evidence-based treatments do not allow for clinical judgment and 20% agreed or strongly agreed that would not wish to use a manualized treatment program.	The workshop was rated as a positive experience on most items, with scores ranging from 2.08 to 3.48 on a 4-point scale.	46% of log sheets returned by providers indicated that they had used Skills for Psychological Recovery among bushfire victims and 54% indicated the program had been used among victims of other traumatic events.
Garg et al 2007	100% of residents reported feeling comfortable with receiving the WE CARE survey from parents.	77% of residents reported believing that conducting the WE CARE survey did not increase the duration of the visit.	90.9% of residents said that conducting the WE CARE survey resulted in the addition of less than 5 minutes to the patient's visit and 54.5% said that less than 2 minutes were added to the visit.
Ishizaki et al 2005	66.7% of providers said that they used the handbook at least once or twice per 2 or 3 months.	63.2% of providers said that the handbook was at least relatively useful.	34% of providers with limited training in children's psychosomatic issues said their thoughts and behaviors about children's psychosomatic disorders had changed (8% among trained providers).
Patient (parents and/or children) Outcomes			
Borowsky et al 2004	No difference between intervention and control groups in child-reported aggressive behavior. Significant difference at follow-up between groups in parent-reported aggressive behavior ($p=0.005$).	No difference between intervention and control groups in parent's report of their child being bullied or in child's report of bullying, either bullying or being bullied, physical fighting, or attitude toward violence. Significant	

Study	Outcome 1	Outcome 2	Outcome 3
		difference at follow-up between groups on parent's report of	their child bullying other children (p<0.001), either bullying or being bullied
		difference at follow-up between groups on parent's report of	their child bullying other children (p<0.001), either bullying or being bullied
		difference at follow-up between groups on parent's report of	their child bullying other children (p<0.001), either bullying or being bullied
		difference at follow-up between groups on parent's report of	their child bullying other children (p<0.001), either bullying or being bullied
		difference at follow-up between groups on parent's report of	their child bullying other children (p<0.001), either bullying or being bullied
Dubowitz et al 2009	There were significantly fewer instances of child abuse and neglect among intervention group children (13.3%) compared to control group children (19.2%) at follow-up: odds ratio 1.5, p=0.045.	There were significantly fewer instances of possible neglect among intervention group children compared to control group children based on review of child's medical records (data not reported).	No difference between intervention and control groups on parent reported nonviolent discipline, psychological aggression, or minor physical assault. Significant difference between groups on parent reported severe or very severe physical assault: mean 0.11 vs. 0.33, p=0.04.
Dubowitz et al 2011 Dubowitz et al 2012 Feigelman et al 2009	There were significant differences between intervention and control groups at 12-month follow-up on psychological aggression (effect estimate −0.12, 95% CI −0.24, −0.002, p=0.047) and minor physical assault (effect estimate −0.14, 95% CI −0.28, −0.005, p=0.043).	No significant difference between groups on abuse or neglect-related problems documented in children's medical records.	No significant difference between groups on child protective services reports for neglect or physical abuse.
Garg et al 2007	More psychosocial topics were discussed at well-child care visits among intervention group families (mean 2.9) than among control group families (mean 1.8) (p<0.01).	Intervention group parents received significantly more referrals than control group parent (mean 1.15 vs. 0.24, p<0.001).	
McFarlane et al 2005	No significant difference between intervention and control groups on internal behavior problems.	No significant difference between groups on external behavior problems.	No significant difference between groups on total behavior problems.