Impact, psychological sequelae and management of trauma affecting children and adolescents

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Purpose of review

In this review we examine the most recent literature on the impact, psychological sequelae and management of trauma affecting children and adolescents. We focus on consequences of early traumatic events in childhood, adolescence and adulthood; mediating variables (risk and protective factors); intervention strategies and available treatments.

Recent findings

Increasingly often, mental health professionals are being asked to address the needs of children and adolescents who have been exposed to traumatic events, either as individuals or in groups. Studies on a wide range of age groups, populations and types of trauma revealed that traumatized children and adolescents are at high risk for developing a range of different behavioural, psychological and neurobiological problems. Social support may have a protective effect on the relationship between exposure to traumatic events and psychosocial symptoms.

Summary

Several recent studies analyze a wide range of early traumatic events that may be directly or indirectly experienced by youth. These studies raise many fundamental questions such as validity of current diagnostic criteria for post-traumatic stress disorder, comorbidity with anxiety, depressive disorders and childhood traumatic grief symptoms. Vulnerability and protective factors, mainly gender, age and social support are considered. A common problem in research into the impact of trauma on children is the presence of many limitations: studies are often retrospective, use self-report questionnaires and the results may not be generalizable (i.e. they are trauma or population specific). There is a lack of well designed studies, addressing in particular treatments for post-traumatic symptoms in children and adolescents.

Keywords

adolescents, children, post-traumatic stress disorder, psychological trauma

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Abbreviations

CBT	cognitive–behavioural therapy
CSA	child sexual abuse
CTG	childhood traumatic grief
HPA	hypothalamic–pituitary–adrenal
PTSD	post-traumatic stress disorder
SIB	self-injurious behaviour

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Introduction

In the wake of recent natural and man-made disasters, and acts of violence there is growing interest in the impact of traumatic events on children and youths. Some victims do organize, adapt and recover in a surprising manner, despite the traumatic experience they have lived through or witnessed; individual protective factors, as well as parental/social support, may help children to recover, thereby preventing severe psychosocial impairment. Nevertheless, a significant proportion of youths exhibits developmental disorders and substantial levels of impairment in their daily lives.

Over the past 20 years, empirical and theoretical understanding of the effects of childhood trauma on various developmental domains (e.g. biology, cognition, self-development and attachment) has grown considerably. What is less clear from the existing research is the extent to which psychopathology interferes with children's daily lives and functions, or whether the symptoms may be considered 'normal' reactions to abnormal events. Another open question concerns the psychobiological mechanism of vulnerability. Given the potential long-term effects of trauma on children and adolescents, mental health professionals must be careful to assess children's pre-existing levels of psychopathology as well as their functioning after trauma.

We searched two computerized scientific literature databases most relevant to psychiatry and psychology (Medline, PsycInfo) from 2004 up to February 2005. The search includes the following terms and combinations of terms: 'post-traumatic stress disorder', 'psychological trauma' and 'children and adolescents'. We downloaded all bibliographic records generated from the search and duplicate records were identified and removed. After the search was completed (345 articles), we selected relevant abstracts. The criteria for inclusion

of abstracts were as follows: it was published in a scientific journal; it included original data or review; and it evaluated impact, sequelae and/or intervention programs. An abstract could be excluded if the inclusion criteria or the same criteria used in the first assessment of relevance were not met. A total of 171 abstracts, including some in languages other than English, were suitable for review. The most relevant articles were analyzed and are described here.

Impact and psychological sequelae

Recent studies analyze the impact and psychological effects of a wide range of traumatic events, such as community violence, natural and man-made disasters, child abuse and maltreatment, road traffic accidents, and exposure to medical illnesses and death.

Much of the recent research lends support to the association between exposure to community violence and symptoms of post-traumatic stress [1,2•]. In a sample of 349 adolescents from nine US middle schools, 76% reported witnessing or being victimized in at least one violent event in the prior 3 months. More exposure to violence was associated with more self-reported post-traumatic stress disorder (PTSD) and depression [3]. Similarly, Seedat *et al*. [2•] found that more than 80% of a sample of 2041 Kenyan adolescents reported exposure to violence, either as victims or witnesses. Only 5% of the sample developed symptoms of full PTSD, and 8% developed symptoms of partial PTSD.

Children and adolescents exposed to war and terrorism are at high risk for a broad range of traumatic events and psychosocial consequences [4•,5••,6•]. War is frequently associated with injuries, death of family members, imprisonment, and refugee or child soldier status. Exposure to war is not found to have a unique association with PTSD but also with depression [7••]. Among Palestinian children, PTSD was mainly predicted by the experience of anxiety in the home environment [8•]. In a sample of Ugandan child soldiers, neither age nor sex appeared to be related to PTSD, but in girls the death of the child's mother was found to increase the score for avoidance symptoms [9••]. Anxiety, depression, anger and violence are also associated with refugee status. Reactions to stress in refugee children may be mediated by coping strategies, belief system and social relations [5••]. Many effects of terrorism are similar to those of natural and man-made trauma. However, terrorism appears to have specific features; terrorist attacks are unpredictable, imply an indefinite threat and may have a profound effect on adults and communities [6•].

The bulk of the existing research on the psychological impact of early traumatization is focused on child abuse and maltreatment, which may lead to a heterogeneity in consequences that compromises the quality of individual adaptation at different levels of competence. Abused and maltreated children are at risk for PTSD [10•], self-injurious behaviours (SIBs) [11•], alexithymia [12], mood disorder [13], substance abuse disorder [13,14], sexual behaviour problems [15], positive psychotic symptoms [16], psychological dissociation [17] and somatoform dissociation [18].

In one study [10•], 109 adolescents who had been sexually abused (e.g. sexual touching, kissing, breast or genital fondling, attempts at penetration and penetration) by an intrafamiliar or an extrafamiliar perpetrator were recruited shortly after disclosure of the abuse. Among them, 50% were diagnosed with PTSD and approximately 33% were asymptomatic. Some studies [10•,17] do not support the idea that intrafamiliar (as compared with extrafamiliar) abuse leads to more severe consequences and higher levels of distress.

In a cross-cultural comparison of four post-communist bloc countries [19], incidence rates for emotional and physical abuse and trauma symptoms were found to be influenced by sociocultural traditions, whereas a similar association was found between abuse and psychosocial symptoms.

According to a developmental psychopathology framework, Yates [11•] clarified the widely observed association between childhood trauma (maltreatment) and SIBs. Over time, SIB emerges as a compensatory, regulatory and relational strategy to facilitate young people's negotiation of developmental challenges despite their vulnerabilities. The relationship between childhood maltreatment and SIB was suggested to be mediated by alexithymia [20]. Difficulties in expressing emotions may place children at increased risk for developing SIBs as a way of expressing emotional pain and distress.

Child physical abuse and child sexual abuse (CSA) are distal risk factors for development of psychosocial problems in adolescence and adulthood. Deterioration of interpersonal resources (reduced capacity for relying upon interpersonal coping resources, isolation and deterioration of support systems), adult re-victimization (e.g. rape) [21], and physical and sexual victimization (especially by intimate partner) [22] are secondary traumas that may influence the development of PTSD in adulthood. Child maltreatment is also a distal risk factor for adolescent dating violence, and trauma-related symptoms have been found to be a significant mediator in this relationship [23••,24].

Some populations, such as homeless adolescents [25] and juvenile offenders [26•,27••,28,29], have been shown to experience particularly high rates of early trauma

(e.g. physical, sexual abuse and violent crime). As a consequence, they exhibit high rates of PTSD. A link between trauma exposure, psychological disorders and antisocial behaviour has been suggested [27••].

Some recent reports concluded that road traffic accidents may have psychological and behavioural consequences for children [30,31]. Children exposed to road traffic accidents may also experience some positive effects, termed 'post-traumatic growth', related to perception of self, interpersonal relationships and change in life priorities [32].

A clear association between childhood medical illness and post-traumatic stress symptoms in children and families has been found in many studies [33–35].

Studies of the impact of traumatic events on children and adolescents, across a wide range of populations and types of trauma, have shown that the psychopathological consequences are mainly PTSD, anxiety, depressive symptomatology and impairments in psychosocial functioning [36••]. Acute stress disorder was not found to be predictive of later PTSD, but the severity of acute stress disorder and PTSD symptoms does appear to be associated [37•].

In recent years, researchers have questioned the validity of the existing classification of symptoms of PTSD. Some authors have suggested an alternative set of criteria for PTSD for preschool children [38]. Others, according to more generalized findings in adult samples [39], have questioned the diagnostic validity of avoidance and numbing as a unified symptom cluster in a sample of homeless adolescents [25]. The nosology of PTSD was also challenged by high rates of comorbidity with depression, which raises a question about whether depression and PTSD are truly distinct syndromes or different aspects of the same phenomenological spectrum of a single trauma-related psychiatric syndrome.

In a longitudinal study of adolescents bereaved following a peer suicide [40•], a cluster of symptoms that correspond to childhood traumatic grief (CTG) was identified. These symptoms (yearning, crying, numbness, preoccupation with the deceased, functional impairment and poor adjustment) prevent children from successfully addressing the normal tasks of grieving. Traumatic grief was found to be independent of depression and PTSD, despite the high comorbidity with depression.

Neurobiological effects and psychophysiological correlates

As important as understanding the occurrence of psychopathology is understanding the neurobiological [41] and psychophysiological correlates of trauma. Much attention is given to alterations in the hypothalamic–pituitary–adrenal (HPA) axis. Similar to the adult population, findings (arising from extensive and clear reviews) concerning cortisol levels in PTSD are variable [42••]. In children a positive association has been found [43] between low initial urinary cortisol and adrenaline level and the development of PTSD symptoms, even when controlling for gender, parental income and, most interestingly, for depression.

The hypothesis that the alteration in the HPA axis that occurs in PTSD relies on enhanced sensitivity of glucocorticoid receptors in the pituitary has been tested through dexamethasone suppression testing [44]. Post-test levels of adrenocorticotrophic hormone were significantly lower in sexually abused adolescent inpatients with PTSD than in hospitalized control individuals. Interestingly, no association was found between hormonal and clinical parameters (e.g. age of trauma, time elapsed since, chronicity and severity of symptoms, history of multiple traumatic events, depression and anxiety). The authors hypothesized that hypersensitivity to glucocorticoid might already be present before trauma, and that it might represent a compensatory mechanism to protect the central nervous system from chronic elevated cortisol levels. Through this mechanism, severe stress in early life could create in adulthood a greater vulnerability to major depression as well [45]. A similar study [46] was conducted in a population of adult survivors of child abuse. Trauma appears to influence the HPA axis through its resultant psychiatric consequences, and the question of the effective nosologic distinction between major depressive disorder and PTSD is raised.

The presence of morphological correlates of alterations in the HPA axis have been studied using magnetic resonance measures of pituitary volume [47]. Although no overall differences were seen between young people with PTSD ($n = 61$) and matched control individuals ($n = 212$), pituitary volumes appeared to be larger in pubertal/postpubertal patients with PTSD than in control individuals. Larger volumes were also found in PTSD patients with suicidal ideation. This study does not differentiate whether the effects result directly from the trauma or are mediated by PTSD.

In an imaging and neuropsychological study conducted in women survivors of child abuse [48], no difference in hippocampal volume and memory performance was found between individuals with PTSD, those exposed to trauma but without PTSD, and control individuals. In contrast, another study [49] found that PTSD after early childhood abuse is associated with deficits in verbal declarative memory, suggesting a possible alteration in the hippocampus.

Scheeringa *et al.* [50•] supported the notion that a traumatic experience (such as an automobile collision, domestic violence and invasive medical procedures) has an effect on individual psychophysiological reactivity regardless of PTSD. Compared with the nontraumatic group, even minimally symptomatic children, aged 20 months to 6 years, exhibited decreased heart period (interbeat interval derived from electrocardiographic data) in response to a trauma stimulus. The second main result was that children with higher levels of symptomatology and with the least parental discipline exhibited the greatest decrease in respiratory sinus arrhythmia during the trauma stimulus.

Trauma, vulnerability and protecting factors

A common finding of disaster studies is that the severity of PTSD is related to the degree of proximity to danger, injury and death – a phenomenon known as the 'exposure effect'. In a sample of 178 children who were exposed to the Athens earthquake of 1999, PTSD and anxiety were found to be significantly related to proximity to the epicentre, exposure to threat and female gender [51•]. Little is known about the long distance effects of natural and man-made disasters. A recent study [52•] examined the impact of September 11, 2001 on 171 adolescents residing 3000 miles from Ground Zero. Many adolescents, even if distant from the disaster site, reported changes in everyday life activities and signs of distress. The authors suggest that there is a need to provide supportive services for adolescents who are exposed to major tragedies, even when they are distant from the disaster site or when their exposure is based on media reports.

An interesting interaction between age and degree of proximity to a natural disaster has been found. Children in a younger age group were more severely affected by direct exposure to the effects of an earthquake, whereas older children who lived in the furthest and least damaged area exhibited greater symptomatology due to indirect exposure such as television reports [51•].

A developmental perspective suggests that there are age-related and gender-related vulnerabilities for psychiatric disorders. The literature supports the notion of heightened vulnerability to PTSD in girls; female gender appears to be an independent risk factor for the development of PTSD following CSA. There are also gender differences in the biological correlates and psychiatric sequelae of CSA [53]. Another study evaluated the age dependency hypothesis of the effects of trauma in a sample of 498 women who had experienced at least one early traumatic event [54]. It found that the risk for developing major depressive disorder was higher if traumatization occurred before age 13 years.

Many studies have explored the role of family environment and parent–child interactions, both as risk and protective factors with regard to the impact of traumatic events. Although the bulk of the research has highlighted the positive effects of family and social support [3,55,56], Paxton [1] suggested that social support (i.e. support from peers, family members and other adults) does not buffer the negative psychological sequalae of community violence.

Treatment

Child abuse is one of the most studied traumatic events in childhood and adolescence. A well designed study [57••] described a two-site controlled trial comparing the differential efficacy of two cognitive–behavioural therapy (CBT) treatments for 203 sexually abused children with PTSD or related emotional/behavioural problems. The first type of treatment was a well structured 'trauma-focused cognitive–behavioural therapy'. In the second, the 'child centred therapy', children and parents were encouraged to direct the content and timing of the sessions and to formulate their own personal strategies. Children who received trauma-focused CBT exhibited significantly greater improvements than did those who received child-centred therapy in terms of measures of PTSD, depression, shame, abuse-related attributions and behaviour problems. Similarly, parents assigned to trauma-focused CBT reported significantly greater improvements with respect to their levels of depression, abuse-related distress, parental support and parenting practices. A major limitation of this study is the lack of a nontreatment control group. In another study [58•] an integrated CBT parent–child approach for child physical abuse is offered both to the offending and to the non-offending parent. Including the child in the treatment may improve the outcome, as a result of the family acquiring and using positive disciplining strategies and developing positive parent–child interactions. However, particular attention should be paid to parent and child readiness to participate in the joint sessions.

Treatments for traumatic sequelae of war and terrorism are increasingly frequently described in the literature. In an interesting preliminary study [59], a mind–body technique was used in 139 high school students in Kosovo. Symptoms of post-traumatic stress, as measured using the PTSD Reaction Index, decreased after participation in the programme, but there was no control group. Research on mass trauma and terrorism emphasizes that there is great unmet need for large-scale programmes of screening and effective interventions [55,56]. After 9/11, 10% of New York children received some kind of counselling (through schools, medical systems or other sources) but it is estimated that only 27% of those who needed effective support for severe or very severe post-traumatic stress reactions received counselling services [60•]. This finding

raises the problem of children's access to mental health services [61]. Following the World Trade Center attack, schools were considered to be useful bases for screening, prevention and assessment programmes, and worked as settings for trauma-specific interventions [62].

Trauma in children and adolescents may also be represented by severe medical conditions or illnesses. Melnyk *et al.* [63••] obtained positive long-term effects with a preventive educational–behavioural intervention programme for mothers of children who were unexpectedly hospitalized in paediatric intensive care units. Post-traumatic stress symptoms in adolescent survivors of cancer and in their families were the target of a 1-day intervention comprising mixed CBT and family therapy [64]; some of the results from this randomized waiting list controlled trial were biased by the high percentage of nonrandom dropout in the treatment group.

Increasing attention has been paid to CTG and to its treatment. A CBT treatment for bereaved children and parents yielded good results in terms of relieving PTSD, CTG, anxiety, depression and behavioural symptoms [65••]. Interestingly, trauma symptoms appeared to improve only during the first (trauma-focused) part of the treatment, whereas CTG improved during both the trauma-focused and grief-focused components. The authors stated that it is important to include both the trauma-focused and the grief-focused treatment components, and that trauma-specific intervention should be provided first.

Until now, no conclusive randomized controlled studies of pharmacotherapy in treating PTSD in youths are available. Despite this, selective serotonin reuptake inhibitors and α-adrenergic agonists appear to be used widely in clinical practice [66] and, recently, clozapine was reported as useful for treatment-resistant adolescents with PTSD and psychotic symptoms [67].

Conclusion

Recent research has supplemented our understanding of the impact of traumatic events on children and adolescents, raising interesting questions about the DSM-IV criteria for PTSD risk and protective factors, sequelae and treatment strategies. Early traumatic events can have significant behavioural and psychological consequences. There is a growing awareness that individual experience and recovery from trauma may vary as a function of various factors, including gender, age, and family and social support. Although most studies on the effects of trauma on mental health have focused on PTSD, increasing attention has been given to other psychopathologies, mainly depression and anxiety, and psycho-functional impairment. It is now clear that in childhood as well as in adulthood, adverse early experiences can be associated with neurobiological and functional changes. Nonetheless, further research is needed to clarify whether these changes represent a consequence or a substrate for vulnerability to stress. Given the high prevalence of subclinical PTSD and its comorbidity with depression and anxiety disorders, researchers have also questioned the validity of the existing classification of PTSD symptoms as applied to children and adolescents. Thus far, only a few studies have supported the efficacy of CBT for traumatized children and adolescents [68••]. There is a dramatic lack of randomized controlled studies in the field of treatment.

An important issue in research into the impact of trauma on children is represented by the limited generalizability of findings, which are often trauma, population and culture limited. More investigations are needed with better methodological designs that address psychological sequelae and management of the impacts of trauma. Moreover, much of the current research remains pathology driven, with only a few studies focusing on resilience and protective factors in young poeple. Strategies for fostering well-being should be tested in the future.

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